

Editorial of Project manager

■ We are very happy to present you the 1st Newsletter of the HEAVEN project. In HEAVEN, six major European cities will together develop and demonstrate new concepts and tools to allow local decision makers and planners to estimate air and noise pollution from traffic in near-real time.

We are convinced that HEAVEN will give considerable support for decreasing the negative impacts of road traffic. It will help in complying with existing and forthcoming European and national legislation on air and noise pollution. We will therefore lay a great focus on ensuring a European wide distribution of the project results. The main target groups are transport and environmental decision-makers in large cities as well as to national and regional government decision-makers, the international research community, local stakeholders, to the press and other "multipliers".

One important tool for informing interested stakeholders on HEAVEN are the project newsletters. During the life time

of the HEAVEN project four project newsletters will be produced. In this first newsletter, we want to give you an introductory overview of the background of HEAVEN; its objectives and planned applications. Furthermore, we will briefly present the different European sites, where the HEAVEN tools will be developed and tested.

Finally, this newsletter (like the three following newsletters) will give a status report of the different HEAVEN work phases and give an outlook to the future work steps of the project. In each of the following editions of the project newsletter, we will inform you about all the research and demonstration results so far and present the work being done at two of the HEAVEN applications sites in detail. I wish you a heavenly time with our newsletter!



Maurizio Tomassini
Project Manager

Good HEAVENs! What do the partner cities think?



For the greater region of Paris, HEAVEN will improve considerably the availability of information on transport related air quality for the citizens and decision makers. This information will be provided in real-time, using modern air quality monitoring and modelling tools. In addition to that, HEAVEN will allow our local decision makers and planners to make use of a Decision Support System, which can evaluate the effects of future strategies of urban transport management on air quality.

Dominique Gombert, Airparif, Paris



Berlin's key objective within the HEAVEN project is to develop a Decision Support System which supports our environment and transport authorities to assess the impacts of local transport management strategies on air and noise quality. This innovative decision support tool can support us in our efforts to comply with EU legislation on air quality and noise. Furthermore, the City of Berlin will establish an information platform providing high quality environment and transport related data. This platform will lead to improved services for our citizens through better quality of and access to environmental information.

Martin Lutz, Senatsverwaltung für Stadtentwicklung, Berlin



Leicester, the United Kingdom's first 'Environment City' is working with the community on implementing Environmental Policies including a Local Agenda 21 Action Plan. This commitment was recognised with the European Sustainable City Award in 1996. Supported by the European Commission and the Department of the Environment Transport and the Regions a series of projects have developed an Air Quality Monitoring and Modelling system integrated with an Urban Traffic Management and Control system to provide environment information via a range of media and delivery mechanisms. HEAVEN with its Decision Support System will enable the Council to provide user friendly environmental information to a wide range of users to help everyone to make the appropriate decisions and choices".

Nick Hodges, Leicester City Council,



"The HEAVEN project will help us to achieve a safe basis for decision making in one of the crucial urban problems, which is air pollution caused by traffic. I hope that in the long term HEAVEN will largely contribute to the improvement of air quality in Rotterdam".

Frank van Vliet, City of Rotterdam



The Heaven project at Prague is aiming to develop a decision support system, which will enable to evaluate impacts of different traffic demand strategies on air quality and noise levels. The DSS will help both at the process of city and urban planning and at the real time traffic and environmental management.

Maria Kazmukova, City Development Authority, Prague



The Administration of the city of Rome has devised a policy of sustainable mobility based on environment friendly choices and has created an Integrated Telematic System for Traffic Monitoring and Control which allows to exploit actual transportation resources in an efficient and rational way. The results of the HEAVEN project will allow to add to the Telematic system an essential function to evaluate, in a comprehensive way, the impacts on the environment induced by the transport strategies adopted, reaching a very advanced degree of integration of ITS applications.

