

Smart Cities and Urban Governance. The urbanAPI Project: Bologna Case Study

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1 ABSTRACT

The urbanAPI project has been funded by the European Commission in the context of European initiatives to improve policy as a more transparent and understandable process: it is a three-year, €4 million, multi-partner collaborative project developing ICT tools to support urban governance and spatial planning in four cities across Europe.

Underpinning the project is the understanding that the delivery of more sustainable cities requires the application of enhanced intelligence in urban management, to produce an effective basis for assessment of urban complexity and decision-making.

Fraunhofer IGD (Project Coordinator), AIT (Austrian Institute of Technology) assisted by GeoVille are responsible of ICT tool design and implementation, UWE and AEW (Rome) with the contribution of ICLEI, are responsible for engagement with stakeholders in order to define their needs, organisation of workshops and assessment of the tools application in the partner cities. Vienna, Bologna, Vitoria-Gasteiz, and Ruse are the partner cities supporting the applications with practical experience, governance needs and data.

The urbanAPI tools provide advanced ICT based intelligence in different urban planning contexts:

- First, directly addressing the issue of stakeholder engagement in the planning process by the development of enhanced virtual reality visualisation of neighbourhood development proposals.
- Second, at the city-wide scale, developing mobile (GSM) based applications that permit the analysis and visual representation of socio-economic activity across the city.
- Third, the development of simulation tool applications in the city-region responding to the simultaneous demands of both expanding city populations for certain European cities, and declining and frequently ageing populations elsewhere.

Lessons derived from the urbanAPI experience will permit the development of generic ICT tools that can be used in the majority of the cities of Europe.

In this context, 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.

In this paper will be analysed the project expected impact on urban governance and the results achieved with the 3D application in the city of Bologna during the first phase of the project implementation.

2 ICT-INTELLIGENCE FOR URBAN PLANNING CONTEXTS

Effective governance of the cities and city regions of Europe today is fundamentally undermined by urban complexity, whereby the high degree of interconnectedness and multiple interactions between socio-economic and environmental factors in a territorial context create major barriers to the effective implementation of sustainable urban development. The proactive governance of cities and the delivery of more sustainable compact cities require the application of enhanced intelligence in urban management, to produce an effective basis for assessment of urban complexity, and decision-making support.

The governance of cities is a collective effort requiring joint initiative between planning and management agencies from EU to local level, clear coordination between a variety of agencies at the local level, as well as critical inputs from all stakeholder groups including citizens.

In this context the urbanAPI applications -3D virtual reality visualisation, mobile phone based mobility dynamics, city region growth simulation – will be brought as common toolsets to the four cities serving as

test cases (Vienna, Bologna, Vitoria-Gasteiz, and Ruse) addressing different spatial scales in the multi-level governance setting of urban environments.

The proposed urbanAPI toolset and the applications will make use of the vast data resources – geospatial and statistical datasets – related to urban planning, by integrating smart ICT technologies to promote sustainable planning policies by engagement with the public through ideas and visions that address alternative urban planning perspectives and new city development proposals.

Local initiatives will be encouraged to participate within the planning process, to contribute to the appropriate solutions and understand and finally endorse the expected impacts on environment and citizens.

Each application developed in one city context will be paired with another similar application in another and different city and national context, where different socio-economic, environmental and territorial characteristics, as well as governance structures and practices will be evident. Lessons will be derived from the comparative assessment of the applications developed in these differing contexts that will form the basis for the future development of generic ICT tools that can be utilised in the majority of the 500 cities of Europe with populations over 100,000, as well as other smaller cities and towns throughout Europe.

•	• 3D VR	• Public Motion Explorer	• Urban Growth Simulation
• Vienna	• ✓	• ✓	•
• Bologna	• ✓	• ✓	•
• Vitoria-Gasteiz	• ✓	• ✓	•
• Ruse	•	• (✓)	• ✓

Fig. 1: City wise urbanAPI applications at the three urban contexts: neighbourhood (3D), city (PME) and urban region (UGS)

The urbanAPI project will support both sides in the urban policy and governance system: the policymaking and practitioner side as well as the stakeholders and the public.

The 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. Public participants in urban governance processes usually are not always ready to observe simulations for hours, to orient themselves in relation to complex cartographic products or use special equipment to experience results. Making these applications available to the public requires on the one hand simplification in the simulation concept, and on the other hand enhancement of visualisation techniques.

3 THE USER PERSPECTIVE

Most European citizens embrace the "collaborative Internet" and expect to be able to interact with city governments using ICTs. ICTs are seen as enablers of more and better participation (e-Participation), and democracy (e-Democracy) and more inclusive societies (inclusive e-Governance and e-Inclusion), extending beyond enhanced service delivery, to facilitate and enhance interactions between actors, thus requiring change in regulatory and governance processes. However, especially at the city level there is as yet only limited evidence of the direct effects of ICT-enabled innovations on city governance systems.

The urbanAPI project provides ICT enabled innovations for city governance and adapted governance models to support new stakeholder engagement and citizen participation, in order to enhance sustainable urban policy development and delivery. The conceptual frame for the project is based upon the understanding that urban managers throughout Europe face common challenges in responding to the desire for a more participatory democracy, in order to define the basis for securing urban economic vitality, social inclusion and environmental sustainability.

