

M. VACCARINI, B. NATICCHIA, A. CASOLARO, A. CARBONARI. **Ultra-pervasive district monitoring for water leak detection.** *Gerontechnology* 2012;11(2):95; doi:10.4017/gt.2012.11.02.284.00 **Purpose** One of the main concerns regarding integrated water resources management is related to the development of scalable monitoring and control systems for pro-active maintenance of water distribution networks. It is necessary for the availability of ultra-pervasive sensor-actuator networks to be deployed at the district level. The same technology is useful for several other applications involving sensors accrued from city to building scale<sup>1</sup>. This paper deals with the design, development, and initial experiments of a first prototype of ultra-pervasive monitoring network for automated leakage detection in water distributions system (WDS). These pose technology challenges mainly generated by the need to transmit from underground. **Method** The availability of a new generation of ultra-pervasive communication and monitoring systems is a prerequisite for providing fine-grained, real-time monitoring data at district level, so that control policies can be applied in real-time<sup>2</sup>. The sensing layer developed in the system object of this paper is intended for a dense deployment even underground. It is based on short-range battery-operated wireless networks, forming a mesh made up of end devices (sensors/actuators), routers/repeaters and coordinators/gateways. The coordinators/gateways—besides coordinating the network routing—transfer sensors packets to a host application enabling interconnection to fixed and mobile networks made available by the Telco operator. Because of this set-up the network can cover a large territory at low cost. It supports leakage detection algorithms, estimates leakage occurrence probability and pinpoints them. **Results & Discussion** First laboratory trials and preliminary on-site experiments (*Figure 1*) show the feasibility of the approach and the potential for ultra-pervasive communication through the network. Results indicate this system to be cheap and easily deployable alongside WDS.

### References

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**Keywords:** information technology, ultra-pervasive sensing, district monitoring, maintenance

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**Full text:** doi:10.4017/gt.2012.11.02.284.673

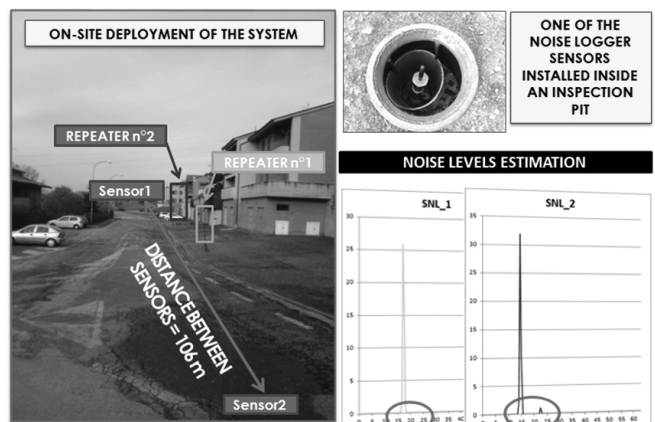


Figure 1. Location of on-site trials with noise levels acquisition