



INTERACTIVE ANALYSIS, SIMULATION AND VISUALISATION  
TOOLS FOR URBAN AGILE POLICY IMPLEMENTATION

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## **TABLE OF CONTENTS**

<b>PROJECT IDEA AND PERSPECTIVES</b>	<b>7</b>
<b>THE URBANAPI OBJECTIVES AND APPROACH</b>	<b>8</b>
<b>CONCEPT</b>	<b>9</b>
<b>PROJECT STATUS AND NEXT STEPS</b>	<b>11</b>
<b>IMPACT OF urbanAPI RESULTS</b>	<b>12</b>
<b>GENERAL INFORMATION</b>	<b>13</b>
<b>URBANAPI CONSORTIUM</b>	<b>14</b>
<b>POINT OF CONTACT</b>	<b>15</b>



## PROJECT IDEA AND PERSPECTIVES

In the context of European initiatives to improve policy as a more transparent and understandable process, the urbanAPI project aims to support activities such as issue identification, policy analysis, consultation, decision and evaluation in urban planning and land management policy.

For this purpose, a policy meta-model, a formalized vocabulary, a set of rule languages to define data integration and abstract simulation models are introduced.

Furthermore, the urbanAPI approach will transpose elements of agile ICT development to the urban policy making process: Multiple activities can run in parallel, and all activities are kept synchronized. In such a process, risks are identified earlier, conflicts are understood better, and knowledge gained in one activity can directly be used in all other activities.

On this formal basis, a novel ICT toolset is developed. The urbanAPI toolset allows the fast development and deployment of participative policy support applications. These applications can be used for decision support, conflict management, analysis and visualisation and rely on innovative interaction platforms. Concepts known from web 2.0 and semantic web technologies, such as linking,

tagging, rating and adding of semantic annotations are supported directly.

Applications created with the urbanAPI toolset also make use of a comprehensive data integration system to make use of the vast data resources – geospatial and statistical datasets – related to urban planning. Local initiatives in the four urban regions working in this project are encouraged to participate within the planning process, to contribute to the final solutions and understand and finally accept the expected impacts on environment and habitants.

Based on the toolset, adapted urban planning applications will be created, deployed, evaluated and used to support policy makers, planners and stakeholders at different governance and spatial levels (urban quarter level, municipal level, urban region level).



Urban planners working on a 3D city model

## THE URBANAPI OBJECTIVES AND APPROACH

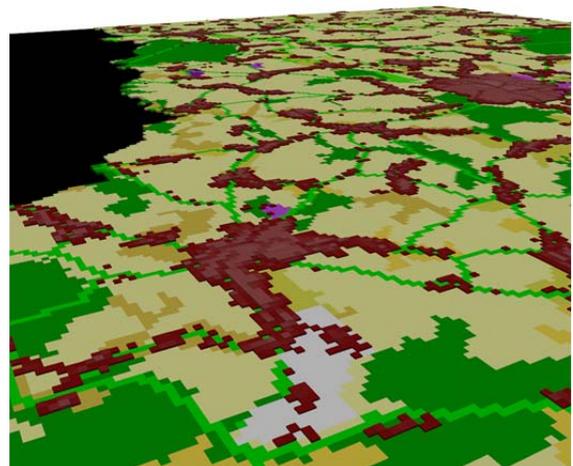
**Policy making and public participation are the leading aspects in our work. Concerning this, our objectives in urbanAPI are:**

- ☞ to support public participation in urban planning policy;
- ☞ to enhance the transparency of planning outcomes at the local scale;
- ☞ to achieve a better identification of benefits and outcomes for the population – by exploring socio-economic interaction in public spaces;
- ☞ to conduct enhanced prediction of urban development and societal trends and possible impacts of policy measures to achieve a more sustainable implementation of government policies.

**In addition the ICT and Policy Modelling objectives include:**

- ☞ to develop an object-oriented meta-model for the creation of policy making domain models, including a model of geometric (topological, multiple representations/scale) and functional relations (feedback, conflicts);
- ☞ to design and implement a toolkit for rapid development and deployment of participative policy making applications;

- ☞ to create a family of domain-specific rule languages enabling urban planning domain specialists to define policy models and their requirements, to integrate required data sets and to define the presentation of content to be delivered;
- ☞ to allow domain experts to use the family of rule languages to create policy support applications;
- ☞ to perform real-time simulations with interactive reaction times.



