



TURAS

TRANSITIONING TOWARDS URBAN
RESILIENCE AND SUSTAINABILITY

D1.1 G-ICT based Inventory



DOCUMENT PROPERTIES

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Task Leader	UCD
Authors	Zorica Nedović-Budić, UCD. Aoife Corcoran, UCD.
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1. Introduction

1.1. The scope of the deliverable

Deliverable 1.1) G-ICT based inventory: First version of framework and tools for G-ICT based inventory, analyses, management and communication specific to each of the WPs 2-6

Deliverable 1.1 is directly related to Task 1.2 of the Description of Work: Survey, and Task 1.3: System Development and Access.

Task 1.2 is a survey questionnaire of all partner cities about “digital spatial data they would need (and possibly have) to accurately represent the case study areas at the neighbourhood or other pertinent level selected as for testing the results of the TURAS project”.

The scope of this deliverable is to:

- Identify the necessary datasets by type, scale, availability, accuracy, format and accessibility.
- Identify the particular data needs, approaches and procedures to support the specific functional and analytical requirements for each WP2-6.
- Establish a common lexicon and mutual understanding of the common needs for spatial data resources and analytical functions.
- Finalise the plans for development of the support framework for specific project management and communication needs.

Task 1.3 is the acquisition of spatial and other associated datasets from each partner and integrated using open source software.

The scope of this deliverable is to:

- Obtain spatial and other associated datasets from each partner and integrate them using open source software.
- Develop an internet-based GIS facility to provide easy access to the project data, analytical, communication and management functions.
- Complement the standard GIS functions with interactive tools for uploading, downloading and exchange of various contents, including spatial data, photographs and textual information.
- To include the latest communication devices such as wikis, tweeters and smart phones.



1.2. Methodology

The following methodology was used in the development of the G-ICT based Inventory:

(i) Survey Design:

- University College Dublin (UCD) was responsible for the design and distribution of the survey questionnaire (see Appendix 1).
- The survey was divided into four core sections:
 - Partner Information
 - Part A. Context general data - spatial data layers,
 - Part B. Project specific digital geospatial database - layers / objects,
 - Open ended questions about systems, geoportals and development.

(ii) Surveying the Partners

- Contact was made with all WP leaders to acquire a list of relevant partners from each case study area who had the ability to complete the survey.
- A list of relevant partners was received.
- The survey questionnaire was distributed to the relevant work package contacts by email in February 2012.
- A copy of the survey was also made available on the WP1 wiki on the TURAS Partner Protected Area (PPA).

(iii) Analysing survey returns

A completed survey was returned by project partners from all 11 TURAS case study areas by March 2012. The results from each survey were compiled and analysed (see Appendix 3). After analysing the data, the data layers which were found to be mostly a) available and b) highlighted as important to include in TURAS webGIS were chosen as the core dataset for the webGIS.

The data layers included:

- Socio-economic data (employment and population)
- Transportation (street network)
- Built environment (building footprint)
- Land Use (general)
- Land Zoning
- Ecosystems/habitats and biodiversity

(iv) Acquiring relevant data

In order to provide a common database for each of the 11 case study cities it was necessary to obtain the spatial and other associated datasets from each partner.

- Using the contact details acquired from the partner information section of the survey questionnaire, emails requesting data were sent in June 2012 to those nominated as contacts for the WebGIS.
- The email request outlined the seven relevant data sets for each of the 11 TURAS cities.
- The initial data acquisition began in June 2012 with a three month deadline of September 2012.
- Data acquisition continued from September 2012 – January 2013 as datasets on boundaries and the outline of each case study area was required.
- The data acquisition was a very slow process and the WP1 team encountered a number of problems which are outlined in table 1.
- All data which was received was sent to and stored by WP1 team in University College Dublin (UCD)
- On completion of the data acquisition process the data was transferred to The GIS research centre, Feng Chia University, Taichung in January 2013

Table 1: Outline of obstacles encountered during data acquisition

Obstacle	Description of obstacles
Communication	<ul style="list-style-type: none"> - Problems with initial communication - misunderstanding of what exactly was required - Summer months slow for the acquisition of data in Europe project partners on holiday (little or no communication from project partners) - Constant communication between WP1 team and project partners required.
Access	<ul style="list-style-type: none"> - Project partner does not hold data needed. Local authority which holds data not project partner – unwilling to give access to data due to resource constraints. - Access to third party data cannot be provided for free - Problems gaining access to internal servers where data is held. - Filling out licence and user agreements. - Transferring of large data sets.
Format	<ul style="list-style-type: none"> - Partners wary of supplying the spatial dataset with the associated information and instead leaned towards providing non-editable copies of the data. - Range of formats received ranged from the requested GIS compatible data to pdf documents and digital images of data.
Scale	<ul style="list-style-type: none"> - Some data not available on Local Administrative Unit 2 (LAU2) scale - Data only available on a regional scale.



