EnviMon
Real-time Metal Monitoring

The EnviMon Project:

A ground-breaking solution for real-time monitoring of metals in aquatic environments.

Laymann´s report

Challenge:

The presence of dangerous metals in surface and ground water is a significant risk to our health and the environment, and represents an increasingly serious problem worldwide. At present the detection of metals requires manual water sampling and laboratory analysis – a time-consuming, retrospective method with no possibilities for real-time intervention.

Solution:

EnviMon has developed an automated on-line water monitoring and reporting solution for continuous metering of metal concentrations that the project partners will commercialize. The solution provides continuous monitoring and better control, including early warning alarms in drainage basins.

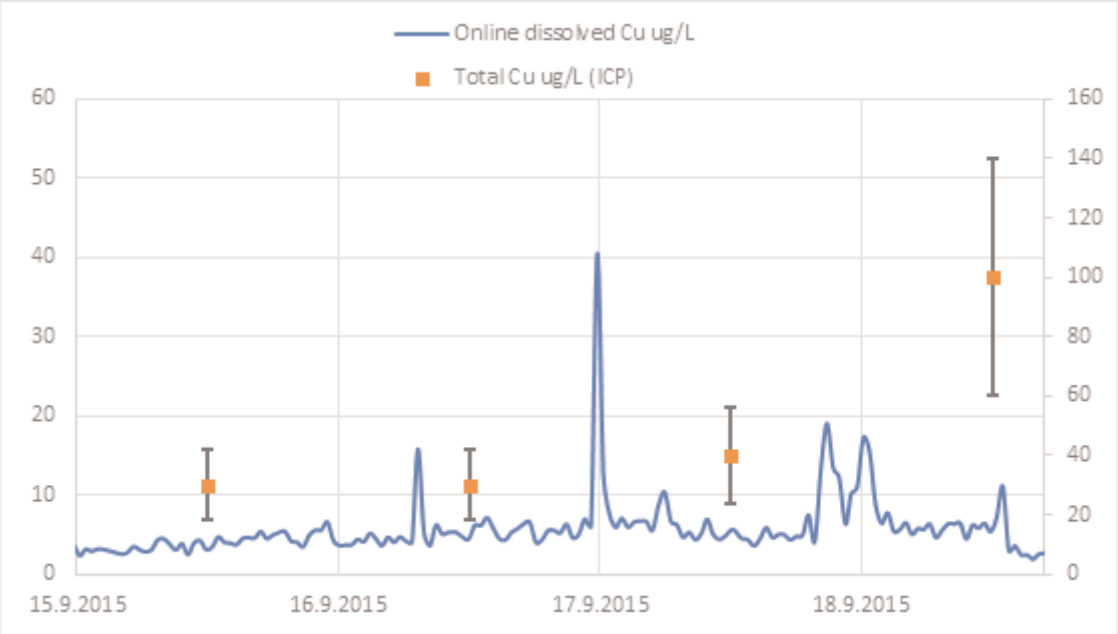
Helping heavy industry improve environmental performance and productivity

The project's innovations help water-intensive industries like mining, metal manufacturing and pulp and paper to reduce metal emissions and thus improve their environmental performance and productivity. The system fully meets the needs of environmental authorities responsible for water monitoring.

EnviMon is the first small-sized sensor-like automated and autonomous metal-in-water monitoring solution, capable to measure metal concentrations in harsh environments.

Co-funded by the Eco-Innovation Initiative of the European Union

Remote real-time measurement versus manual sampling



EnviMon introduces fully automated measurement, analysis and reporting of metal concentration in water. The system has been specifically developed to monitor metals in industrial waste water and natural waters, but is equally applicable in other metal effluent monitoring scenarios as municipal waste water, for example.

The diagram above shows a comparison between a manual sampling regime and automatic continuous monitoring. This clearly illustrates two important advantages of real-time measurement over manual sampling and laboratory analysis:

More exact measurement of actual amount of metal discharged over time:

- Frequent automatic measurements by a fixed sensor provide a more accurate total estimate of metal discharge than less frequent laboratory analysis.

Early warnings of accidents or illegal discharges:

- Because measurements are done in real time, immediate action can be taken if there is a sudden significant rise in metal contaminants in the effluent.

