interoperable Smart City services through an Open Platform for urban Ecosystems

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Fact & Figures

• i-SCOPE, interoperable Smart City services through an Open Platform for urban Ecosystems

• i-SCOPE is supported by the CIP / ICT Policy Support Programme Pilot Type B of the European Commission

• FrameWork:
Competitiveness and Innovation Framework Programme

• ICT PSP Identifier:
CIP-ICT-PSP-2011-5

• Objective Identifier 5,1: Open innovation for Internet-enabled services in «smart» cities

• Duration: 36 months

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Overview

i-SCOPE project plans to develop and test technologies for the so-called smart cities services based on interoperable 3D Urban Information Models (UIMs). Indeed, the latest generation of UIMs created from accurate urban-scale geospatial information, can be used to create smart web services based on geometric, semantic, morphological and structural information at urban scale level, which can be used by local governments to:

- Improve decision-making on issues related to urban planning, city management, environmental protection and energy consumption based on urban pattern and its morphology.
- Promote inclusion among various users groups through services which account for barriers at city level.
- Involve citizens at wider scale by collecting geo-referenced information based on location based services at urban scale.

Furthermore, i-SCOPE aims at providing a significant contribution to standards in the domain of smart city services, through contribution to the extension and wider adoption of CityGML as a key enabling open standard for 3D smart city services. With specific regard to this, i-SCOPE has the following goals:

- Promoting establishment of a common "Urban Information Model" (UIM).
- Accelerate the uptake of CityGML as the reference standard to support simulation.
- Extending the core CityGML open standard.
- Promoting a number of awareness activities to accelerate the uptake of CityGML as the reference standard to support urban-scale smart services, sustainable planning and simulations.

Moreover, i-SCOPE will deliver an open platform on top of which to develop three 'smart city' services, which will improve:

- Inclusion and personal mobility of aging and diversely able citizens.
- Optimization of energy consumption
- Environmental monitoring.

The Consortium

GraphiTech
CEIT
Vrije Universiteit Brussel
GISt
indeco
M.O.S.S.
reggiani
C3L
GEOSYS
Ordnance Survey
Epsilon
GEOFOTO
Informatica Trentina SpA
ZADARSKA ŽUPANIJA
Newcastle City Council
Δήμος Δράμας
REGIONE LAZIO

The Pilot Scenarios

The smart services proposed address the following three scenarios:

- Improved inclusion and personal mobility of aging people and diversely able citizens;
- Energy dispersion & solar energy potential assessment;
- Noise mapping & simulation.

Scenario 1: Energy dispersion & solar energy potential assessment

The first scenario of i-SCOPE project deals with Energy dispersion and solar energy potential assessment.

In general, this scenario reflects the importance of renewable energies and reflects this in the project. There, it exemplarily handles both aspects, the generation of energy with solar panels on building roofs as well as the heat losses on building at a roof level.
The integrating factor between the two aspects of the scenario is the CityGML based data-structure, which allows handling with a 3D city model enriched from both directions with a classification regarding the solar power potentials of the building roof and a classification of the heat loss too. Both aspects can be evaluated as separated from each other or in an integrated way. Thus, the scenario provides an appropriate knowledge-base and a support system for energy related spatial decisions.

For the solar energy potential assessment, a 3D city model is generated based on the projects platform infrastructure. This model can then be used:

• to assess the solar power potential considering the exposition and inclination of the roof surfaces,

• to assume the roof coverage with solar panels and to estimate the related investments and benefits, or

• to simulate the effect of planning to the solar power potentials.

Heating loss is captured based on infra-red areal surveys. The information gathered from this sensor is used to perform a classification of the building roofs. It can be used to identify urban areas where energy saving activities would be appropriate: starting from an image based data capturing process, the scenario will not only allow the storage and use of semantics (classification) generated throughout the process, but will also enable using the images themselves as textures to the 3D city model.

The information generated throughout the aforementioned processes is managed in a CityGML schema that is currently under development within the project.

The information is always managed on a building level; nonetheless, the scenario addresses rather regional decision makers that owners of single buildings. This level defines the requirements towards the data acquisition and modeling, the simulation processes and the final results themselves.

While using the system, users will have the chance to access the information stored in the project's 3D city model database novaFACTORY or to initiate the mentioned analyses, simulations and processes. Results can enrich the existing dataset, can be used to generate an independent scenario related dataset or handled as a temporarily evaluation scenario.