Language	- Mismatch of official place names - Defining terms - Data in native language – difficulties with translation
Metadata	- Data received with no metadata

(v) Development of the webGIS platform

- The concept design including contents, functionality and interface was proposed by University College Dublin (see Appendix 2)
- The GIS research centre, Feng Chia University, Taichung and University College Dublin were responsible for the development of the webGIS platform
- Open source software was chosen for the development of the TURAS webGIS platform as it was deemed to have a number of advantages: No software costs, software tools are easy to use, no need to commit to proprietary software, freedom to extend the software with functionality not present in commercial software, compatibility with existing IT infrastructure.
- The first prototype of the TURAS webGIS was made available in October 2012 for the TURAS projects first Annual General Meeting.
- The prototype was reviewed and suggestions for improvements were made.

1.3 Partners Involved

University College Dublin is the lead partner for this task. Over the first 18 months they have been working very closely with the WP leaders, municipalities, project partners and the technical development team in the GIS research centre, Feng Chia University, Taichung in the detailed specification and development of the TURAS G-ICT based inventory.

Input from partners with a working knowledge of GIS has been invited through the development of a small working group. Discussions on the development of the G-ICT based inventory have taken place between UCD, University of Aalborg, University of Rome La Sapienza and University of East London.

2. Initial specification for the TURAS webGIS

There are four principal elements in the TURAS webGIS interactive platform:

- The data
- The internet based GIS facility and functions
- Interactive tools for the uploading, downloading and exchange of various contents.
- Interface with TURAS website

The initial specification for the structure and content of each element is presented hereafter along with a report on work completed to date. An implementation plan for stage 2 is presented in the next section.

2.1 The Data

As described in Task 1.3, spatial and other associated datasets were obtained from each partner and integrated into open source software. The data was collected between June 2012 and January 2013.

Based on the feedback form the survey which was distributed in March 2012, seven themes were selected which were deemed to be a) available b) highlighted by the TURAS partners as being important to include. Table 2 outlines the seven themes which were chosen to comprise the common geographic information systems (GIS) dataset for the participating eleven European Cities.

The acquisition of the datasets was complimented by the acquisition of Metadata for each dataset which was received. Metadata is information describing spatial data sets and spatial data services and making it possible to discover, inventory and use them (INSPIRE Directive, 2007). The Infrastructure for Spatial Information in the European Community (INSPIRE) Directive which came into operation on the 14th March 2007 aims to improve the sharing of spatial data among public administrations and to facilitate public access to these data across Europe. The Metadata was collected in line with the INSPIRE Implementing Rules (IR) on Metadata. The INSPIRE Metadata rules outline the core metadata elements for spatial datasets.

The success of the TURAS webGIS, and in particular its value in fostering interaction with the wider public, will to a large extent depend on the content available through the site. The content for stage 1 and stage 2 is sourced in cooperation with WP partners. The focus for Stage 2 will broaden to include the wider public and those involved in the case study areas.

Table 2: Description of the data themes acquired for the TURAS webGIS

Data theme	Definition of data theme	Source
Socio – economic	Data relating to the interaction of social and economic factors such as population and employment	Stevenson, A. 2010. Oxford Dictionary of English (3 rd Edt). Oxford University Press.Oxford
Transportation / street network	Transportation (air, rail, road) network and street network	
Built Environment	That part of the physical surroundings which are people-made or people-organized, such as buildings and other major structures, such as roads and bridges. Down to lesser objects such as traffic lights.	"European Environment Information and Observation Network (Eionet). General Multilingual Environmental Thesaurus (GEMET) http://www.eionet.europa.eu/gemet/about "
Land Use	The purpose for which each area of land is being utilised.	Park, C. 2007. A dictionary of Environment and Conservation. Oxford University Press.
Land Use Zoning	The segregation of land use into different categories for each type of use e.g agriculture, residential and industrial	Mayhew,S. 2009. A dictionary of Geography. Oxford University Press.
Biodiversity / ecosystems / habitats	<ul style="list-style-type: none"> - A discrete unit that consists of living and non-living parts, interacting to form a stable system. - All aspects of biological diversity, especially including species richness, ecosystem complexity, and genetic variation. - The living place of an organism or community, characterized by its physical or biotic properties 	Allaby, M. 2010. A dictionary of Ecology. Oxford University Press.
Boundaries	The limits or borders of a geographic area under the jurisdiction of some governmental or managerial entity.	"European Environment Information and Observation Network (Eionet). General Multilingual Environmental Thesaurus (GEMET) http://www.eionet.europa.eu/gemet/about "

2.2 Internet based GIS facility and standard functions

The purpose of the interface is to enable visualisation and access to data and tools in relation to case study areas and to facilitate communication and interaction amongst project stakeholders (academic, local authority, SME and community).