City of Linz: Population density and growth

## CONCEPT

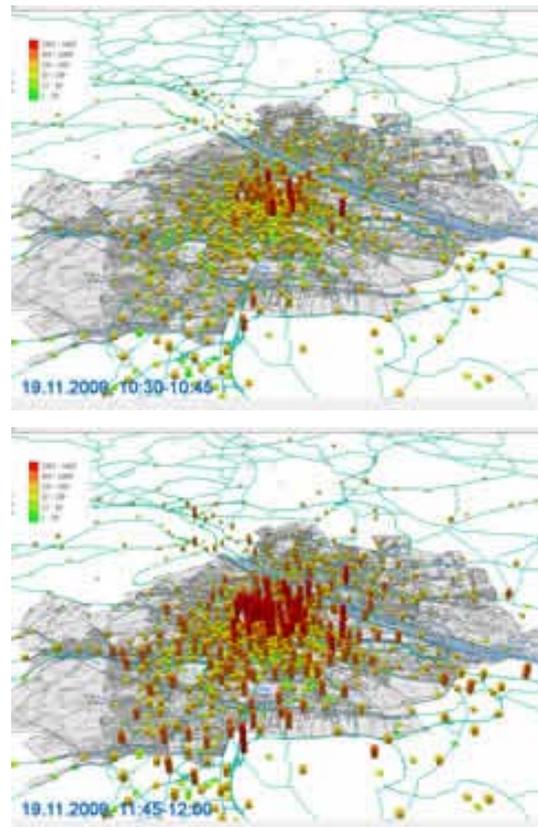
The enhanced ICT tools proposed by **urbanAPI** offer the potential to provide urban planners with the tools and intelligence needed to actively manage the urban environment. These tools will provide planners with precisely the information they need to fully expose the socio-economic and environmental impacts associated with alternative options for territorial development and thereby create conditions in which the political mandate and the basis for more effective management is secured.

The **urbanAPI** tools will provide advanced ICT-based intelligence in **three urban planning contexts**. First, **urbanAPI** will directly address the issue of stakeholder engagement in the planning process by the development of enhanced virtual reality visualisation of **neighbourhood** development proposals.



Urban planning with urbanAPI tools

Second, at the **city-wide** scale, **urbanAPI** will develop mobile (GSM) based applications that permit the analysis and visual representation of socio-economic activity across the territory of the city, and in relation to the various land-use elements of the city.



Example of citywide scale application: mobile communication device locator allows describing activity dynamics within a city during a day

Finally, **urbanAPI** will develop ICT simulation tool applications in the **city-region** context addressing multiple challenges in responding to the simultaneous demands of expanding city populations for certain European cities, and declining and frequently ageing populations elsewhere.



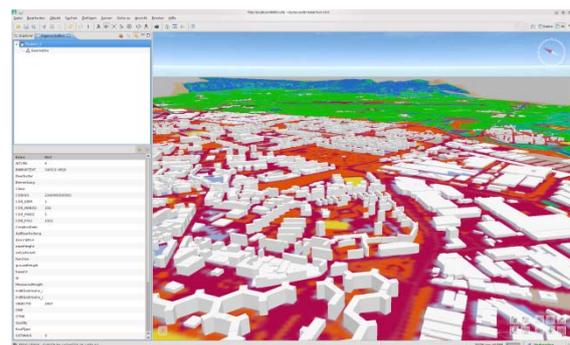
Example of a city-region scenario: area of interest for 3D-VR and city borders of Bologna, Italy

Such applications collectively provide vital decision-making aids for urban planners in the management of the territory, as well as for the associated responsibilities in political negotiation, and wider stakeholder engagement regarding the future development of the territory.

Each of the participating cities will provide scenarios for two of these applications, to address a broader perspective, to learn from each other and also to be able to compare the results.

**urbanAPI** will provide a toolset that enables the city planning authorities to effectively use interactive simulation and visualisation instruments, and will additionally facilitate direct participation of stakeholders and citizens.

These proposed generic ICT applications will be built from a set of common libraries for **data integration, policy modelling, simulation and visualisation**, to be easily adapted to changing requirements by integration of the relevant data sets, to inform the practitioners and gather feedback from the public.



Visualisation of planning areas in Vitoria-Gasteiz, Spain

## PROJECT STATUS AND NEXT STEPS

During the first year of the project a requirements analysis commenced with respect to each of the city partners applications. Question surveys and a user workshops provided the basis for the elaboration of project goals and the identification of user needs and requirements.

