Aquarius Spectrum

Achieve control on NRW and water network asset management support

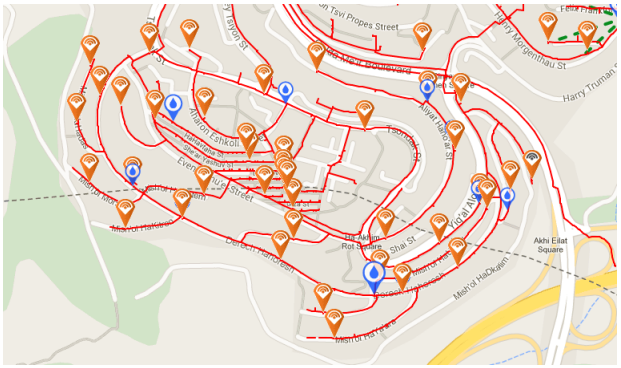
Jerusalem and Netanya water utilities monitor their water network in near real time.

Proactive Leak Detection

Proactive water leaks detection is one of the main goals in reducing NRW in urban water distribution networks. As most leaks remain under the surface, utilities find it difficult to reduce water loss and to properly assess pipe condition. Current leak detection technologies are lacking in terms of reliability, accuracy, labour costs, system complexity and therefore, questionable return on investment.

The water utilities of two cities in Israel, Netanya and Jerusalem, have chosen to proactively monitor the city water network, taking the guess work out of their multi-million dollar maintenance budgets as well as avoiding unexpected costly pipe bursts.

Continuous Monitoring Method



Continuous Correlation Monitoring technology by fixed sensors, developed and manufactured by Aquarius Spectrum, provides an optimum solution for leak detection. Correlation acoustic monitoring is significantly more sensitive than noise logging, as it detects leak generated patterns at specific locations on a pipe, rather than noise level in a pipe. Performing correlation measurement every night enables pin-pointing of the leak with high precision and reliability. The primary challenges of working with correlating sensors are:

- High attenuation and dispersion of acoustic waves in branched pipes of different diameters
- High sensitivity to artifacts such as sporadic water consumption that create artifacts
- Interpretations of correlation logger's results require expert analysis and experience to identify leaks and discriminate it from artifacts.

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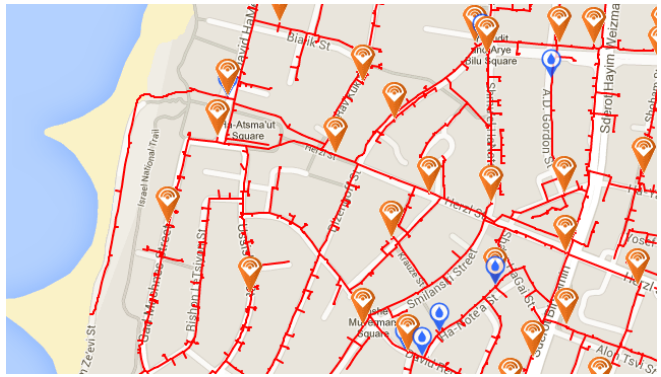
To achieve high accuracy continuous correlation, Aquarius Spectrum uses broadband communication technology and state of the art time synchronization.

The System

The system includes correlating sensors that can be installed on fire hydrants above the ground or pits in a complex urban pipe network, providing 980- 1640 Feet distance between sensors. The sensors feature 3G cellular communication and GPS based time synchronization that transmits data to the server for signal analysis and results presentation via web browser. The system features automatic leak detection based on proprietary multiband correlation algorithms and statistic artifact rejection. The leaks and sensors information are presented as layers on a web based interactive map and the Utility GIS system. The system suggests next action to be taken by the operator and supports an internal workflow for the utility engineers and company experts support.



Analysis and operation

The system, which will ultimately cover in these two cities over 1,100 Km of a water pipe network, has already successfully detected and reported numerous suspected leaks, which were later checked and verified by an independent leak detection team. Calculated system sensitivity for leak detection over 1 mm was 98% and Specificity of 95%.

Given the in-line leak detection tools, the optimal replacement strategy can be determined not just by water loss, but the cost of the repair. Once the rate of leaks in a certain section of pipes rises significantly, the economical-based decision can be taken to replace it. This decision requires precise knowledge of developing leak rate that previously has not been available since most leaks are relatively small underground leaks that remain undetected.

Integration to smart city systems

With its database capabilities, and full connectivity to operational GIS system the system can accumulate leak statistics per each pipe section and alert for local problems in a pipe section that may require renewal of pipe or other maintenance steps. The integration with other management systems enables the utilities to provide optimal and more cost-effective maintenance of pipes and prolong their service life.

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