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The HEAVEN approach to Environmental Assessment of city wide TDMS"

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Emissions of air pollutants and noise by road traffic is of particular concern to many European citizens. Despite emission reduction techniques, the quality of urban environment will remain on the agenda for the coming years, as a result of the continuous growth of road traffic. The Council Directive 96/62/EC on Air Quality Assessment and Management (Framework Directive) [1] and Daughter Directives [2, 3] are addressing regular assessment of air quality through monitoring and modeling in agglomerations with more than 250.000 inhabitants. *Furthermore Articles 7.3 and 8 of the Framework Directive require Action Plans for the improvement of air quality and calls for public information.* Currently, the Clean Air for Europe programme (CAFE) within the 6th Environmental Action Plan is developing the thematic strategy for further reduction of air pollution and its effects. Next to air quality, the problem of noise in densely populated areas is also of importance to most citizens. It is estimated that at least 20 % of EU population suffers from noise and its adverse effects on the quality of life. In a new proposal for a Directive [4] relating to the assessment and management of environmental noise larger cities need to produce noise maps, which indicate the number of people exposed to certain values of new harmonized noise indicators. On the basis of such noise maps, cities will have to develop Action Plans aiming to achieve noise limit values, which will be set on Member States' level. Both air quality and noise have unquestionably adverse effects on human health. Because the dominant source in most urban areas for both types of environmental impacts is traffic it is a challenge for local authorities to find *integrated solutions* for the environmental and traffic problems in urban areas. Any improvement will increase the quality of life for European citizens. Informing the public on the environmental situation as it is integral part of the Framework Directive is also governed by the Directive 90/313/EEC [5]. The proposal for the replacement of this directive COM(2000) 402 final [6] even calls for the development of respective information technologies. The HEAVEN Project as it is part of the IST-Programme is developing an Decision Support System (DSS) to assess the environmental impacts of urban traffic, identify environmental efficient Transport Demand Management Strategies (TDMS) and informing the public on the environmental situation. The DSS will support European harmonisation and effectiveness of the implementation of air quality and noise related European legislation.

The HEAVEN project

HEAVEN is a RTD project of the IST Programme, runs for a period of three years (2000-2002) and is being implemented through the co-operation of six major European cities (Rome, Paris, Berlin, Rotterdam, Leicester, Rotterdam, and Prague) with a common approach. The work concentrates on the development of a) a *Telematics System* which provides integrated and near real-time information on air and noise pollution caused by the traffic and b) a *Decision Support System* (DSS) for Traffic Demand Management Strategies (TDMS) Evaluation and Implementation.

In the framework of HEAVEN new concepts and tools to allow cities to assess the impacts of traffic on air quality and noise pollution in near-real time are being developed and demonstrated. These innovative tools, merging monitoring and simulation systems by means of IST technologies, will be integrated and will have *benefits for Cities* by allowing near real-time environmental impact assessment, identification of suitable Traffic Demand Management Strategies and the provision of information on air and noise pollution levels in urban areas. The HEAVEN project will contribute to the implementation of EU

regulations on air and noise quality by researching and demonstrating new Information Society Technologies (IST) environmental management tools.

The system concept

Diagram 1 shows the links between the main building blocks of the DSS that is being developed. The TDM Strategies under consideration will have an influence on the traffic situation according to the nature and the extent of the likely implementation of the TDM strategies. The traffic situation will be measured in real time through traffic sensors. Together with a traffic model, the traffic situation will be described in near real-time and will be the input for the subsequent environmental models. Emissions models will calculate the vehicle-related emissions for each link of the network for a number of primary pollutants taking the traffic characteristics (number of vehicles, speed etc.) into account. These network-related vehicle emissions will be fed into dispersion models to calculate air quality concentrations. The noise model will use the same traffic data as input, together with additional information such as data on road surface and topography. The results of the emissions modelling, air quality and noise modelling will be fed into the decision making process and will be disseminated to interested professional users as well as to the public. This might have an impact on the TDM strategies.

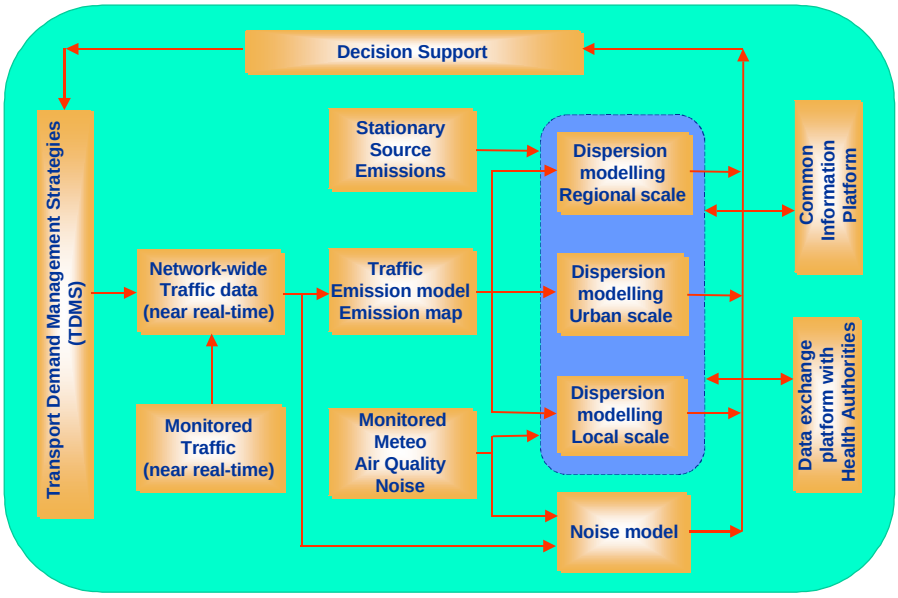

Diagram 1: HEAVEN system concept

The Impacts of Heaven Project

The HEAVEN applications are almost ready developed and integrated into the Decision Support System, the large scale demonstration the six project cities is under preparation and will start in Spring 2002. The decision makers and city authorities in charge of traffic- and environmental management in urban areas are going to use the DSS as a new means for urban planning and decision making. It is expected that HEAVEN will have the following main impacts:

- Enhanced description of **current environmental situation**
- Enhanced environmental **scenario analysis**
- Improved **access and quality** of environmental information
- Improved institutional **co-operation** of transport, environment and health agencies
- Increased support of **strategic planning** and **decision making** on an environmental basis

The full paper will describe the HEAVEN DSS, will report on practical experiences and knowledge gained through the implementation and operation of the system in the six project cities, will provide information about suitable traffic measures with the potential to improve the urban environment and will give an overview about the end products of the HEAVEN project.

References:

[1] Council directive 1996/62/EC, September 1996, on ambient air quality assessment and management

[2] Council directive 1999/30/EC, 22 April 1999, relating to limit values for sulfur dixoide, nitrogen dioxide, particulate matter and lead in ambient air.

[3] Council directive 2000/69EC, 16 November 2000 relating to limit values for benzene and carbon monoxide in ambient air.

[4] COM(2000) 468 final, 27 July 2000, A proposal for a Directive of the European Parliament and of the Council relating to the assessment and management of environmental noise.

[5] Council directive 90/313/EEC, 7th June 1990, Freedom of access to information on the environment.

[6] COM (2000) 402 final, Proposal for a directive on public access to environmental information.