The urbanAPI project ICT tools will be developed with the application cities of Vienna, Ruse, Vitoria-Gasteiz, and Bologna. Local initiatives in the four urban regions working in this project will be 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.

In order to gain relevance beyond the four cities implementing the ICT tools proposed by urbanAPI, to gather additional input from urban experts and to reach out to the many cities throughout Europe that could

potentially benefit from the project's results, various activities at different stages in the project foresee the involvement of one or more relevant stakeholder organisations:

- Stakeholder Board: This advisory group convened a number of (approx. 10) networks, associations and other organisations dealing with urban policies, urban planning and/or urban sustainability.
- Requirement Workshops, organised in each application city: In order to tailor the application of the ICT tools proposed by urbanAPI as much as possible to the needs and possibilities of the four cities participating in the project.
- Evaluation Workshops: In the evaluation phase, expert input will be organised through another series of workshops, setting the criteria for analysing the outcomes and reflecting on the experiences made during the application of the ICT tools.

4 3D VR APPLICATION

The 3D urbanAPI system is built on the basis of the City Server 3D, developed by Fraunhofer IGD, which has already been proven in use by various municipalities. A web-portal is set up for the integration of several reusable visual interaction components that will be accessible over the internet.

The applications in the three cities (Bologna, Vitoria Gasteiz and Vienna) will allow, through an interactive process, the implementation of a new 3D scenario creator.

These technical developments will permit the transfer of Virtual Reality from academic research to real world applications by developing a generic tool:

- to display live content, such as other users' interactions, sensor data and simulation results;
- to render 3D content adapted to the requirements of the policy making support application;
- to add content and to modify 2D and 3D objects depicting alternative urban planning decisions, e.g. on the basis of parameters (such as eaves height) defined in the zoning plan;
- to create custom projections, e.g. in vertical and horizontal cross-sections across time, space and theme on the fly;
- to process large amounts of rich 3D models, but also little and coarse 3D information from standard CAD and GIS data bases and selected elevation views (photos, renderings) as texture information;
- to allow easy and widespread applications, by providing a simple and intuitive graphical user interface (GUI) to introduce alternative planning scenarios;
- to focus on data integration and harmonisation and to the delivery of seamless applications.



Figure 1: Preview of the 3D scenario creator (source: Fraunhofer)

Using the 3D VR (virtual reality) visualisations, the general effects and the visual impact of urban development plans can be realistically shown. The 3D scenarios support the negotiation process for urban development projects. Interactive control of planning interventions and presentation of the new visual effects, released through changes in zoning, help citizens to experience these changes.

In order to guarantee the best user experience possible high quality 3D geodata are used as well as rich interaction elements, especially to provide feedback on planning in various forms. This means that special emphasis is put on user-friendly client interfaces and an easy-to-understand simulation. Users will have the possibility to choose between the 3D web client and a mobile application.

5 BOLOGNA NEIGHBOURHOOD SCALE: 3D APPLICATION

Bologna is pursuing ICT solutions for both urban planning as well as environmental objectives. The aim is to communicate more effectively with citizens by visualising future development and potential impacts and enhance public engagement for a quick feedback on planning initiatives.

The development of the 3D scenario creator is conceived to enhance public and stakeholder engagement in the rehabilitation and mobility plan for the city centre (“Di nuovo in centro”).

A pilot area of the city centre has been chosen for the application: this area is also involved in a project called „Ambiente Vitale“, which aims to increase awareness and public participation in relation to green and public spaces provision, as well as sustainable lifestyles.

The 3D application will help planners to better visualize urban transformations in the district, improve interdepartmental collaboration and coordination in decision-making, and take account of citizens’ opinions and suggestions, in line with the community participation processes already started with the many citizen committees and cultural associations.

Citizens will be able to interact with the Municipality through the 3D scenario creator, and chose their focus on including, for example, the rehabilitation and mobility plan, bike and car sharing points, public transportation and cycle track routes. They can also provide inputs concerning the management of pedestrians’ route ways, the rubbish collection system and the use of public spaces.

The tool will help public and private planners to take easily in consideration citizens' suggestions and feeds, in order to better take care of interests and needs of the community, and come to an agreement with environmental sustainability issues.

- The application is started: the process of needs definition and requirements gathering has been completed, work on cartographic data is finished, it was time consuming work, because available data derived from different sources and have been collected for different purposes;
- after the selection and the final check, Geoville harmonized the data.

At present the visualisation of the district’s routes has been realised and we are working on communication to public and private stakeholders: a specific urbanAPI 3D application link to add to the Bologna Municipality web page, is under development.



Fig.2- Bologna city centre

6 CONCLUSION

The urbanAPI 3D virtual reality visualisation toolset will allow the fast development and deployment of participative policy support applications for decision support, conflict management, analysis and visualisation, being developed and evaluated in collaboration with the cities partners.

The Bologna application will be assessed in comparison with the experiences going on in differing city contexts (Vitoria and Vienna) and will form the basis for future generic and reusable ICT tools. Setting this goal will ensure the sustainability of the approach, as the created solutions will be applicable beyond the application cases used for evaluation in this project.

7 REFERENCES

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