Clean Water Monitoring (CWM)

A multi-parameter probe to monitor in real time the evolution of drinking water quality

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Brief description

Development of a multi-sensor probe able to measure 6 different parameters (turbidity, residual chlorine, temperature, conductivity, water velocity and pressure) for continuous monitoring of the quality of drinking water in a distribution network with insertion of the probe directly into the pipe without interrupting the water supply. The measured data are transferred using a low power IoT network. It has an integrated battery for a running time of at least 6 months without maintenance.

Key points

Up to now, commercialized probes did not match the selection criteria of the SIG (Geneva water, gaz and electricity supplier) due to an incomplete list of measured parameters (high cost and energy consumption and inexistent wireless data transmission).

Therefore, low cost and energy consumption, easy installation, reduced maintenance and wireless communication, combined with the ability to measure multi-parameters in the specified range, represent strategic components of this innovative system.

The Clean Water Monitoring probe

Drinking water resource is vital for the health and well-being of human beings. Significant cases of contamination are attributable to problems in the distribution systems and are due to a rather long time between two cycles of sampling and measurement by conventional laboratory methods of control.

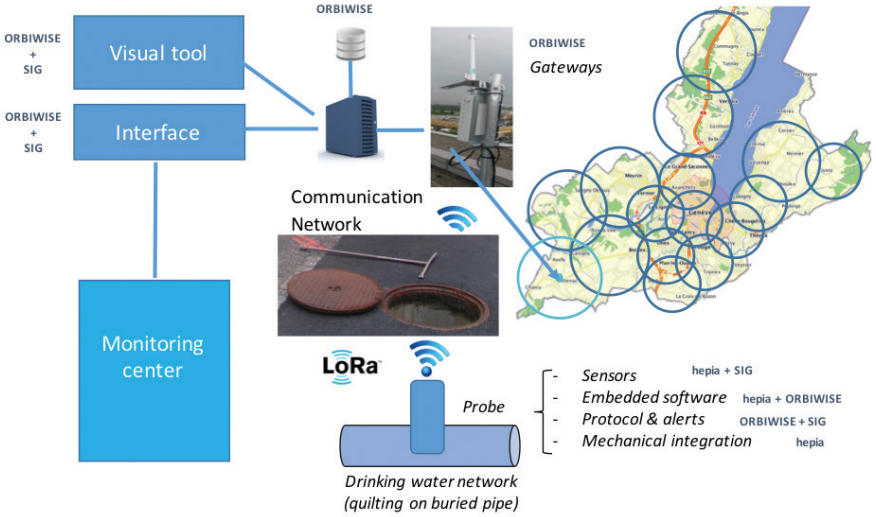
Many parameters are continuously measured in production plants and reservoirs. But once the water leaves these facilities, its quality is only occasionally monitored by sampling and laboratory analyses.

Several experimental studies indicate the need for an on-line monitoring to regularly survey the water quality.

Consequently, the main challenge was to develop a multi-parameter measurement system, which has to be accurate, self-powered, installed in pipes, targeting a material cost of US$1'500, with reduced energy consumption and maintenance, installable and removable anywhere on the network without any risk of inducing pollution.

The probe includes all the essential sensors, correctly calibrated, self-powered by an integrated battery. The dispatching center receives via a wireless network (Lora) the values of water quality within the required ranges, with a high degree of precision (and alarms if the measured values are out-of-range) and for a variable acquisition data frequency.

Three partners are involved in this innovative project: SIG represents the end user, the University of Applied Sciences and Arts Western Switzerland (hepia) oversees the probe development, including the sensors and the conditioning electronics and the mechanical design whereas the company OrbiWise is in charge of the development of the bi-directional wireless data transmission via the low-power wide-area network and the user interface.



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Output

This project has received financial support from the Swiss Federal Institute for Gas and Water Industry (FOWA) and the Federal Office for Food Safety and Veterinary Affairs (OSAV).

Other Swiss water authorities and international institutions have already shown their interest. The project has been selected and presented at the International Water Congress in Brisbane in October 2016, at the Protocol for Water and Health (UN session) in November 2016 and during the IoT Week 2017 in Geneva.

Legend

1 - The global architecture.
2 - The low consumption electronics and wireless communication.

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