The TURAS webGIS provides a basic geographically referenced entry to each of the case study areas from the common selection point on the TURAS web page. The user is directed from a map of Europe to a case study city viewer from here the user can chose to zoom to a TURAS case study area (see figure 1).

Figure 1: Common selection point on TURAS website



The screenshot shows the 'URBAN REGIONS' section of the TURAS website. The page includes a navigation menu with links for HOME, METHODOLOGY, URBAN REGIONS, PARTNERS, and CONTACT US. Below the navigation, there is a section titled 'URBAN REGIONS' with a brief introduction and a list of 12 urban regions participating in the project. The regions are: Aalborg, Belgrade, Brussels, Dublin, Ljubljana, London, Nottingham, Rome, Rotterdam, Seville, Sofia, and Stuttgart Region. A map of Europe is shown on the left, with yellow stars indicating the locations of these regions.

TURAS

HOME METHODOLOGY URBAN REGIONS PARTNERS CONTACT US

URBAN REGIONS

There are 12 urban regions participating in the TURAS project. In this section, we profile the grand challenges facing each urban region in terms of sustainable development and we describe how TURAS will help to address these challenges.

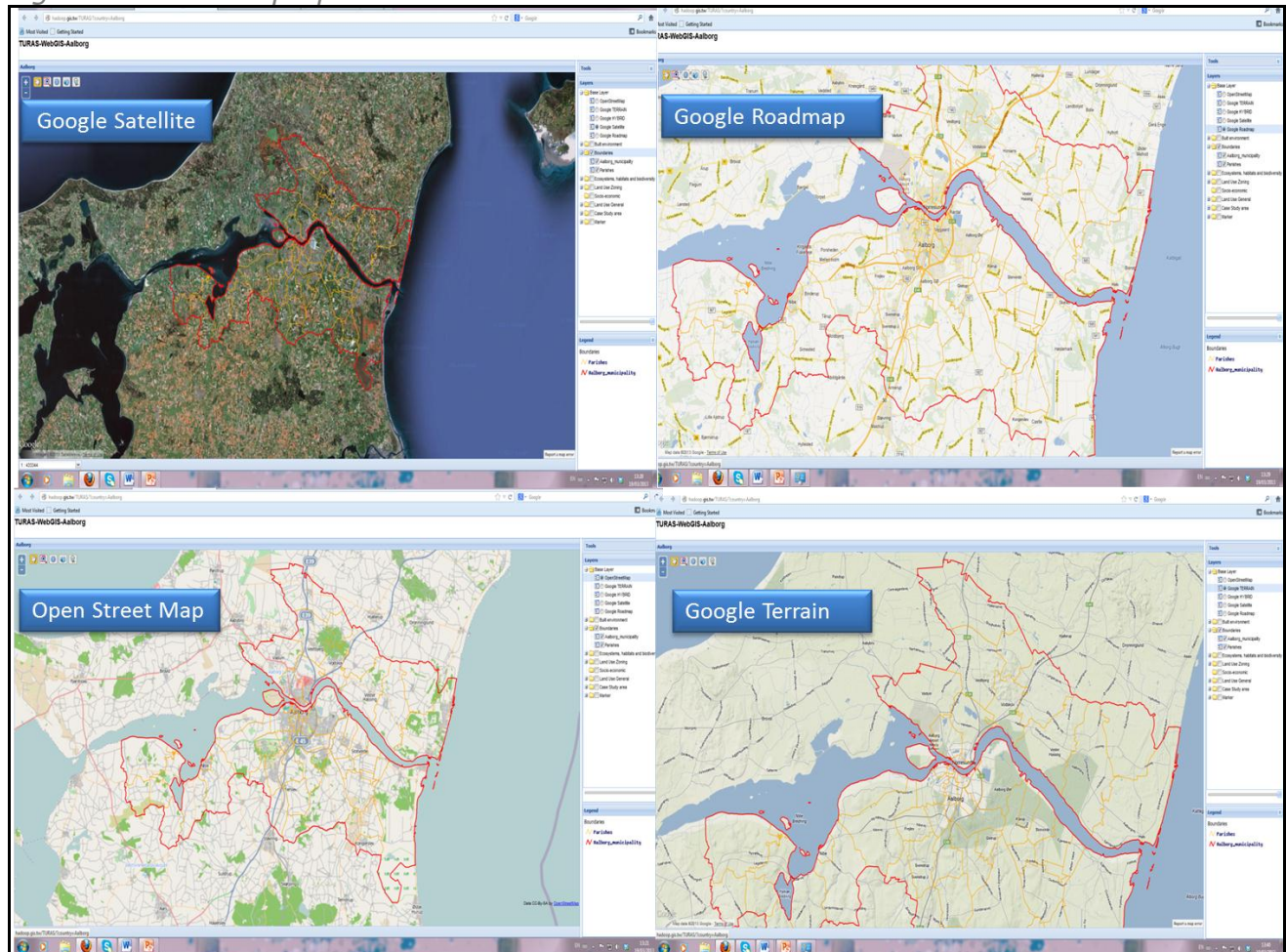
Access is provided to webGIS information for each region and solutions focusing on specific urban issues are provided in the accompanying case studies e.g. tackling urban sprawl in post Communist countries or looking at sustainable solutions to address flood risks in others.