Decision makers can again access the same database and visualize, evaluate and compare the information. The entire system is web-based and it allows accessing the information and processes from an office, meeting facility or mobile client.

This flexible approach allows the user the following processes, for instance:

• **Example 1 - Establishing the smart city knowledge pool on energy.**

In order to motivate citizens to contributte to the power generation by implementing solar panels or to invest in insulation to avoid heating losses, city administration performs a solar power potential assessment and assesses the heating losses based on the i-SCOPE technology.

This information is published and made available to the citizens, who can view the loss and potential classification of their own buildings and decide about appropriate activities and potential investments.

• Example 2 - **Assessing the affect of a new building to existing and potential solar panels.**

When processing a new building permit, the city administration officers can use i-SCOPE technology to asses current status of solar potentials in the surrounding of the new house. By using the i-SCOPE technologies, the new house can be inserted as a scenario dataset to the platform and can be used to recalculate the solar power potentials of the surrounding to estimate the impact of the new house by comparing the original and the scenario dataset.

Scenario 2: Noise mapping & simulation

The second scenario that i- SCOPE focuses on is that of mapping noise in urban areas, both through a novel participatory approach involving citizens and their mobile phones, as well as through the more standardized approach to simulating the most important traffic-related sources of noise in a city.

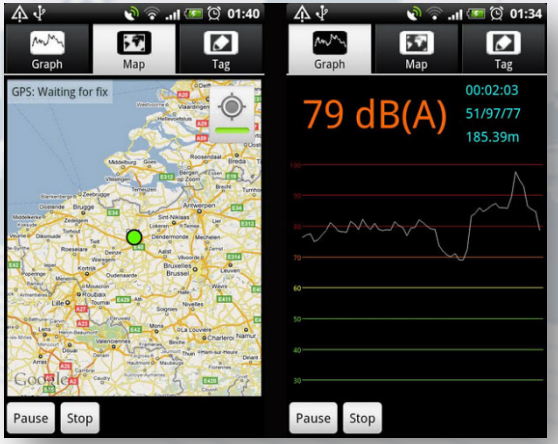
In order to assess the distribution of this noise pollution (in time and space), the BrusSense team of the Vrije Universiteit Brussel proposes the NoiseTube project. The concept? To facilitate sound measuring at any place and time through a mobile app that exploits basic smartphone functionalities, namely microphone, wireless connectivity and localisation through GPS. Through these three components, NoiseTube transforms already ubiquitous smartphones into highly portable, accessible sound measurement devices, thus enabling all citizens to measure ambient sound levels whenever and wherever they please.

NoiseTube is a user-friendly, free and open source too that is being integrated within i-SCOPE, and can be used by citizens all over the world, for individual use as well as for measuring campaigns by citizen action groups.

It is a tool with which citizens can estimate the quality of their daily environment and how it is affected by their behavior, and as such, it provides support for awareness-building as well as for undertaking bottom-up, citizen-steered actions to solve local issues.

Next to the mobile app, a second pillar of our participatory approach is the NoiseTube website, which collects all user measurements and visualises them on maps.

Given enough measurements for a particular area, we can construct noise maps of comparable quality to those produced by governments today, which are of a very different kind. Indeed, pollution maps are typically created through computer simulations based on general statistics, such as the average number of cars in the city. They are backed up only by limited amounts of sound measurements, because current measuring methods are expensive and thus not very scalable. The resulting maps give an average but not at all a complete view on the situation, entirely missing local variations due to street works, neighbor noise etc.



Scenario 3: Improved inclusion and personal mobility of aging people and diversely able citizens

Lastly, the i-SCOPE project will develop inclusive routing that will be targeted for visually impaired and wheelchair users. The results of route planning can be made available for blind people as spoken instructions. Unlike route planners, the innovativeness of the application lies in the fact that the blind are not guided in a linear fashion through the city. Instead, they are offered the possibility to experience and understand city spaces, streets, places, parks, etc. as spatial constructs.

The idea is not to navigate the user, but to open up the chance for the user to navigate themselves by interactively discovering web-based city maps.

The aim is to provide a holistic description of the urban space which means that the user should be able to discover as many attributes of a street section as possible to get a better image of the city.

This image – or mental map – should include information about streets, intersections, blocks, points of interest, possible causes of risk, etc. and their spatial relation to each other. The elements of the map need to be described in a semantic way that is adapted to the requirements of pedestrians, *especially blind and visually impaired users.*

Key Past Events

The main events that i-SCOPE Consortium has attended in this first year of the project life have been:

- **CORP Conference** (www.corp.at), where i-SCOPE submitted a scientific paper and had a presentation.