Maurizio Tomassini, STA, Rome Mobility Agency

Overview

• Editorial of Project manager	1
• Good HEAVENs! What do the partner cities think?	1
• Thanks HEAVEN! - innovative management tools are reducing mobility related pollution in urban areas	2
• HEAVEN system solutions	2
• HEAVEN: how does it work?	3
• Partner cities (Paris, Berlin, Rotterdam, Leicester, Prague, Rome)	3-6
• HEAVEN: status of work	7
• News	8



Thanks HEAVEN! Innovative Management Tools are reducing mobility related pollution in urban areas

Traffic congestion and negative impacts of traffic on air and noise quality have increased considerably in the last years. Large urban centres are particularly challenged by the conflicts that arise between maintaining and promoting economic growth and seeking to limit the growth of traffic and the resulting pollution. Today, most European Cities have recognised the need to find new solutions for their environmental and traffic problems.

The HEAVEN project is designed to help cities to reduce the negative impacts of urban traffic on the environment, by improving their ability to evaluate and manage mobility related emissions. HEAVEN will develop a system that

supports traffic planners and local decision-makers in evaluating the effects of local traffic flows on air and noise quality. Through this so-called "Decision Support System", European Cities will also have the possibility to identify efficient strategies for managing traffic, which can reduce transport-related noise and air pollutant emissions. In addition to that, HEAVEN will support the development of publicly accessible information platforms, which will provide near real-time information on the state of transport related air and noise pollution levels and their effects on health.

HEAVEN System Solutions

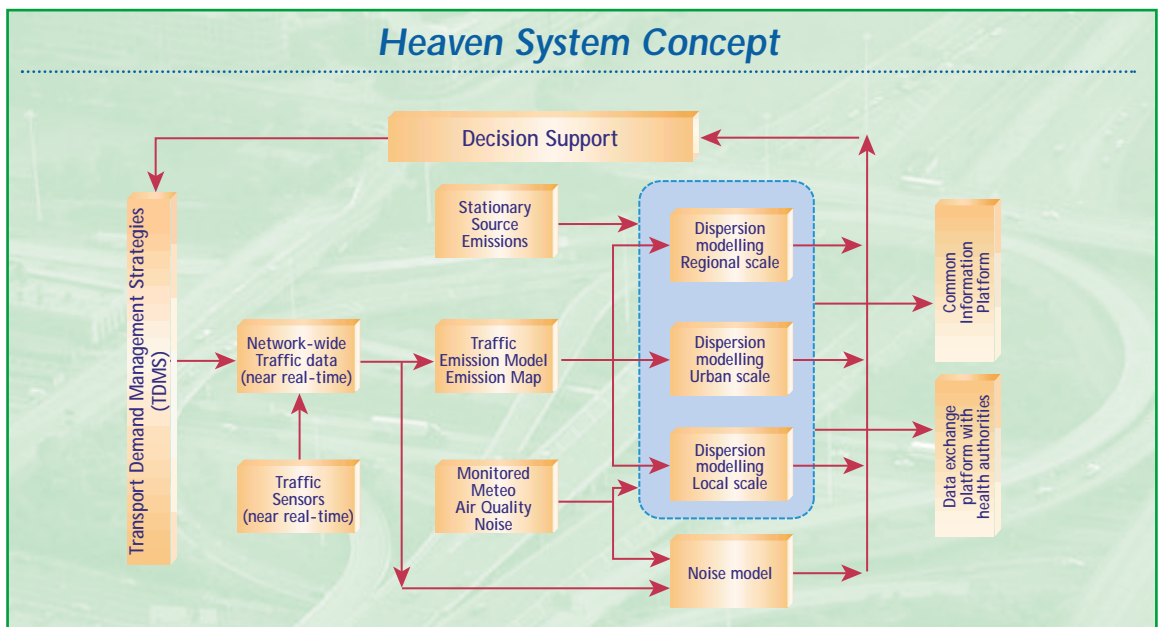
The planning process for implementing Transport Management Strategies, aimed at reducing air and noise pollution, implies various steps of data collection and exchange. These are key for supporting the identification of appropriate actions and providing a solid basis for decision making. Until now, the different information sources, which are necessary to obtain a high quality description of the environmental situation in urban areas, have been only available independently, fragmented and not integrated into the everyday local context.