A designated local contact person has been identified in each region and we invite your input and involvement in the TURAS initiative. You can also sign up for updates and results in each region or for the initiative as a whole.

- > Aalborg
- > Belgrade
- > Brussels
- > Dublin
- > Ljubljana
- > London
- > Nottingham
- > Rome
- > Rotterdam
- > Seville
- > Sofia
- > Stuttgart Region

The TURAS webGIS has two main source of base maps: Google maps and Open Street Map. They both provide open access to the general public. The user has the option to toggle between Open Street Map, Google Earth, Google Terrain, Google Satellite and Google Road Map depending on what background they require (See figure 2).






Figure 2: Base map options



The webGIS also allows the user to control what features or map layers can be drawn on the map. A range of layers are available to the user based on the seven themes. The exact nature of the data layers change for each city depending on what data was provided to WP1 from the participating city.

The webGIS has some of the functions associated with a standard GIS facility. Table 3 below presents the features and functionality of the TURAS webGIS which have been completed to date. It is envisioned that as the project progresses and users become more familiar with the webGIS and more aware of the possible tools they require more functions can be added.

Table 3: Standard Functions

Function	Icon	Description of function
Pan		To shift a map image relative to the display window without changing the viewing scale
Zoom In		To display a smaller region of an on-screen map or image
Zoom Out		To display a larger region of an on-screen map or image
Show Full Extent		The maximum bounding rectangle (in x,y coordinates) of an on-screen map. Users cannot zoom out beyond the max extent.
Identify		a tool that, when applied to a feature (by clicking it), opens a window showing that feature's attributed information