- **Zagreb Energy Week.** The 16th of May 2012, dr. Raffaele De Amicis participated to the international Conference "Local and regional authorities in the process of Sustainable Energy Development" within the Zagreb Energy Week, with a presentation on the project i-SCOPE.

- **COST Workshop**. Carsten Roensdorf from Ordnance Survey presented the i-SCOPE project at the COST action TU 0801 workshop focused on the semantic enrichment of 3D city models. The meeting took place on 13rd April 2012 in Madrid, Spain, attended by approx. 35 participants from across Europe.

- **OGC TC Meeting**: A presentation to the Open Geospatial Consortium 3D Information Management Domain Working Group was given to introduce the iSCOPE project, the use cases we will be working on as well as setting the expectation to receive standardisation requirements for CityGML in the future. The meeting took place on 21st march 2012 in Austin, Texas (USA), attended by approx. 30 experts in geospatial technical standards with a further 50 experts expected to view the presentation on the OGC web portal. More information are available at the event website: http://www.opengeospatial.org/event/1203tc

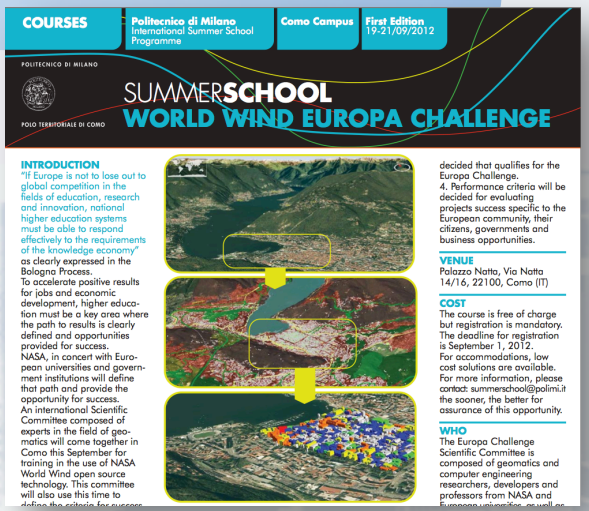
- **Workshop on ICT Innovations**. Graphitech joined the Workshop on ICT Innovations (19-21 march 2012) with a presentation on the i-SCOPE project. The title has been: "*From research to innovation: a European perspective on Internet of places. Geointelligence for society.*"

- **INSPIRE Conference 2012.** The INSPIRE Conference 2012 took place from Saturday 23rd – Wednesday 27th June 2012 in Istanbul, Turkey. The theme of this year's edition was "Sharing environmental information, sharing innovation". Fondazione Graphitech attended it with a presentation of the project: Paving the way to smarter cities.

- **Festival dell'Economia 2012**. In the setting of the Festival dell'Economia of Trento, a conference on "Smart City. How Internet and ICT new technologies change people and generations lifestyles" was held the 2th of June 2012, in the Kessler Room of the Faculty of Sociology, University of Trento, Via Verdi 6 (TN). This event, organized by Informatica Trentina and Fondazione Graphitech within the EU project i-SCOPE, has had the aim of "exploring cities and territories opportunities, outlining the existing changes scenario and activating a comparison on how Internet and ICT new technologies can change people and generations lifestyles and relationships in a urban setting and not only".

WorldWind Europa Challenge 2012

Fondazione Graphitech has organized a 3–day intensive training and geomatics information exchange, where experts in computer engineering from NASA, European universities and government institutions, as well as accomplished PhD and Master students, have provided and received specialized training in the use of World Wind technology.
For more information:
http://www.graphitech.it/GT/docs/news/World_Wind_Europa_Challenge_blue.pdf