The HEAVEN project will provide the technical integration, so that the exchange and interoperability of the different information sources becomes possible. The linkage of near real-time maps of traffic flows and models that try to analyse air and noise quality levels will enhance the overall quality of modelling and forecasting traffic related pollution. HEAVEN will develop the technologies for creating a Decision-Support System for evaluating transport management strategies, which are based on the availability of real-time data on traffic related pollution. In the course of the first phase of the project, HEAVEN will develop various applications, which will be combined together to form the HEAVEN system which will be tested across the application sites. A selection of the following components will be demonstrated in six different major European cities:

- **Air quality monitoring applications** will improve the process of periodic and/or continuous quantification of traffic related emissions and other pollutants in the air.
- **Air quality modelling applications** will improve

emissions models and inventories, as well as dispersion models. These applications will lead to an improved forecasting quality, based on the integration of air quality data (from measuring networks and from spot measurements), emission models, dynamic meteorological data and (near real-time) traffic flow data into the modelling approach.

- The **Decision Support System (DSS)** will provide information about "hot spots" or short-term forecasts or long-term annual average concentrations of traffic-related pollutants, using a user-friendly interface for decision makers. This system will be able to evaluate the environmental impacts for actual traffic situations and for planned Transport Management Strategies.
- The **Common Information Platform** will enable the public, the media, and professional users to obtain real-time and historic information on air quality, noise, and traffic flow. In the course of this application, common data structures and a common data pool that includes all information on the assessment of emissions, air quality and noise stemming from urban transport will be developed and tested.
- **Urban noise model** will predict noise pollution by utilising input from a diverse range of data types (including geographical, near real-time urban traffic, and dynamic meteorological).
- **Health Data Platform** will define a data exchange platform with health authorities for supplying near real-time health-related information on air and noise pollution.





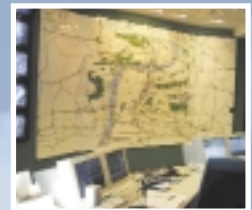
HEAVEN: How Does It Work?

HEAVEN is a Pan-European project, which is co-financed by the Information Society Programme of the European Union. The systems solutions to be developed and demonstrated in HEAVEN will be tested in six major European cities: Berlin, Rome, Paris, Prague, Rotterdam and Leicester. The HEAVEN cities are central to the success of the project. They will demonstrate how HEAVEN will work in practice and how it will contribute to improved transport planning and a cleaner environment.

All HEAVEN project cities are already using various infrastructure consisting of hardware and software tools (traffic sensors, environmental monitoring networks, emission and dispersion models). Furthermore, all cities have some considerable experiences in developing strategies for managing transport demand and evaluating their environmental effects on different spatial and

temporal scales. This knowledge originates from the long-term involvement of many project partners in related national and international initiatives and projects. Besides the solid base of previous and ongoing work in the area of Transport Demand Management and environmental management in urban areas, all HEAVEN cities are looking for new solutions to reduce the negative effects of urban traffic on the environment. In all cities, improving information quality on traffic flows and their environmental impacts and increasing the efficiency of planning processes are important elements in that respect. Although each of the HEAVEN cities has a different point of departure concerning traffic, air and noise quality monitoring all cities follow a common systems approach which provides enough flexibility to take national and local peculiarities and constraints into account.

HEAVEN's partner cities



Paris

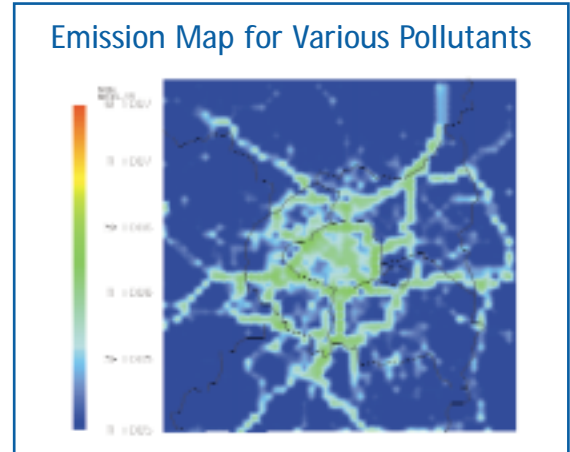


The existing air quality monitoring tools in the Greater Region of Paris deliver a permanent description of the air pollution levels at specific background and roadside locations. Beside this standard monitoring, specific modelling tools are also available. They allow an extensive description of air quality patterns, for some particularly interesting air pollution episodes. However, despite the strong involvement of the transport sector in the local atmospheric emissions, there is no direct and permanent feeding of the air quality modelling tools by observed traffic data. Therefore, the main objective of the HEAVEN project in Paris will be to merge real time traffic description with the air quality modelling tools.

