



SEWING

System for European
Water Monitoring

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*SEWING will provide
the latest technology
for water monitoring.*

Project presentation

1. Project main goals

The most common methods for analysing the chemical ingredients in water are now of a laboratory type. Among them spectrophotometry, chromatography, and electrochemical methods are the most developed. They are quite expensive. The main goal of SEWING project is to create a cheap and generally accessible system for monitoring and early warning of water pollution. A large variety of non-organic polluting ions detected and a broad range of sensitivity for ion concentrations, will make sensors suitable for all types of water resources and waste water in high-risk industrial regions, giving the possibility of monitoring, early warning and finding the sources of pollution. When running this project, methods of design will be created and prototypes of microsystems based on new types of ISFET and other chemical sensors, selectively sensitive to various polluting ions will be realised. The microsystems will be flexible, reliable, and will take into account interference, temperature, ageing, etc. The system will create a possibility of general European or regional policy in water management. It will be implemented and verified by end-users, and prepared for industrial implementation.

2. Key issues

The SEWING project is of an interdisciplinary type, combining the following specialisations:

- Environmental engineering
- Chemical engineering
- Electronics
- Material technology
- Informatics

It is an important and difficult task to combine smoothly the efforts of partners being of different specialisation and to create an integrated system for cheap, general and easy to manage system of water pollution monitoring. The pollution detection will be limited to non-organic ions, so co-operation with other project, focused on organic pollution will be necessary. In particular the following problems must be solved:

- Investigation what kind of ions and in what concentration in water must be detected in different regions (industrial, urban, agriculture)
- Preparation of ion selective sensors based on ISFET technology
- Preparation of suitable software for data extraction
- Realisation of microsystem prototypes

3. Technical approach

The system is based on 3 hierarchical layers:

- Chemical sensors with appropriate data processing (smart sensors)
- System for data transmission to intermediate server
- Software for data storage in the central computer

Fig. 1 shows the 3-layer system in a block representation.

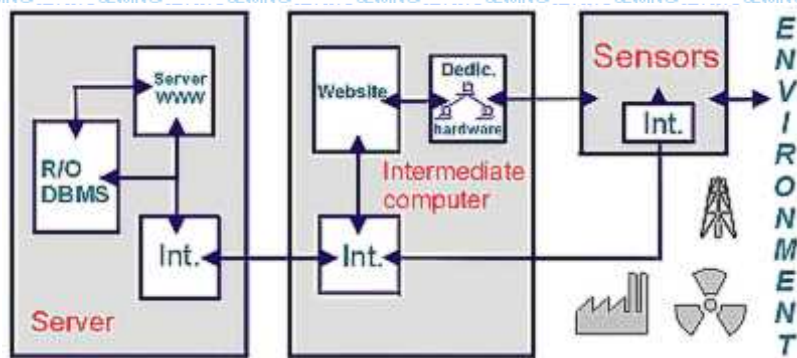


Fig. 1: Block representation of the SEWING system

The sensor itself is a small and flexible device suitable for detection of selected ion concentration in surface-, soil-, and ground-water, drinking water, industrial waste and process water, water for irrigation, etc. The "vision" of the smart sensor is shown in Fig. 2.

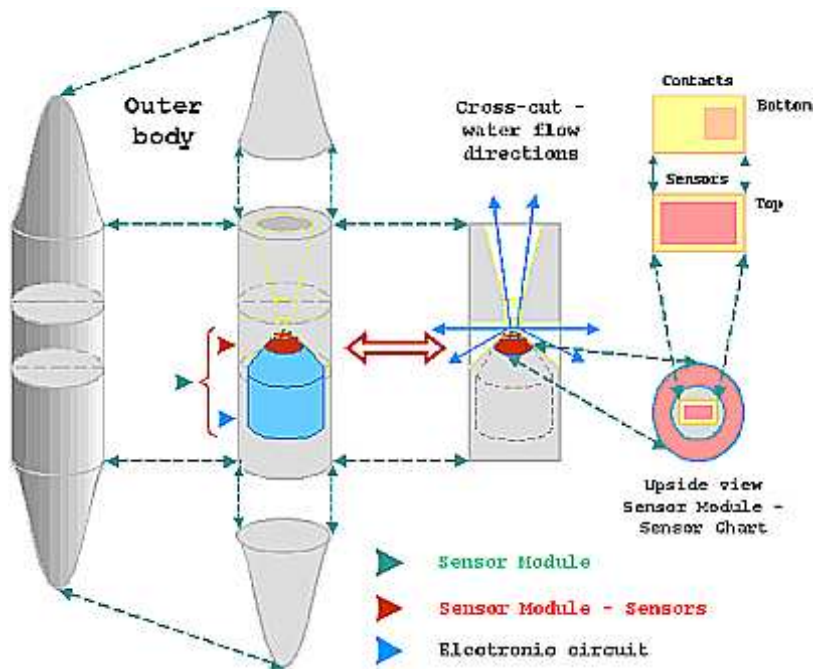


Fig. 2: "Vision" of the smart sensor

4. Expected achievements/impact

The main achievement of the project will be creating a compact, cheap and easily accessible system for water monitoring and early warning about pollution. The prototypes will be used in the field in real environmental conditions to verify their usefulness, reliability and accuracy. The implementation plan expects to prepare the system for industrial production and its final use in all participating countries and in the future also in other countries. Many FP5 projects, particularly in the Thematic Programme IV, are concerned with water pollution monitoring and expect to use the SEWING system in the future. The impact on Community added value and social objective can be important. The availability of simple and cheap microsystems for water pollution monitoring will raise the standard of life and general health of the population of the continent. The flexibility and user-oriented properties of the microsystems will make Europe more competitive in the challenge for a clean environment that can bring countable economic effects. Last but not least, design, production and exploitation of the system will raise the employability in Europe, with beneficial and important effects on the employees' work. In a more quantitative description, it is expected that once the microsystem for water monitoring and early warning is developed, it will be produced in thousands and used in many regions where water pollution is becoming dangerous. Among partners in the project there are organisations responsible for water management in Poland, Slovakia, Austria and Italy. Partners from other participating countries, through their personal contacts, will make the application of SEWING results even broader. So finally, dissemination of the project achievements can make a significant impact on water management all over Europe. Standardisation of microsystems is of great importance. This will be done not only through a standard way of data storing, but also through standard software used for processing and visualisation of collected data concerning water pollution. Such a standardised system produced in the above-mentioned quantities (over-passing the critical mass of economic success) will bring a good position in the challenge for the environment protection market for Europe.