Source: Descriptions sourced ESRI GIS Dictionary

2.3 Interactive Tools

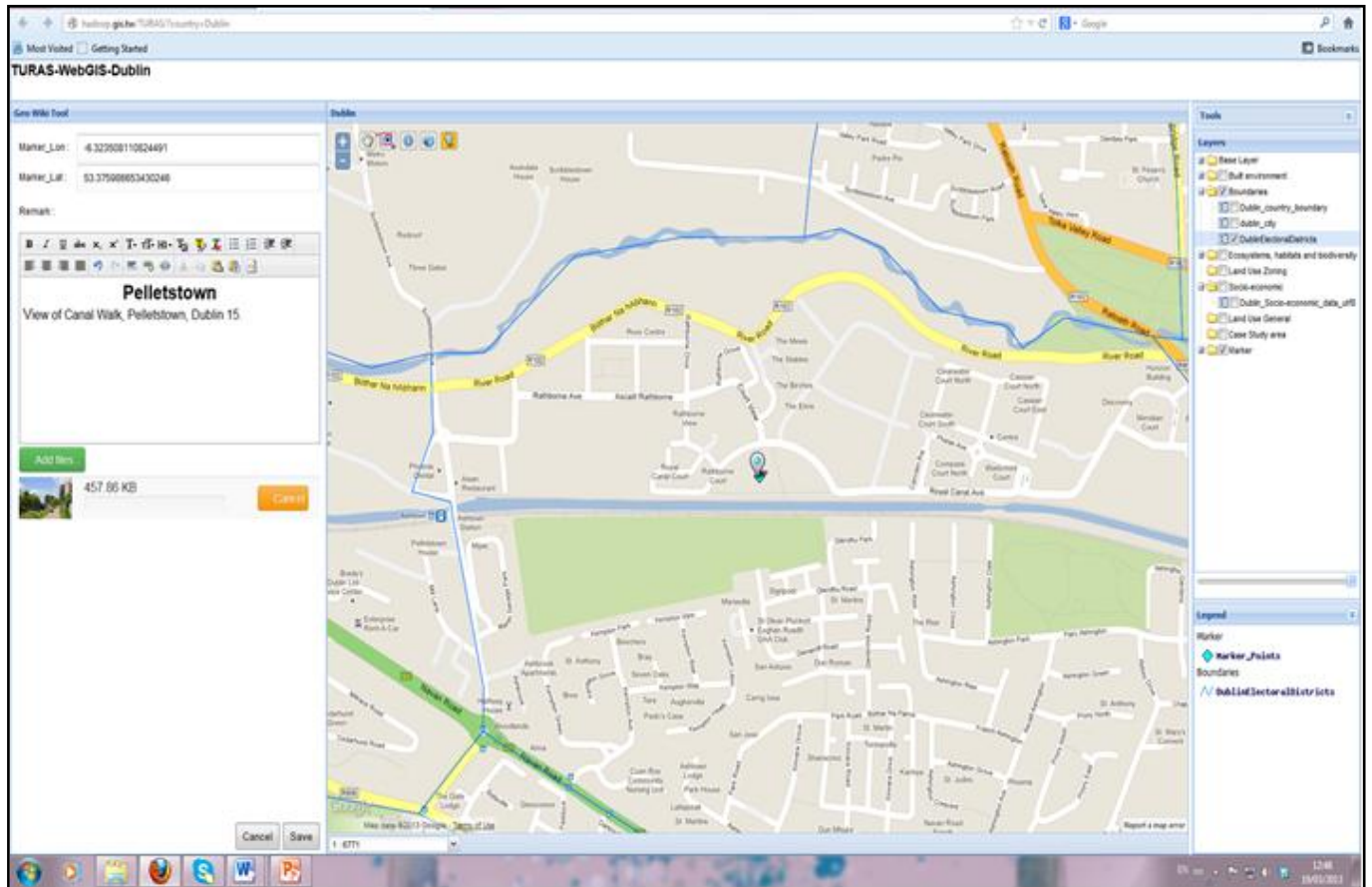
Central to the concept of TURAS is the principle of engaging with communities in these case study areas and establishing a working partnership between these communities and local authorities, academic partners and industry in order to develop new solutions for sustainability and resilience in each city. In order to increase communication, engagement and interaction with the wider public the TURAS webGIS will host a range of interactive tools customised for different purposes and users.

The standard GIS tools are complimented with interactive tools for uploading, downloading and exchange of various contents photographs and textual information (comments, ideas and records). Due to the access restrictions outlined in table , it was not feasible to provide the facility to upload and download spatial data.

The first tool to be added to the TURAS webGIS is the geowiki. A Geowiki is considered a geographically contextualized wiki. Central to the geowiki is its ability to be edited by not only official partners of the TURAS project but it is open to the wider public to contribute comments, ideas and photographs.

Users can navigate to a specific area on the webGIS using the navigation tool. They can then add a point to the map. It is then possible to write a description of the point, upload photos or documents and add related links. The Geowiki also allows users to comment and attribute data to other points which are on the map.

Figure 3: Example of Geowiki tool on TURAS webGIS



2.4 Interface with TURAS website

The TURAS webGIS is an essential element of the main TURAS website. The TURAS webGIS is embedded in each of the municipal page on the TURAS website. It is through these municipal webpages that users can gain access to the webGIS and the data layers which are relevant to that particular municipality. Embedding the webGIS into the municipal page will allow for increased interaction and engagement between the TURAS partnership of communities, local authorities, academic partners and industry.

3. Implementation Plan for WP1:

3.1 Training workshops

The remaining task for WP1 in relation to Deliverable 1.1 is the completion of Milestone 3: Full local authority participation in a training workshop in G-ICT infrastructure and specific framework and tools for each WP 2-6. WP1 must also complete Milestone 4: Full partner participation, in particular from local authority partners in training workshop on G-ICT infrastructures and specific framework and tools for each WP2-6. The training has been scheduled to coincide with the next TURAS annual general meeting in October 2013 as all relevant partners for Milestone 3 and 4 will be present.

3.2 Stage 2

The goal of Stage 2 is to compliment the webGIS created in Stage 1 with additional tools specific to each of the WP2-6. These will be identified and developed after month 18 in partnership with the case study teams. The tools will depend on the nature of the project and case study, ranging from modelling (MOLAND or other), databases, indicators, Geowikis, smart phone applications, blogs, social media etc. The decisions regarding these geospatial processing and visualisation as well as other communication tools and their integration into the case study web pages would take place later over the course of the project.