COURSES
Politecnico di Milano International Summer School Programme
Como Campus
First Edition 19-21/09/2012
POLITECNICO DI MILANO
POLO TERRITORIALE DI COMO
SUMMERSCHOOL
WORLD WIND EUROPA CHALLENGE
INTRODUCTION
"If Europe is not to lose out to global competition in the fields of education, research and innovation, national higher education systems must be able to respond effectively to the requirements of the knowledge economy" as clearly expressed in the Bologna Process.
To accelerate positive results for jobs and economic development, higher education must be a key area where the path to results is clearly defined and opportunities provided for success.
NASA, in concert with European universities and government institutions will define that path and provide the opportunity for success.
An international Scientific Committee composed of experts in the field of geomatics will come together in Como this September for training in the use of NASA World Wind open source technology. This committee will also use this time to
decided that qualifies for the Europa Challenge.
4. Performance criteria will be decided for evaluating projects success specific to the European community, their citizens, governments and business opportunities.
VENUE
Palazzo Natta, Via Natta 14/16, 22100, Como (IT)
COST
The course is free of charge but registration is mandatory. The deadline for registration is September 1, 2012.
For accommodations, low cost solutions are available. For more information, please contact: summerschool@polimi.it the sooner, the better for assurance of this opportunity.
WHO
The Europa Challenge Scientific Committee is composed of geomatics and computer engineering researchers, developers and professors from NASA and

Events Focus

For more Information about Project Events visit the project website: http://www.iscopeproject.net/

SMAU 2012

Informatica Trentina and Fondazione Graphitech presented i-SCOPE at SMAU 2012, 19 October, Milan, Italy.
A video of the presentation is available at:
http://www.taslab.eu/a-smau-presentati-i-servizi-intelligenti-del-futuro-grazie-al-3d-del-progetto-i-scope
and at:
http://new.livestream.com/triwu/events/1612868

Bologna Smart City Exhibition

Informatica Trentina and Fondazione Graphitech presented i-SCOPE at Bologna Smart City Exhibition, 30 October 2012.
Broadcast of the presentation by Raffaele De Amicis at:
http://www.youtube.com/watch?v=Jj6ABZeCr-0

Official news press at:
http://www.uffstampa.provincia.tn.it/c2008.nsf/0/ABF026F3CAC587A6C1257AA80040A6BA?OpenDocument#.UPgzr6EX4ho

Future Events

The project will be further disseminate through the participation to:

- Corp 2013 Conference
- INSPIRE 2013 Conference

Project Meetings

Kick-Off Meeting

The first (kick-off) project meeting was held in Brussels, Belgium, on the premises of the Vrije Universiteit Brussel, from the 23rd to the 25th of January 2012. The purpose of the meeting was to introduce the project and its work packages. All consortium members, EC project officer, advisory group members, related project representatives and invited guests attended the meeting.

The project was officially introduced by the project coordinator (Raffaele De Amicis - Fondazione GraphiTech), and then followed by the presentation of all the partners institutions. Next, the agenda of the first day also included presentations of each work packages by the WP leaders, which then continued on Day 3. The second day all the partners participated to the CIP, OPEN INNOVATION FOR SMART CITIES CONSTITUENCY BUILDING WORKSHOP organized by the European Commission, while in the 3rd day, after the presentation of the final WPs, there has been the description of the project management, with general information concerning project handbook, the appointed The first (kick-off) project meeting was held in Brussels, Belgium, on the premises of the Vrije Universiteit Brussel, from the 23rd to the 25th of January 2012. The purpose of the meeting was to introduce the project and its work packages.

Malta Meeting

The second project meeting was held in St Julians, Malta, from the 12th to the 14th of June 2012.
The meeting was hosted by the project partner GEOSYS.

During the meeting the state of the art of the project activities was presented. Presentations were given by the work packages leaders, the task leaders and the project coordinator. The third day started by presentation regarding the project management issues which was given by the project coordinator, while in the The second project meeting was held in St

Julians

, Malta, from

the 12th to the 14th of June 2012.

Above: Group shot during the Kick-off meeting

Below: Malta meeting

Review Meeting

The first review meeting was held in Brussels, Belgium, on the premises of the European Commission, Communications Networks, Content and Technology Directorate-General - DG CONNECT, on the 25 October 2012.

Belgrade Meeting

The last project meeting will be held in Belgrade from the 22nd to the 23rd of January 2013.

