Integrated Water Management and remote data access, possibilities of a system based on telematics.
Remssbot, Regional Environmental Management Support System Based On Telematics.

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Introduction
Remssbot is a co-operation project among the regions Piemonte (Italy), Attica (Greece) and Scheldt (Netherlands and Flanders). Remssbot is supported by the European Commission within the 4th framework of the Telematics Application Programme (DG XIII). Remssbot aims to improve environmental information services at the level of the water system, taking benefit of an innovative design. The physical and administrative area related to an water system and its environmental problems may vary from a part of a region up to several countries. The Remssbot system provides administrations access into each others information. This, on an independent base while each administration controls its own data. The concept results in several connected databases which are physically separated, but appear as one. The central element is a catalogue conform to the guidelines of the Catalogue of Data Sources (CDS) of the European Environment Agency. In this paper the river Scheldt region is discussed.

The Remssbot project in the Scheldt region.
The source of the Scheldt river is situated in North-France, nearby Gouy-le-Cavelet, just north of Saint-Quentin. The river, which is about 350 km long, flows through France, Wallonia, Flanders and the Netherlands. At about 11 million people live in the catchment area. The river Scheldt is of great importance for a wide variety of use like fishing, agriculture, shipping purposes, industry, drinking water purposes and recreation. For centuries these activities have taken their benefits of the river basin. The last decades however the development of the economical interests is conflicting more and more with the ecological functioning of the system.
The high number of habitants, the high degree of industrialisation and the agricultural use of a big part of the area resulted in a considerable pressure on the river ecosystem.
The ecological problems in the Scheldt basin are partly due to the enclosure of wetlands for agricultural use and more recently for a wider variety of industrial and port related, urban, safety and recreational purposes. As a result, unfortunately the river Scheldt is still one of the most polluted river systems in Western Europe.

The project in the Scheldt region concerns the needs of the water managers within the region to have access to the right information on the right moment. The main activities of the participating administrations are related to the water quality and the ecological functioning of the river Scheldt. Subjects with which they are occupied, are the ecosystem as a whole, the functioning of a habitat like a marsh with associated mud flat, the presence of birds, fish and vegetation depending on it, up to the primary producers of the food chain, like the fytoplankton and benthic diatoms.

Main project objectives :

- Developing an environmental management support system which can be used for a wide variety of environmental topics and management levels.
- Facilitate the search for and access to specific environmental data by several well developed navigation systems.
- Increasing the quantity of environmental information and velocity of availability.
- Wider dissemination of all kind of publicly available environmental information concerning the water system using the internet access.
- Using the Catalogue of Data Sources in the data communication between regions and countries will stimulate the standardisation of terms used for a certain object, activity or location within a system. This is essential in using one European standard thesaurus for environmental subjects. The Remssbot project supports the EEA making this multilingual list in the daily practice of environmental managers.

Scheldt region objectives:

- Stimulating integrated water management development which places the river basin as the central entity within policy plans, instead of geographical determined boundaries, such as land frontiers.
- Sharing experiences, knowledge and measured data on water management topics between administrations and their water managers concerned with an ecosystem. This can result in closer co-operation and understanding of public administrations concerning environmental information.

The Catalogue of Data Sources (CDS)

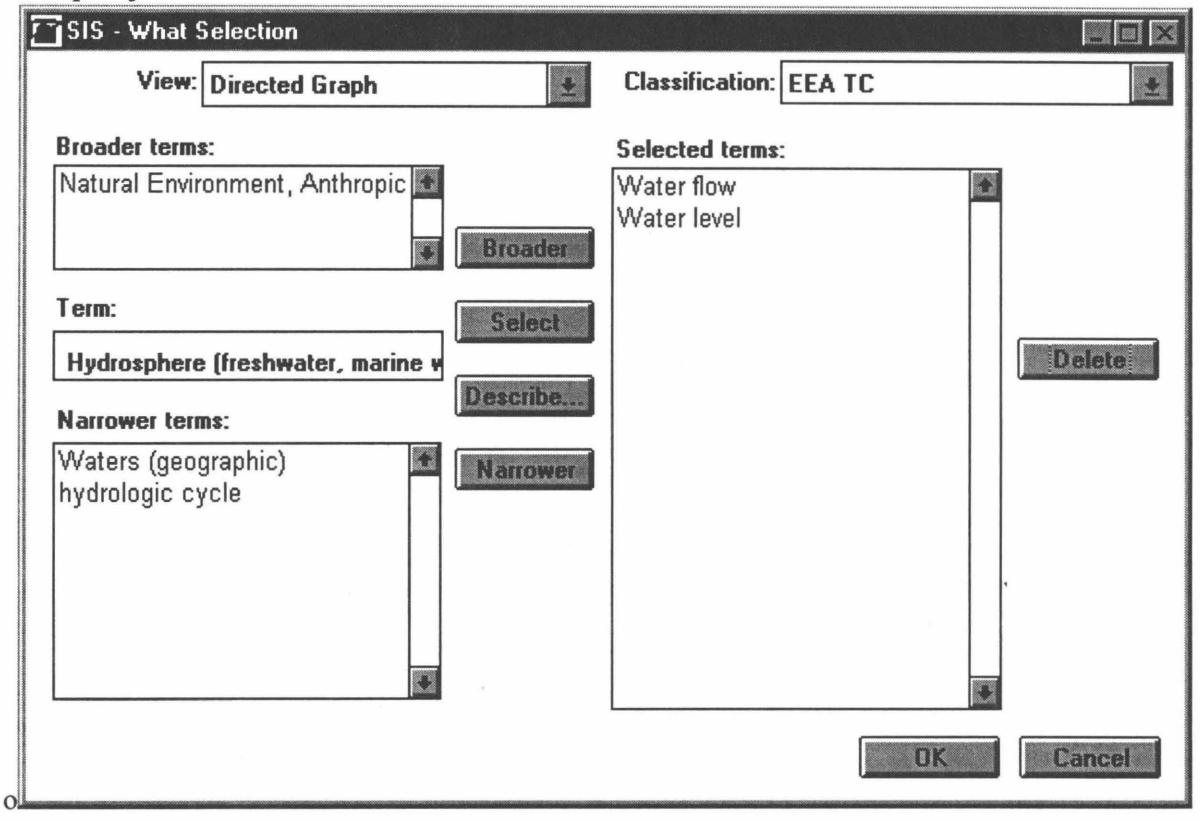
Environmental managers have different interests in information, however the concept of the problem remains the same. This concept is what information is available about an item, where is it and how does it becomes available