Stage 2 consists of three milestones and 1 deliverable outlined in table 4. Stage 2 will also involve the completion of Task 1.4, Development and employment of G-ICT frameworks for specific WP areas; Task1.5 Training, integration and evaluation. Task 1.6 Integrated G-ICT model.

Table 4: Milestones and deliverables for Stage 2 of the TURAS webGIS

MS/D	MILESTONES (MS) & DELIVERABLES (D)	Month	
MS4	Pilot G-ICT infrastructure with tools specific to WP2-6 -- training workshop for all partners	24	PHASE 2
MS5	Completed G-ICT infrastructure with tools specific to each of the WPs 2-6	30	
MS6	Evaluation and reporting on the utility of G-ICT infrastructure by local authorities	36	
D1.2	G-ICT infrastructure -- integrated database and tools	48	



4. Appendices

4.1 Appendix: Survey Questionnaire

PARTNER INFORMATION						
NAME						
ABBREVIATION						
COUNTRY						
CASE STUDY CITY						
CASE STUDY SITE within the CITY						
WP1 - WebGIS Contact: Municipality						
WP1 - WebGIS Contact: Academic /SME						
A. Context general data - spatial data layers						
	Availability	Access/ Source	Digital format	Unit / Scale	Include on the TURAS WebGIS? Y/N	Note
Socio-economic (population, employment)						
Transportation (street network)						
Built environment / building footprint + data						
Land use (general)						
Land use / development regulation						
Ecosystems / habitats / biodiversity						
Open / green space						
Infrastructure - water						
Infrastructure - sewer						
Infrastructure - energy						
Community services / facilities - schools						
Community services / facilities - recreation						
Community services / facilities - care centres						
Community services / facilities -shopping						
3D - Topography / terrain						
Other 1						
Other 2						
Other 3						
Other 4						
Other 5						
B. Project specific digital geospatial database - layers / objects						
	Availability	Access/ Source	Digital format	Unit / Scale	Note	
Data theme						
Layer 1						
Layer 2						
Layer 3						
Layer 4						
Layer 5						
Open Ended Questions						
1. Which development framework / software / tools do you use for your Municipality's website?						
2. Do you have a Geoportal on the Municipality's website?						
3. If yes, which tools / software is used for the development of the municipal Geoportal?						
4. Would you think that it is better to develop TURAS WebGIS by extracting spatial data from various sources OR by providing a live link to the data sources (if such is available – e.g., from the national, regional or local / municipal Geoportal)?						
5. Which development tools /software would you recommend for the building of the TURAS WebGIS? (Please note that TURAS WebGIS is only one part of the overall TURAS GeoICT interface; WebGIS will be complemented by other analytical, visualisation and/or communication tools – as per each WP's methodological procedures and requirements).						

4.2 Appendix 2: TURAS WP1 webGIS concept

TURAS WP1 WebGIS Concept

May 2012

TURAS

[HOME](#) [METHODOLOGY](#) [PARTNERS](#) [CONTACT US](#)

TRANSITIONING TOWARDS URBAN RESILIENCE AND SUSTAINABILITY

The "TURaS" initiative brings urban communities and businesses together with local authorities and researchers to collaborate on practical new solutions for more sustainable and resilient European cities.

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PhD position in UCD
25 Apr 14:18 [more](#)

TURaS on LinkedIn
30 Mar 12:54 [more](#)

TURaS Green Wall competition launched...
28 Mar 12:50 [more](#)

Gaining a perspective

by [Marcus Collier](#)
24 Apr 17:37

Human cities are often compared to ant colonies – a myriad of individuals moving with purpose, seemingly oblivious to the happenings in the background, seemingly unaware of potential hazards, and uncaring of what is going to happen next. Ant colonies are a highly organised and resilient unit so when something happens – let's say it rains – the ants react efficiently all the time.

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The Challenge

Over half of the global population live in urban areas and this is predicted to rise. Cities represent the major consumer of resources, which can greatly impact surrounding landscapes and the communities therein. Many urban areas are vulnerable to gradual environmental change and many city dwellers are

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Goals

TURaS is a five year Project that will develop visions, feasible strategies, spatial scenarios and guidance tools to help cities address the urgent challenges of:

- climate change adaptation and mitigation
- natural resources shortage
- unsustainable urban growth.