Furthermore, the application scenarios for each of the cities were created as the basis for the development of the urbanAPI tool sets. The results of this analysis are presented in the deliverable on user requirements, and will be made publicly available in November 2012 on the project web site.

The city requirements provide the basis for the design and implementation of the urbanAPI ICT tool set to support the defined scenarios for the user community. In respect of the different applications and user expectations the appropriate data is being defined and acquired in order to operationalize the scenarios. Data preparation, harmonisation and integration has commenced for those data sets already available from the participating cities.

However, this task has proved more difficult than expected as some cities do not have appropriate data available, and others use proprietary data formats, so that existing standard solutions could only be partly

applied, and specific solutions have had to be developed.

The data management, visualisation, and interaction requirements will be realized via the Fraunhofer IGD CityServer3D. A code camp held at the beginning of the development activities provided the opportunity for discussion of the integration of existing systems with the new tools, as well as integration with the applications from IGD and AIT.

A common urbanAPI concept was outlined, defining the client as a standard web-browser which loads a web application from CityServer3D. The web application can make use of all state-of-the-art web technologies including X3DOM to display 3D contents over the WebGL-API. The CityServer3D hosts all the data required including 3D-city models, terrain models or data related to the buildings themselves. The required development and integration work is currently on-going.



urbanAPI developers team at the Code Camp in Darmstadt April 23-27, 2012



Consortium Meeting Rome September 6-7, 2012

Pre-existing tools and development extensions have commenced and two early demonstrators realised, one for the urban planning application in Vitoria Gasteiz, Spain, using a 3D scenario creator, the other for the public motion explorer in Vienna.

The third application concerning the urban growth simulation has also commenced and early performance tests established. The other scenarios for all three applications involving the other urbanAPI cities are expected to be developed step by step during the second year of the project. Following a review and evaluation cycle for each of the scenarios in year 2, a second iteration round for updates and improvements, as well as additional functionality according to upcoming requirements will be the main focus of activity during the last year of the project.

In addition an assessment methodology has been developed for evaluation of feedback in respect of both from user perspectives as well as technical evaluation, to be further detailed, implemented, and applied in the review

cycles. The deliverable concerning the assessment methodology is prepared and will be published on the project Web site. Also in year 2 the evaluation procedures will be detailed and applied to the scenarios.

### **IMPACT OF urbanAPI RESULTS**

The expected results of the urbanAPI project with its three applications using the ICT tool set will have impact policy making as follows:

- ☞ Improving prediction of urban planning policy provisions by incorporating multiple input variables and providing outputs in various forms to support the effectiveness of policy impact assessment.
- ☞ Using innovative ICT technologies and tools to facilitate urban planning, policy modelling, and decision making.
- ☞ Ensuring compliance with EU standards and the INSPIRE Directive as well as +contributions to the EUs Digital Agenda 2020.
- ☞ Aligning with the DG CONNECT SISE initiative
- ☞ Engaging directly with stakeholders and end user communities in the validation of ICT tools according to user requirements
- ☞ Development of generic ICT tools to be used in urban planning by cities throughout Europe
- ☞ Improving the transparency of decision-making in relation to sustainable development of the urban territory

## GENERAL INFORMATION

The project urbanAPI commenced on September 1, 2011 and will end in August 2014. urbanAPI is an on-going small and medium scale focused research project (STREP), co-funded by the European Commission within the Framework Program 7 under Objective ICT-2011-5.6 Solutions for governance and policy modelling

The project is established with nine partners from six European countries. The partners include representatives from four application cities, two urban planners and policy modellers, and three development groups.

The project is coordinated by Fraunhofer Institute for Computer Graphics Research IGD, Darmstadt, Germany.



urbanAPI has established a Stakeholder Board to obtain further inputs from the community, secure evaluation and feedback on project developments and to support the dissemination of the results via the user communities.

General information concerning the project as well as a list of the publicly available results and deliverables can be obtained at the urbanAPI website <http://www.urbanapi.eu>. For further information, please, contact the urbanAPI Project Office or the Coordinator.

**urbanAPI CONSORTIUM**



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University of the West of England, Bristol, Centre for Research in Sustainable Planning and Environments and Centre for Complex Cooperative Systems (UWE)



Austrian Institute of Technology GmbH - Department Foresight and Policy Development (AIT)



GeoVille GmbH



AEW srl



City of Bologna (COBO)



Agency for Sustainable Development and Eurointegration "Ecoregions" – ASDE (City of Sofia)



City of Vienna



Vitoria-Gasteiz (CEA)

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