The final product is expected to deliver in quasi real time :

- traffic description on the main network;
- air pollutant emission maps ;
- air pollutant concentration maps on both background locations at the regional scale and roadside locations along the main traffic network.

This information, related to the whole Ile-de-France region, will be updated several times a day and will be available on various web sites, for the public and professional users. The system will also allow the evaluation of environmental impacts of different transport management strategies (e.g. traffic restriction, speed reduction, improved running fleet).



Berlin



In the context of HEAVEN, near real time traffic data collected from a network of measurement points, and environmental data will be processed and integrated into a Decision Support System. The basis for the Berlin HEAVEN system will be the traffic management centre which will be established in 2001. The traffic management centre will collect real time traffic data from 158 measurement points in the city of Berlin. With traffic modelling tools the traffic in the whole city will be modelled on the basis of the measured traffic data. By using forecasting models traffic forecasts can be made by the traffic management centre. Air quality in Berlin is regularly monitored at 20 measurement stations and noise data is collected in the so-called BLUES data base. The combination of data from the traffic management centre and the existing models will allow for the modelling

of pollution levels in near real time and – in the long term - at the street level for each major street in Berlin. The Decision Support System will help planning authorities and decision makers to evaluate environmental situations in specific city hot spot areas. It will help to implement transport demand management strategies, which can contribute to a reduction of air and noise pollution in the City. Within the HEAVEN project, the Decision Support System will be implemented and tested in a small area in Berlin (Beusselstraße). It is characterised by a high share of truck traffic leading to very high pollution levels. In fact, the German noise emission limits are often exceeded in this area and countermeasures have to be taken in order to be in compliance with German legislation.



Rotterdam

The Rotterdam Decision Support System consists of two main systems. The first is the Transport Environment Chart (TEC) that is already being used for long term predictions of traffic induced air pollution. The main innovation in the framework of HEAVEN is to include in the TEC a dispersion model that describes air quality in zones, rather than lines along the roads. The second system is the Environmental Information Platform (EIP), which will be based on near real-time traffic data. The near real-time traffic data form the input of short-term emission and dispersion models, so that a near real-time description and prediction of air quality along the roads is produced. The short-term predictions can be used to induce traffic measures. A real time picture of air quality along roads will be made available for the general public on Internet.

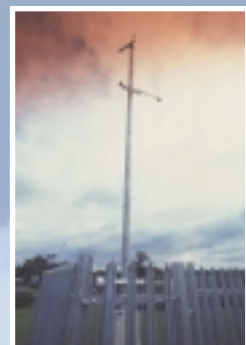
Improved and actualised models are important elements of the Decision Support System that is built within the HEAVEN project. Data from air quality measurement campaigns will be used to improve and actualise the emission and dispersion models used in the region. Within HEAVEN an air quality measurement campaign is being carried out along different roads in the region. Point source measurement stations will be located along the A13 highway, first in an open field situation, later in the built environment of the Overschie district. Furthermore, experimental measurements, using the advanced technique for monitoring air quality (DOAS) are being tested. For the urban road network a point source station will be placed on a major corridor (Pleinweg). In addition to this, passive samplers will be placed throughout the city.



Leicester

Air quality monitoring and modelling is being developed within Leicester using the AIRVIRO system, with the incorporation of live traffic data, near real-time prediction and 24/48hr forecasting. Within the scope of HEAVEN, Leicester aims to test new methodologies for decision making and assess Traffic Demand Management Strategies targeted at reducing transport related pollution, keeping abreast of EU Directives on air quality and noise and comply with National and Local pollution strategies. To assist decision-makers with management strategies and ensure compliance with legislation Leicester will enhance the Air Quality monitoring and modelling network within the city in a number of ways. A 'health database' and an accompanying 'statistical calculation package' will be developed and built into the Air Quality modelling system along with a 'Street Canyon' model to further support the

pollution predictions. The AIRVIRO model will be nested within the background data from the OPANA model. In anticipation of the EU Directive on noise, a noise model will be developed and incorporated into the AIRVIRO system. The current system of integrating live traffic data with Air Quality will also be further enhanced to improve on dispersion modelling predictions. As part of the HEAVEN project, the Decision Support System will be implemented and tested within two regions of Leicester. The areas are already equipped with air quality, roadside pollution and traffic monitoring equipment and have previously been used during the demonstration of other Traffic management projects. One area has also been identified as an 'Air Quality Management Area' through completion of the UK 'Air Quality Review and Assessment' Strategy and will involve cross-boundary consultation.



