



Unión Europea

Fondo Europeo
de Desarrollo Regional
"Una manera de hacer Europa"

NANOMET PROJECT- "Wireless Networks of Heavy Metals Nanosensors for Real Time Water Pollution Assessment"

Given the rising environmental awareness and increasingly stringent regulations for pollution control, monitoring of heavy metals in water has become essential. **Heavy metals** are released into natural water bodies mainly by **urban and industrial wastewater discharges**. The toxicity and bio-accumulative properties of most heavy metals make its control a top-priority environmental task.

Furthermore, of all the heavy metals released into the water, **cadmium and mercury** are of greatest concern, because they can have very harmful effects on human health and environment (including loss of biodiversity of aquatic ecosystems) even at extremely low concentrations due to their high toxicity. That is the reason why they are included in the **list of priority hazardous substances** in the field of water policy.

In view of this situation, the NANOMET project aims to **develop electrochemical nano/micro-sensors for Copper, Chromium, Zinc, Mercury and Cadmium** integrated in wireless Embedded Sensing Platforms (ESPs) in order to deploy Smart sensor systems for the monitoring and assessment of heavy metals in water resources as well as in Urban and Industrial Waste Water Treatment Plants (WWTP).

The project's main **objectives** are:

- ✓ Development of a **Smart sensor system for Water Assessment** based in Wireless Networks in order to obtain a systematic and analytic **monitoring and prediction** of the sites at risk of contamination by **Copper, Chromium, Zinc, Mercury and Cadmium**, with unique features of unattended operation and reusability.
- ✓ Development and manufacture of a new generation of **scalable wireless ESPs** for distributed monitoring and assessment of water contaminants. To achieve this goal, **Copper, Chromium, Zinc, Mercury and Cadmium** electrochemical **nano/micro-sensors**

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with low-power consumption and rapid response will be developed, cutting the cost of collecting data, especially in remote areas, and allowing a systematic risk assessment and control.

The system will work on the Internet and will be a **multi-platform, multi-channel open architecture** system. It will enable real time monitoring of heavy metals and information transmission in a secure, fast and reliable way allowing a rapid identification of pollution sources and providing better coverage of the changes in heavy metals concentration in water resources, giving a more accurate idea of the long-term trends of heavy metals' levels.

In addition, it will help industries and WWTPs to ensure their discharges meet current water standards. Thus, **the system will benefit not only public institutions but also private companies**. Furthermore, with the continued tightening of legislation in the field of water policy, online monitoring of heavy metals is likely to be compulsory for the European countries within a short period.

NANOMET is a collaborative project approved on the Transnational Call 2011 of the **MNT-ERANET Programme**. MNT-ERA.NET (<http://mnt-era.net/>) is a network of regional and national funding programmes for Micro and Nano Technologies (MNT) aimed at reducing the fragmentation of R&D funding in Europe. The project led by **INKOA** with the collaboration of **BeanAir** has been co-funded by the **Basque Government** through the GAITEK Programme (File numbers IG-2012/900, IG-2013/485 and IG-2014/168) and **the French Agency OSEO**.

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