Features of EnviMon real-time monitoring solution:

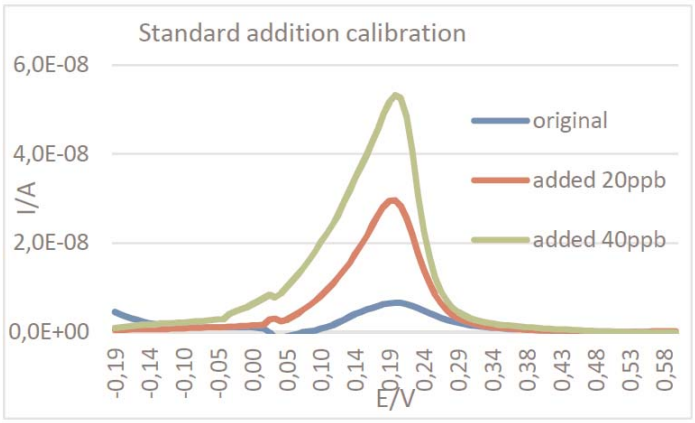
- An on-line metal monitoring solution measuring up to 5-7 different metals in real time
- More accurate measurement of metal contamination than existing manual routines
- Designed for reliable autonomous operation in harsh environment
- Monitoring station can run on 12V green power sources
- Fully automatic water sampling, analysis and reporting
- Web based reporting solution - access and share data over internet

A complete environmental monitoring solution

Unique sensor technology

The EnviMon project has implemented and field-tested a state-of-the-art sensor technology which measures metals in water, based on a voltammetric principle. The measuring device can be accurate up to 1ppb (1 Ìg/L) with typical measuring accuracy of +/- 10% at 10 ppb.

Up to 5-7 different metals can be continuously monitored by the system. The sensor unit weighs less than 10 kg and can be installed directly into the monitoring well.



Autonomous monitoring stations for harsh environments

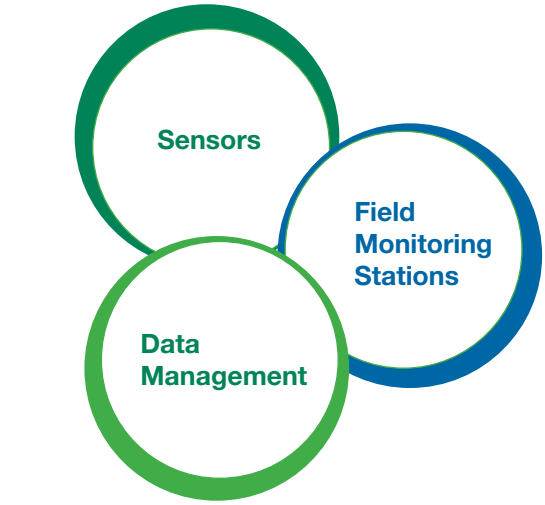
EnviMon project has developed, and through pilot installations, tested and validated complete field stations for measuring metal in water. Product development is based on decades of experience in design and production of complete environmental monitoring stations for harsh Nordic environments.

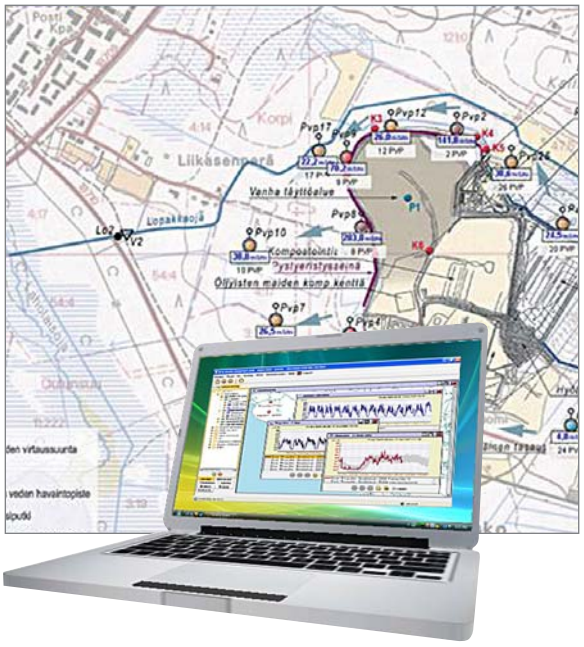
The low-energy 12V monitoring station can run on green power sources - solar, wind, etc. - enabling installations in remote areas. The system sends data over the Internet. The field stations and sensors have been designed with low maintenance in mind. The typical maintenance interval is on average once a month.

MapGraph - environmental monitoring and information management

For data logging, analysis and reporting EnviMon utilizes MapGraph, web-based environmental information management software provided by EnviTech. MapGraph safeguards the data from the sensors in a central archive and generate the necessary environmental reports and documentation for the authorities on a regular basis.

The system is easy to use, and metal-in-water data can be monitored and shared safely through the web in real time. Alarm limits and alerts can easily be set up, and sensor readings can be visualized on a dynamic map which is continuously updated.