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Work Programme

- Standardized, Internet-based geospatial information base for each participating case study area, enhanced with specific applications and an interactive tool for city community stakeholder involvement, communication and management
- Integrated model for the novel use or re-use of

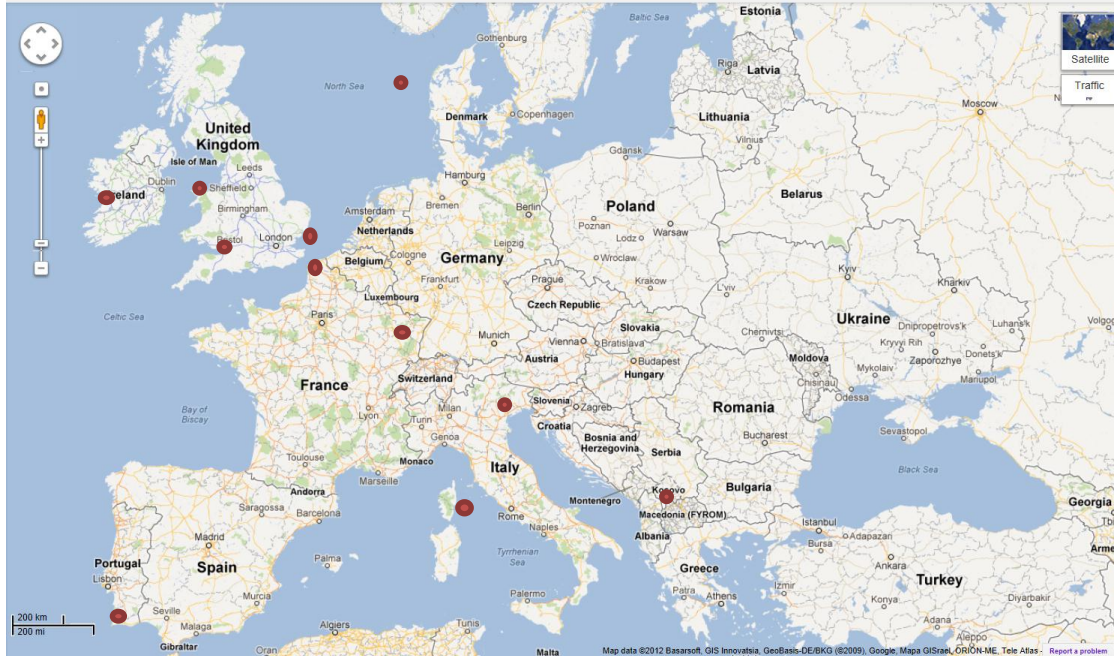
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The TURaS project is supported by the Seventh Framework Programme of the EU.

