From ground to sky to detect water leaks

In some European countries half of the water flowing in the supply system gets lost because of the difficulties experienced by water utilities to monitor leaks in their networks. A new airborne detection method is now tested in France and Portugal.

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The annual World Water Day founded in 1993 by the United Nations General Assembly on March 22 reminds us of the importance of preserving this precious source of life.

Water losses are a big issue faced by companies that manage the transmission networks, as the traditional technologies for detecting the leaks still don't provide efficient solutions in all contexts, particularly in rural areas where monitoring is often difficult. Consequently, in some European countries, half of the water resources is lost, and this also leads to higher bills for citizens.

One of the main ground detection methods in use is acoustic surveys, based on sound waves emitted by pressurised water forced out through leaks, which are intercepted by electronic transducers. Another system is gas injection into pressurised pipes, which causes the water escape from the leak. Then, by scanning the ground surface above the pipe with a gas detector, it is possible to pinpoint the break. However, both techniques are accurate only for small diameter pipes, which is not the case of countryside mains.

Furthermore, the so-called "smart ball", a sort of free-flowing tennis ball with highly sensitive acoustic sensors that is tracked along the pipeline, is not a solution in complex networks.

Isabelle Le Goff, engineer at Société du Canal de Provence says: "Today most of the leaks that we detect are reported to us by neighbours or customers, because they are visible on the surface. But it’s not always possible to locate a leakage from the

field." The French water utility is testing, together with the Portuguese EDIA, a new airborne surveillance service in water supply infrastructures.

This detection method has been developed under the EU project WADI. The researchers applied optical remote sensing devices, using multispectral and infrared cameras, on planes and drones. Manned aircraft monitor long distance infrastructure, while unmanned aerial vehicles survey inaccessible or dangerous areas.

Leaks will be detected by analysing variations in the near environment, essentially through the increased soil moisture and changes in vegetation, and by monitoring the thermal radiation emitted by the soil which makes wet areas dark, for example, as a consequence of their lower temperature.

So far, the flights at the French sites have been completed, all carried out in the southern region of Provence, and the images are now being analysed. In the coming months the Portuguese networks will be checked through aerial detection. The results will be compared with those obtained through traditional acoustic detection, conducted in parallel on the same infrastructure, to evaluate the success of the innovation.

"We may get a general picture of the network's situation, and then direct the search for the leaks more precisely. Breaks in the networks not only cause loss of water but also of energy, considering power used to pump and possibly make this water drinkable," says Le Goff.

Alessandro Bertoni, engineer at SGI, an Italian consultancy specialised in water leakage management and member of the project consortium, underlines the technology's competitiveness: "We plan to recover up to 50% of the water normally lost, with less cost. Conventional ground detection techniques range between 1,000 and 5,000 euro per kilometre, while the airborne technology between 50 and 200 euro per kilometre."

Read the full article: http://www.waditech.eu/newsevents/from-ground-to-sky-to-detect-water-leaks.kl

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