PROJECT

ISHTAR

Integrated Software for Health, Transport efficiency and Artistic heritage Recovery

Funding: European (5th RTD Framework Programme)

Duration: Jun 2001 - May 2004

Status: Complete with results

Background & policy context:

European cities face common challenges concerning their quality of life:

- degradation of the urban environment,
- significant risks for citizens health, traffic congestion causing stress and economic inefficiency,
- progressive damage of the artistic and monumental heritage.

Additional difficulties derive from the lack of integrated tools that allow cities to make balanced decisions on a wide range of issues.

Objectives:

The aim of the ISHTAR project is to build an advanced software suite for the analysis of the effects of short-term actions and long-term policies to improve the quality of the environment, citizens health, conservation of monuments.

The suite will include both existing and newly developed models, covering the areas of citizens behaviour, transport, vehicles emissions noise and safety, pollutants dispersion, buildings related atmospheric emissions, health, and monuments degradation. These tools will find an integration in the use of a GIS and a user-friendly interface software. The models suite will be an innovative tool for advanced urban management and will allow the integrated analysis of the various environmental effects of technical and non technical measures.

This will represent an attractive alternative to the usual separated analysis of the effects of such measures on the various elements of the urban environment.

Methodology:

The integration of a large number of software tools and the creation of specific modules for the advanced simulation of key processes such as transport behaviour and its direct impacts on the urban environment will allow the build-up of an innovative and powerful decision support tool for urban policies optimisation.

The achievement of a high spatial and temporal flexibility in the use of the tool will maximise the possibility of use from local short-term actions to widespread long-term policies, thus being of interest for different categories of users. A high level of technical innovation, in terms of both development of new tools needed and balanced integration of these with existing and marketable tools, will create a new method and an innovative software tool for assessing urban policies.

Specific modelling efforts will be performed in the representation of policies effects on citizens behaviour, in the integrated 24 hr simulation of traffic emissions, noise and safety, in the microscopic analysis of air pollution effects on health and monuments. The maximisation of the European Added Value, deriving from a wide and geographically representative consortium, the development of stakeholders oriented activities, based on a thorough organisation of dissemination, and the contribution to a widespread socio-economic issue, represented by the decreasing urban quality of life, will originate a potentially huge market for results dissemination and exploitation.

The exploitation of the models suite will begin within the project with the application of the tool to the analysis of measures tested in the seven involved cities: Athens, Bologna, Brussels, Graz, Grenoble, Paris and Rome.

The designed strict coherence with EU Policies for Environment, Transport, and Urban Life Quality, together with the proper liaison with relevant Projects in the whole 5th FP, will guarantee the expected resonance of the project within EC research effort.

Parent Programmes:

FP5-EESD KA4 - City of Tomorrow and Cultural Heritage

Institute type: Public institution

Institute name: European Commission, Directorate-General for Research (DG Research)

Funding type: Public (EU)

Partners:

ENEA (Italy) Project Coordinator

TU GRAZ, Austria
STRATEC, Belgium
AIRPARIF, France
CARTE BLANCHE CONSEIL, France
IFSTTAR, France
GRENOBLE Municipality, France
ARIA, France
VILLE DE PARIS, France
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Key Results:

The advanced software Suite has been produced and tested either as a whole integrated tool or through some of its modules, although difficulties were met due to the complexity of the Suite in terms of integration software development, that has delayed the Suite application to the case studies and the realization of the Suite Interface.

In more specific terms the achievements can be summarised as follows:

1) The Cellular Transport Methodology (CTM). This is a completely new software tool developed by ISIS (Italy) that simulates the effects of policies and measures on the behaviour of citizens in terms of movements, mainly producing the modified Origin-Destination matrices. This tool is considered as an ‘ancillary element’ of the suite because it is likely that the city teams wishing to use the ISHTAR software will already have a ‘mobility demand model’ or alternative techniques for estimating the modification of the trip matrices.

2) The Transport toolbox. After an analysis of the available transport models, the VISUPOLIS model has been described as the best tool to integrate within the suite. This rather recent model has been developed by PTV (Germany) integrating VISUM and the innovative tool ‘Metropolis’ by Prof. A. De Palma from the University of Clergy Pontoise (F). However the potential users are free to continue to use their own traffic model (as most of the cities participating in ISHTAR Project). VISUPOLIS was tested in

the Paris case study. It is likely that a significant fraction of the future users of the suite will use this software, while the majority of the user will have their own traffic model and will have to export the related output into the ISHTAR database.

3) The Transport Direct impacts module. The direct impact model chosen for the suite is TEE2004, developed by ENEA and ASTRAN (Italy). This tool is particularly flexible in terms of space and time, includes advanced modelling of kinematics and cold start effects on the emissions, and feeds several downstream suite elements by calculating the emissions of pollutants and noise and the occurrence of accidents. This tool is compatible with most of the traffic models output. In fact the large number of options about the description of vehicle kinematics, the definition of the local fleet at link level and the approach for estimating the fraction of cold vehicles should guarantee an easy coupling between TEE2004 and the upstream used traffic model.

Technical Implications

Even if the ISHTAR Project represented a very challenging Project for its multidisciplinary approach and its level of integration of different decision support software tools it has shown one of its limits in only modelling the urban area. Without taking into account pollutant emitted outside the city boundaries we lose the very high contribution to the urban air pollution due to the background values coming from the industries, agriculture, other cities and so on. In this direction the ISHTAR Consortium identified the need of a ‘regional simulator’ as essential for a better understanding of air pollution in cities, but also for the exposure to air pollution. In fact the phenomenon of urban sprawl causes difficulties in assessing exposure, as compared to the city centres there are always less inhabitants while the number of commuters is continuously rising. For improving the simulation of air pollution the need of a better simulation of other sources within the city is also required in particular the residential emissions. Another limit, or better, another possible improvement, could be the simulation of combined exposure. It would be interesting to study the interactions of exposure to air and water pollutants, food contaminants, EM sources (non ionising radiations) and Radioactive sources (ionising radiations) with an integrated methodology.

Documents:

ISHTAR Final Report Part I (Final report)

STRIA Roadmaps: Smart mobility and services

Transport mode: Multimodal transport

Transport sectors: Passenger transport, Freight transport

Transport policies: Environmental/Emissions aspects

Geo-spatial type: Urban