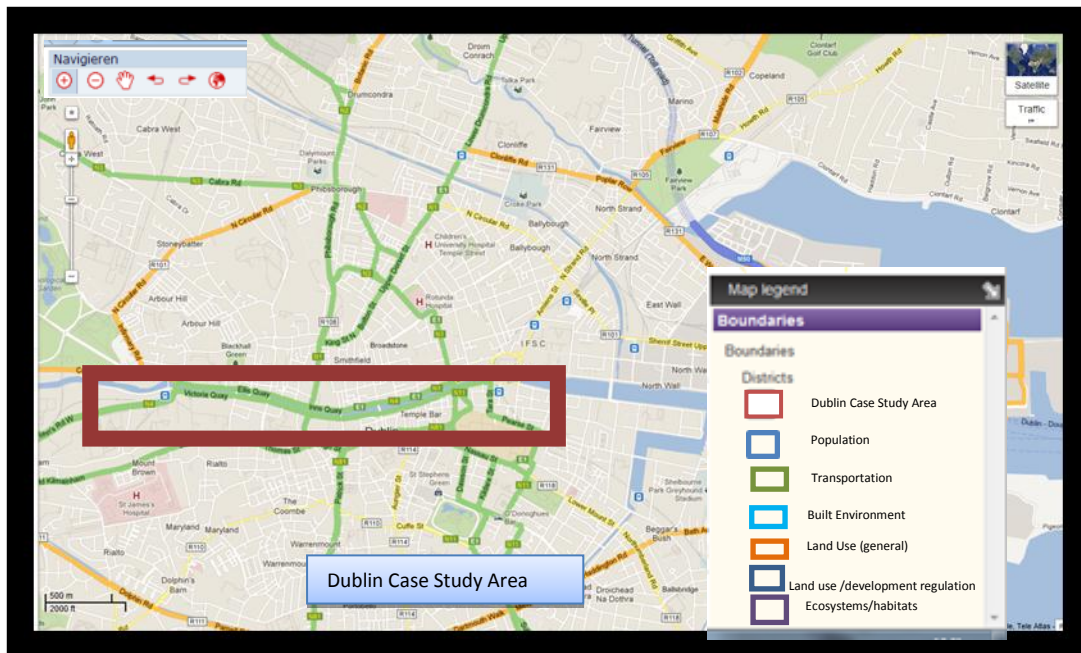
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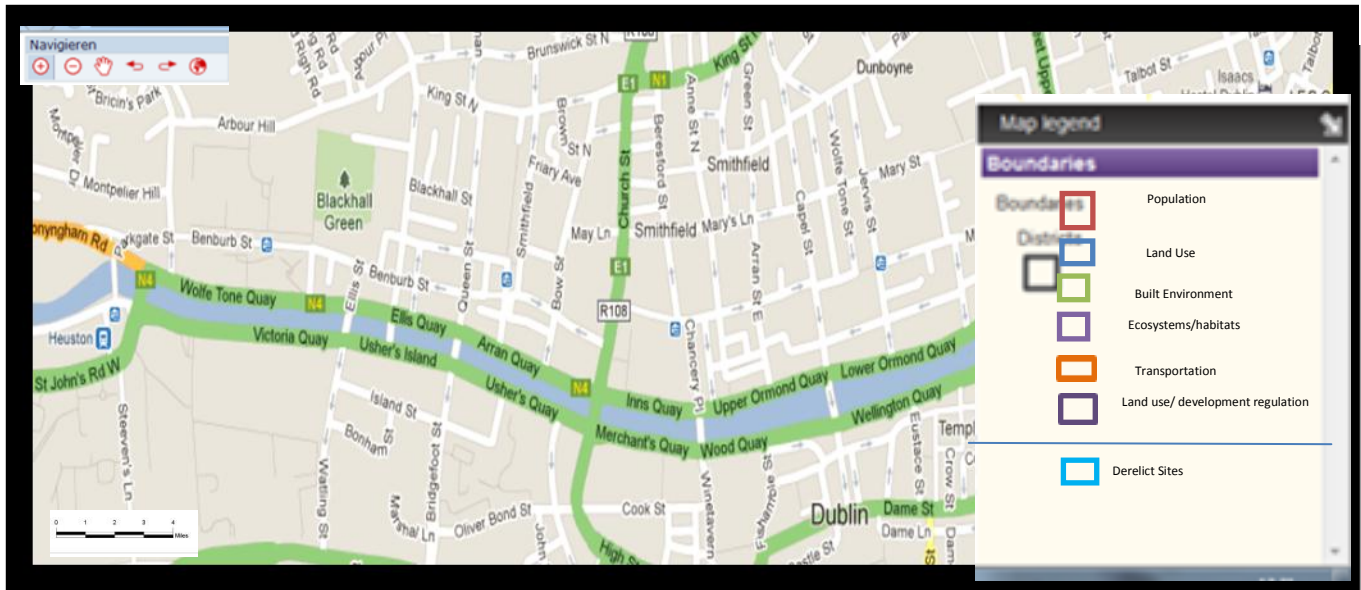
1. Link on TURAS webpage. Open TURAS web page. There is a link within the TURAS website to the TURAS case city view (as seen above). Click on this link and the TURAS City webGIS opens.



2. European Overview. A map of Europe is now visible on the screen. This map has all 11 case study areas highlighted as red dots. These red dots are “clickable”. When you click on a red case study city a window into that case study city opens.



3. Case study City Window. A window into the case study city is opened and the case study area is highlighted. There are different layers such as population, land use, built environment and ecosystems/ habitats, land use development regulation and transportation which the user now has the option to select (all which have been chosen from the WP1 survey).



5. Case study area view. Zoom in further and the case study area is now visible. There is also a zoom in and out, print and save map function available.

6. Tools. Tools and other layers specific to each case study area will also become available at this point.

7. Geowiki/VGI. The next step is to include a Geowiki where community members can contribute suggestions, opinions and data to each case study area GIS WebGIS.

8. Suggested Layers for the initial TURAS WebGIS

1. Socio-economic (Population, employment)
2. Transportation (street network)
3. Built environment (building footprint and data)
4. Land Use general
5. Land Use / development regulation (zoning)
6. Ecosystems /habitats and biodiversity

9. Base Map Options



- Google Maps



- Google Satellite View



- Open Street Maps

10. Where should the data for the TURAS WebGIS reside?

11. How to link to the municipal web sites and web GIS - to be decided (general approach vs working on case by case basis).



4.3 Appendix 3: Results from Survey Questionnaire