The central element in the remssbot project is a catalogue conform to the guidelines of the Catalogue of Data Sources (CDS) of the European Environment Agency. This is a metadata system, multilingual, using the terminology determined by the EEA, describing what information is available at what location and who is the owner of this information. The extensions to the CDS provide IT systems with the automated procedures to access the actual information. The system allows users to navigate through the catalogue and explore information sources regardless of environmental topic and location. The information becoming available, regardless of type and format, is to be related to the existing software.

WWWW Approach

The metadata, which are stored in the Remssbot CDS, is divided into four main components, the **W**hat (subject of interest), **W**here (location), **W**hen and **W**ho (data owner).
The user can navigate through this metadata, which informs him about the available information, ranging from empirical data, documents, scanned maps or metadata.
The metadata is tree structured, allowing the user to navigate from the most broad term up to the most detailed one. This in order to give a user who is not familiar with the information a easy tool to scan what information can be found in the database.
The more experienced user can use the alphabetic search, typing the desired terms, saving time to access the desired information.

Example of a what search.



The Demonstrator.

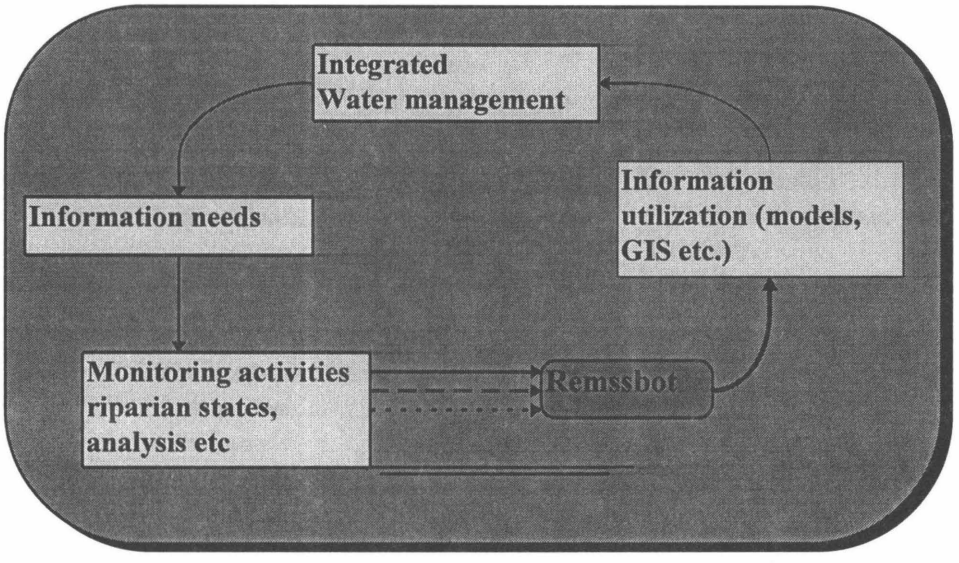
A prototype of the system, the so-called demonstrator is realised at different participating administrations, contains the following applications:

1. A **search information system** (SIS) application gives broader and better access into all kind of information (measured data, documents, maps etc) and from different sources. This system gives detailed information, interesting for the professional water managers working at the participating administrations.
2. A **GIS application** (Schelde GIS), which is developed is mainly depending on the most recent measured parameters from the different administrations. Maps related to the ecological functioning of river catchment are generated through this GIS application.
3. The Flemish Environmental Agency and the Scheldt Information Centre (SIC) formed by various parties among them Rijkswaterstaat, the National Institute for Coastal and Marine Management and the Province of Zeeland will use Remssbot to connect their **WWW server** which informs all kind of organisations and public places (libraries, universities etc.) in the Scheldt region.

Future Remssbot application

Concerning the river Scheldt basin five countries/regions with a different socio-economic background and institutional water management organisation are involved: France, Wallonia, Brussels, Flanders and the Netherlands. One of the main issues at the moment is the collection, analysis, comparison, validation, storage and accessibility of water quality monitoring data.

An example of the information cycle



The available data should be reported to those who need to use it for decision-making, management evaluation or in-depth investigation. Information necessary for future use should be stored and the information exchange should be facilitated not only at the level of the monitoring body itself, but also at other appropriate levels like the river basin. For example the International Commission on the protection of the river Scheldt is preparing a homogenous monitoring programme for the entire river Scheldt. This programme has been appointed as a pilot project for a water quality monitoring programme on the European level.

Data storage systems of riparian countries should be able to handle the agreed data exchange format. For international data storage purposes, a central system may be considered.

In this respect Remssbot offers a considerable advantage when, for example connecting the existing databases of riparian states. In this case there will be no need for a central database, which is not only more cost-efficient, but also allows the participating administrations to use their own developed IT systems. Every authorised administration keeps responsible for the quantity and quality of its own data and has easy and equitable access to the data of other participating administrations.