



SEWING

System for European
Water Monitoring

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

What is SEWING ?

Objectives

Water, air, soil and sea pollution is already a threat to life on our planet. Water is one of the most important elements, as its availability is diminishing, while its pollution is growing. In countries all over the world intensive research and investments are being done to prevent this tendency. In particular, measurements, monitoring, and early warning systems concerning the concentration of pollutants are the subjects of great efforts.

These efforts are concentrated on:

- Accurate, expensive, laboratory-type instruments measuring samples of water
- Less accurate instruments, available in laboratories
- Real time measurements in high risk regions
- General, easy and cheap monitoring of water pollution all over the country (or continent).

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. Not only is the equipment expensive, but also the labour cost is high. Water analysis costs about 10XEU per element, while the global analysis of a sample of water costs about 300XEU. It is annoying to have to bring the sample to the laboratory.

Continuous monitoring of water pollution performed in real time in the field is possible, but still in statu nascendi. Some ten years ago this was still a dream. Now the situation has changed radically, thanks to rapid progress in information technology and microelectronics.

In particular, chemically-modified Field Effect Transistors, called [CHEMFETs](#), have been developed. They allow construction of miniaturised sensors and thus miniaturise monitoring systems. Using modern semiconductor technology, such microsensors can be cheap and mass produced. By depositing different ion-sensitive polymer membranes, one can obtain sensitivity for the chosen target analytes. [CHEMFET's](#) performance is similar to that obtained for other classical chemical sensors, and the response time can be diminished.

[CHEMFETs](#), or their more primitive version ISFETs (Ion Sensitive FETs), are under intensive investigation in many research laboratories. As a matter of fact, they are not yet available in commercial form. Their properties are mostly promising. Arrays of different microsensors can be fabricated on a single silicon wafer, thus obtaining the possibility of monitoring various ions polluting water simultaneously. Combining the set of sensors with on-chip data processing and acquisition integrated circuits, creates a smart versatile sensor that can monitor various elements polluting water.

Such microsystem can be flexible and versatile. Once having developed the design and fabrication methods, they can be designed for individual customer needs, for many fields of analytical control, and their architecture can be open for further modifications.

The main objective 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 early warning.

The aim of this project is to create methods of design and realisation of prototypes of microsystems based on new types of ISFETs and other chemical sensors, selectively sensitive to various polluting ions. The microsystem 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.