Prague



The air quality monitoring network (13 automatic monitoring stations) is operated by the City Hall of Prague in co-operation with the Czech Hydrometeorological Institute and provides on-line data on air pollution for the city administration. Data on different sources of pollution is integrated in the regular biannual off-line modelling of the ambient air quality and is published in the yearly books of environment of Prague. Real time traffic data is monitored by the Traffic Management Centre. Up to now, no link between the two major databases has been established. The HEAVEN project will integrate the data from both air quality monitoring network and Traffic Management Centre

into a common database, together with data on emissions from other sources and short-term meteorological forecasts. Furthermore, Prague will implement the AIRVIRO model for air quality and the digital topographical model in order to improve the information on air and noise quality. Based on the integration of real-time traffic data and new emission factor and dispersion modelling tools, a Decision Support System (DSS) will be developed, which will evaluate the impacts of traffic flows and transport demand management strategies on air and noise pollution.

The DSS will be a useful tool for the City administration to reduce air and noise pollution. Real time information on air quality, noise levels and traffic will be incorporated into a Common Information Platform and will be available on the Internet.

The Decision Support System and the Common Information Platform will enable better information exchange and institutional co-operation between the transport and environmental experts and decision makers.

For the HEAVEN demonstrations, the Prague 7 - Holesovice district has been selected, which is a densely populated area exposed to frequent air pollution episodes and traffic congestion.

Rome



In Rome, the basis for the HEAVEN system is the traffic management centre established in 1999 where real time traffic data from measurement points covering about 200 kilometres of roads in the city are collected. Based on this measured traffic data the traffic in the Demonstration Area will be modelled for each major street. Within the HEAVEN project,

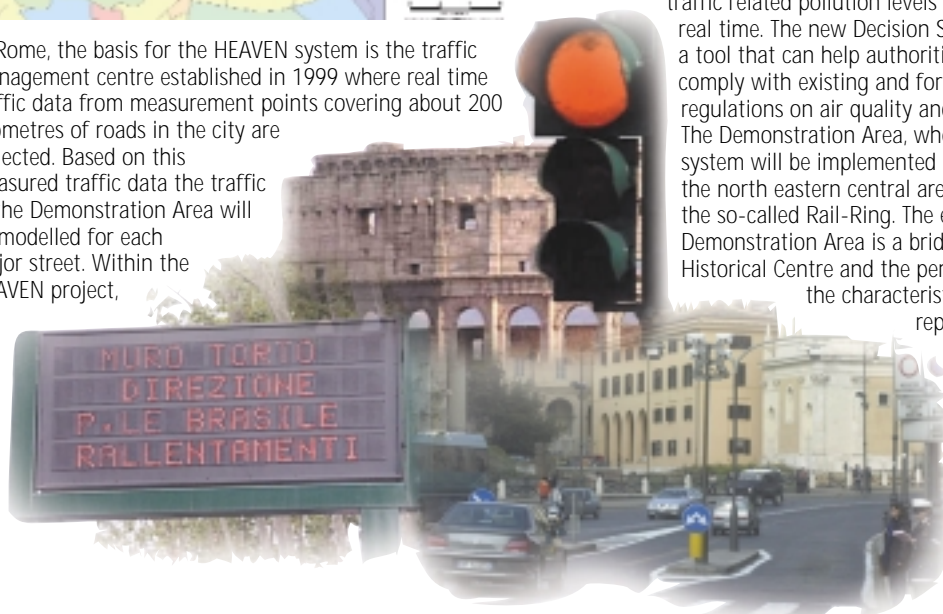
traffic data and environmental models for emission and dispersion will be combined. This allows the calculation of traffic related pollution levels in near real time. These calculated levels will be compared to air quality measurements for validation purposes.