Publications

Within the project, some publications have been made, i.e.:

- *Mapping of potential of roofs for the solar energy assessment*, Ivan Vučetić.
- *Development of "smart city" services for the support of energy-efficient society*, Protić et al. (EGEO team), within the Environmental protection and energy efficiency conference, http://www.sits.rs/include/data/docs0341.pdf.
- *I-SCOPE. Interoperable Smart City services through an Open Platform for urban Ecosystems*, Raffaele de Amicis, Giuseppe Conti, Daniela Patti, Martin Ford, Pietro Elisei, within the REAL CORP 2012 conference.
- *Use of OGC Web Standard for a Spatio-Temporal Enabled SDI for Civil Protection*, Federico Prandi, Raffaele De Amicis, Giuseppe Conti, Alberto Debiasi, WEB3D 2012, within SIGGRAPH CONFERENCE.
- *Pervasive Touristic Location Based Service Mobile App with a Social Perspective*, Umberto di Staso, Raffaele De Amicis, Gabrio Girardi, Federico Devigili, WEB3D 2012, within SIGGRAPH CONFERENCE.
- *Mapping of potential of roofs for the solar energy assessment*, Ivan Vučetić, Faculty of Civil Engineering, University of Belgrade, 22 March 2012.
- *Development of "smart city" services for the support of energy-efficient society*, Protić et al, Association of Engineers of Belgrade, May 2012, http://www.sits.rs/include/data/docs0341.pdf.
- *I-SCOPE – Smart Geo-Services für innovative Stadtentwicklung*, Ines Döring, Daniel Holweg, within the AGIT2012 Conference (www.agit2012.at).
- *Participatory noise mapping*, Ellie D'Hondt, Matthias Stevens, on the Adjunct proc. 9th Int. Conference on Pervasive Computing,, June 2011, http://www.noisetube.net/publications/Pervasive2011.pd.
- *Citizen Noise Pollution Monitoring*, Nicolas Maisonneuve, Matthias Stevens, Maria E. Niessen, Peter Hanappe, Luc Steels, in Proceedings of the 10th Annual International Conference on Digital Government Research (dg.o2009), May 2009, http://www.noisetube.net/publications/DG.O2009.pdf.
- *NoiseTube: Measuring and mapping noise pollution with mobile phones*, Nicolas Maisonneuve, Matthias Stevens, Maria E. Niessen, Luc Steels, in Proceedings of the 4th International Symposium on Information Technologies in Environmental Engineering (ITEE 2009), Thessaloniki, Greece. May 28-29, 2009, http://www.noisetube.net/publications/ITEE2009.pdf.
- *Crowdsourcing of Pollution Data using Smartphones,* Matthias Stevens, Ellie D'Hondt, in Proceedings of the Workshop on Ubiquitous Crowdsourcing, held at ACM conference on Ubiquitous Computing 2010 (UbiComp2010), Copenhagen, Denmark, Sep 26-29, 2010, http://soft.vub.ac.be/Publications/2010/vub-tr-soft-10-15.pdf.
- *Context-aware Resource Sharing for People-centric Sensing,* Jorge Vallejos, Matthias Stevens, Ellie D'Hondt, Nicolas Maisonneuve, Wolfgang De Meuter, Theo D'Hondt, Luc Steels, presented at the First International Workshop on Software Research and Climate Change (WSRCC-1), part of Onward! 2009 (co-located with OOPSLA 2009) in Orlando, USA, Oct 26, 2009, http://soft.vub.ac.be/Publications/2009/vub-soft-tr-09-04.pdf.
- *Measure and map noise pollution with your mobile phone,* Nicolas Maisonneuve, Matthias Stevens, Luc Steels, in Proceedings of DIY for CHI: Methods, Communities, and Values of Reuse and Customisation, workshop held at the ACM SIGCHI Conference on Human Factors in Computing Systems (CHI 2009), Boston, USA, Apr 4-9, 2009, http://www.noisetube.net/publications/DIYforCHI2009.pdf.
- *Participatory noise mapping works! An evaluation of participatory sensing as an alternative to standard techniques for environmental monitoring,* Ellie D'Hondt, Matthias Stevens, An Jacobs, Under submission. Dec. 2011, http://www.noisetube.net/publications/partnoisemaps.pdf.
- *Participatory noise pollution monitoring using mobile phones,* Nicolas Maisonneuve, Matthias Stevens, Bartek Ochab, Information Polity, 15(1-2):51-71, Aug 2010, http://www.noisetube.net/publications/IP2010.pdf.

Follow us !

i-SCOPE @ Web 2.0

-SCOPE project is also promoted through several social networks including Facebook, LinkedIn, Twitter and YouTube. These can be accessed at the following addresses or through the QR codes next to each of the social network logo.

Linked-in:
http://www.linkedin.com/groups/iscope4eu-4263048?trk=myg_ugrp_ovr

Facebook:
http://www.facebook.com/pages/iscope4eu/286235631430210

YouTube:
http://www.youtube.com/user/iscope4eu

Twitter:
https://twitter.com/iscope4eu