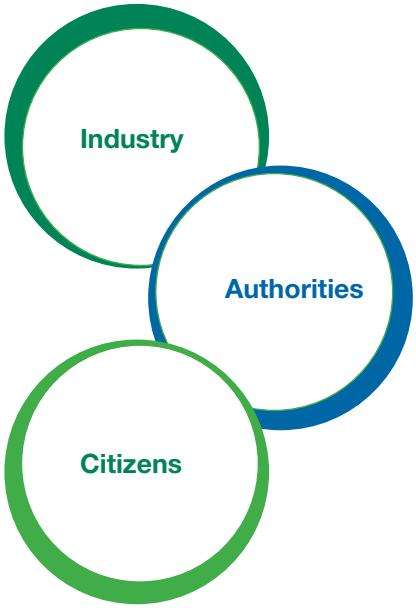
MapGraph provides companies and public organizations with a complete solution for environmental monitoring and information management.

Customer benefits

Positive market reactions

The EnviMon project has carried out several market studies in Europe, North America and South Africa and attended actively at different events, showcasing the solution. All feedback and reactions have been very positive, demonstrating a clear need and large market for the online metal monitoring technologies.

Based on this, the EnviMon consortium is proceeding with wide commercialisation and market entry with the developed solution.



Yearly Effluents Report- 2016

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Date	Water flow (l/s)	Cu (mg/l)	Cu (kg/month)	Zinc (mg/l)	Zinc (kg/month)
January	13.17	3.85	135.62	1.31	46.24
February	13.95	2.10	73.30	1.11	38.73
March	13.04	3.91	136.73	1.12	39.11
April	18.64	5.12	247.30	1.05	50.79
October	5.96	8.92	142.29	0.64	10.13
December	7.93	5.37	114.19	0.96	20.40
May	13.86	11.35	421.27	1.11	41.36
June	12.45	14.79	477.60	0.70	22.57
August	13.53	13.23	479.20	0.73	26.32
July	8.72	13.45	313.89	0.67	15.62
September	9.05	14.57	341.87	0.67	15.81
November	7.69	3.72	74.26	1.11	22.05
Permit Value		3000	3000	400	400
Total	138.00	100.37	2,957.54	11.17	349.14

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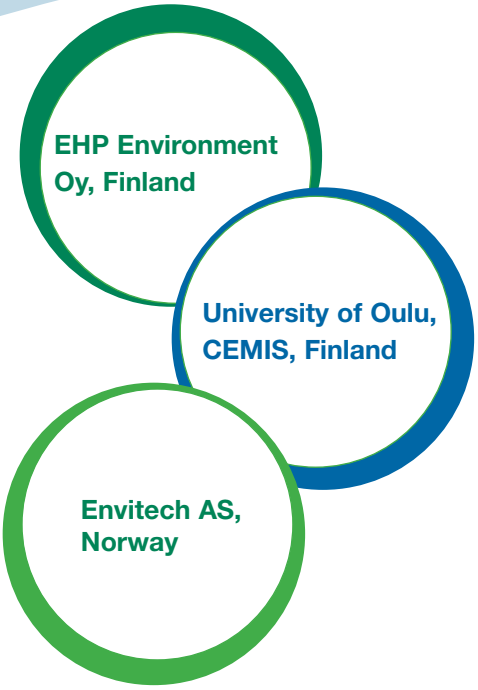
Customer benefits

During the EnviMon monitoring solution test periods, the following customer benefits have been proven:

1. Less manual activities required due to automatization in water sampling, analysis and reporting
2. Possibility to adjust upstream processes based on metal monitoring and gain remarkable faster process optimization
3. Possibility to decrease emissions (kg/day, kg/year) via improved process control
4. Possibility to reduce significantly the cost of monitoring industrial waste water
5. Easy access to and sharing of data over the internet
6. Increased safety for people and the environment through early warning alerts and alarms

EnviMon - Project summary



Overall objective: To increase the use of on-line monitoring solutions in natural waters affected by heavy industries, by providing the market with an efficient system that is capable of detecting metal concentrations.

EnviMon will provide:

- **An automated water monitoring solution that can be used by heavy industries and municipalities for waste water monitoring, and environmental authorities for continuous detection of metal concentrations and other harmful substances in natural waters**
- **Pilot installations for testing and validating long-term functionality in harsh Nordic conditions**
- **A solution that enables decreasing emissions by at least 20-40% and lowering the discharge water purification and monitoring costs**
- **Increased awareness of the automated water monitoring solution amongst the project's target groups**

Project details:

EnviMon - Environmental Monitoring Solution for Heavy Industries

Project ID
Eco/13/630172

Call:
EcoInnovation 2013/ Green business, Water

Duration:
01/07/2014 - 30/06/2017 (36 months)

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