In the past, Transport Demand Management Strategies in Rome have been developed based on off-line simulations in order to ensure the compliance with National air quality limits for urban areas. Through the HEAVEN Decision Support System in Rome, the implementation of effective Transport Demand Management Strategies will be facilitated, since decisions can be based on information of

traffic related pollution levels which are near real time. The new Decision Support System is a tool that can help authorities in Rome to comply with existing and forthcoming EU regulations on air quality and noise.

The Demonstration Area, where the HEAVEN system will be implemented and tested, is in the north eastern central area of Rome, inside the so-called Rail-Ring. The entire Demonstration Area is a bridge between the Historical Centre and the peripheral areas, so

the characteristic of the traffic is representative of the whole urban area.



HEAVEN: Status of Work



Analysis of the needs of potential users of HEAVEN systems has been finalised

The User Needs Analysis is an essential pre-requisite to the design of the Decision Support System, and to its transfer to other European cities. With the User Needs Analysis, it can be ensured, that the design of the system is consistent with the user requirements, ensuring the system is constructed from the viewpoint of the user.

To perform the user needs analysis, six work steps have been undertaken. After the identification of the user groups and the definition of a uniform approach, the analysis of the user needs in the HEAVEN cities took place. Then, the results have been compiled and summarised on the EU-level and the findings have been cross-checked with other European cities in order to ensure the transferability of the HEAVEN system.

User Groups

Three types of users have been identified:

- public administrations
- decision makers
- the general public

Administrations using the HEAVEN system are generally on a city level (but can also include district and state level organisations) and are mainly responsible for transport, environment or health and planning issues. The second user group are decision makers who are indirect users of the system. Decision makers generally get advice on transport and environmental policy actions from the public administration. The general public and diverse interest groups form the third user group and are primarily interested in having access to information on traffic related air and noise pollution and its health effects.

Requested functions

The analysis of needs of potential users of the HEAVEN system has shown that there is a particular need for a support tool to optimise urban traffic flows and to model the environmental effects of temporary transport management measures and long-term transport policies. In order to fulfil these demands, the HEAVEN system should provide the following functions:

Requested functions of the HEAVEN Decision Support System

Modelling function	Modelling functions in order to evaluate the environmental effects of TDMS
Forecast function	Forecasts on pollution concentration
Alarm function	Information when pollution limits are exceeded
Statistic function	Information on historical data in order to compare existing levels with historic levels
Pollutants to be addressed	CO – carbon monoxide, NO _x – nitrogen oxides, HC – hydrocarbons, O ₃ – Ozone, PM 10 / 2.5 – particulate matter
Noise	Noise level and No. of people affected
Spatial resolution	Street level, City level
Time resolution	At least hourly update (during daytime)
Information display	Data should be presented in tables and on maps
Information channel	Internet, teletext but also in periodic reports

Common system architecture has been defined

The HEAVEN Decision Support System (DSS) combines near real-time traffic flow information and environmental models by means of IST technologies to analyse the environmental impacts of urban traffic on air quality and noise.

The system under development will be operated on-line, based on current traffic and environmental information, and off-line, based on planned Transport Demand Management Strategies (TDMS) and on traffic and environmental scenarios. It will provide an enhanced near real-time description of the environmental impacts mainly induced by traffic and will facilitate the analysis of environmental effects of TDMS.

The Starting point for the definition of the system architecture was the investigation of the user needs (see above). A sound analysis of the user needs makes clear that the Decision Support System has to be based on the following functions in order to meet the user requirements identified:

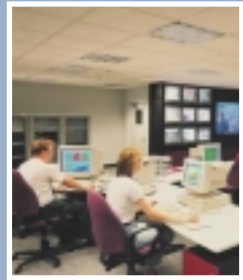
- Traffic related functions:
Near real time traffic monitoring, Assignment of traffic, Modelling of traffic;
- Environmental functions:
Emission modelling, Pollutant dispersion models, Noise modelling, Calibration of models.

- Management of Additional data:
interface to sources of meteorological data, static data (population, road, surroundings, etc.), geographic data, traffic and environmental statistics.

The Overall System Architecture is a consistent representation of the HEAVEN DSS concept. This overall architecture consists of three modelling modules, namely the Traffic Modelling and Forecast, the Air Quality Modelling and the Noise Modelling, that are fully integrated in the HEAVEN system.

The data from these three components is fed into the data base, that in turn supplies information to the Common Information Platform. The HEAVEN system operator communicates with the DSS through a specific interface. The HEAVEN DSS overall architecture has been used as a reference to design the architecture of the project demonstration site DSS:

So the characteristics of the local DSS' architectures reflect the general characteristics of the overall architecture, although duly customised according to the peculiarities of the site: availability and type of data sources external to the system, modelling objectives and modules, models adopted, operational constraints, etc.





Detailed plan for evaluating demonstrations in HEAVEN has been developed

Evaluation plays a key role in establishing the benefits which all users of the HEAVEN products can gain. During the first year of the project, the evaluation team, consisting of six Local Evaluation Managers from the HEAVEN sites and an independent Evaluation Co-ordinator, has worked hard to put together a comprehensive Draft Evaluation Plan (HEAVEN Milestone M3.2).

In four evaluation workshops and various other consultations, the evaluation team agreed on a common evaluation concept. It defined the following common impacts which are expected to arise through HEAVEN:

Impact 1: Enhanced description of current environmental situation

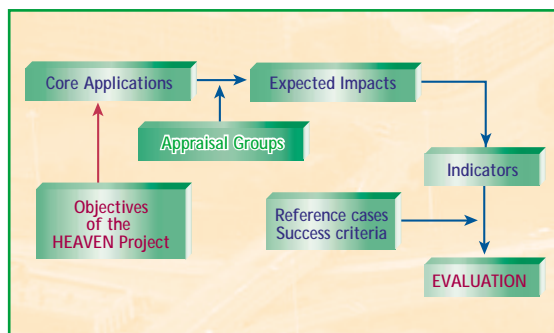
Impact 2: Enhanced environmental scenario analysis

Impact 3: Improved access and quality of environmental information
(divided into impact 3A "for professional users" and impact 3B "for public users")

Impact 4: Improved institutional co-operation

Impact 5: Increased support of strategic planning on an environmental basis

For each expected impact, the evaluation team identified assessment objectives and common indicators.



The evaluation team will devote the next few months to further elaborating the common evaluation concept and planning, in a more operational manner, the evaluation at the respective HEAVEN sites. These results will be documented in the Final Evaluation Plan (HEAVEN Deliverable D3.1), scheduled for May 2001.

During the second year of the project, the ex-ante evaluation will be performed, and in the third year, the ex-post evaluation will take place. At the end of the project, a Final Evaluation Report (HEAVEN Deliverable D3.2) will be produced providing a comprehensive overview of key demonstration results and summarising European added value. The results of the evaluation process will provide important input to the definition of the business case, exploitation and marketing plans and will, therefore, be instrumental for decisions on the direction of any future investments of the final product.

News

HEAVEN web site has been updated: <http://heaven.rec.org>

For further information on HEAVEN (e.g. project structure, partners involved, news from the sites) you can always visit the HEAVEN web site, which is updated on a regular basis. You will also find articles, presentations and the HEAVEN newsletter for downloading.

HEAVEN Brochure available

A HEAVEN project brochure giving an overview of the project objectives, expected benefits, project partners, etc. has been developed and is now available. This HEAVEN leaflet can be downloaded from our web site and can be ordered by post.

Please write or fax to: Gabi Wegeler, Rupprecht Consult GmbH, Kemperbachstrasse 55 D-51069 Köln, E-mail: g.wegeler@rupprecht-consult.de Fax: 0049-221-689 7255

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Milestones/Deliverables available

The „User Requirement Report“ as well as the draft validation plan have been finalised and are now available on the HEAVEN web site.

Prague Technical Meeting, Nov. 28, 2000

The fifth consortium meeting within the HEAVEN project was hosted by Prague's City Development Authority on 28 November, 2000.

The HEAVEN newsletter can also be downloaded on our web site:

<http://heaven.rec.org>

in English, French, German, Dutch, Italian and Czech.

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