Request For Information (RFI) - No. 01/2015

Information regarding the receipt leak detection systems using resonance

1. The proposed system manufacturer: **F.A.S.T GmbH**

2. Number of installations worldwide: **as for acoustic loggers 300 systems were sold worldwide directly or indirectly through sales representative with over 12.000 loggers as components of those 300 systems. Data network as requested, only 4 systems currently installed (very new product!!) but planned over 6 new installations within the next two months.** Multiple installations in Israel : **1.**

3. Please describe the technology of the proposed system: **Water loss management in water distribution networks is more and more getting away from acute leak detection but becoming popular for monitoring through acoustical zone inspection. Therby water leaks getting detected virtually in real time and can get repaired directly after they appear. Hence time consuming and costly leak surveys will be a thing of the past. Acoustic loggers will record the minimum noise level during a custom set time frame, preferably during night/early morning times, when ambient noise and water consumption is the lowest. This noise levels are a very good and precise indicator, if there is a leak in the proximity of the logger. The evaluation of the recorded data is done by a special software and does show the operator the three states in a traffic like manner: "No leak" (green color) "Possible leak" (yellow color) and "Leak" (red color). Within the WATERCLOUD system, the data of the noise loggers getting transmitted via radio to so called Transreceiver stations, which receive and transmit the data to one of the next Transreceiver stations. Each Transreceiver can theoretically receive 10 loggers, which is not feasible practically due to limited radio distance of the loggers, when deployed under street caps or man hole covers on the distribution network. Practically 2-4 loggers can reach one Transreceiver station. The Transreceivers send the data peer to peer to the next Transreceiver station and so on. At the end of the transition chain is a Master station equipped with GSM, who collects all the data**

and transmit it through the mobile phone network to the cloud data base within the WATERCLOUD. The user can access this data from anywhere at any time to see, evaluate and process it for further actions. The possibility to include GIS maps in the watercloud makes the access and evaluation of the data very easy and has a precise indication of what happens in the distribution network.

4. Please specify the method by which the system transfers the data from the field from the data logger to the end server (communications), including standards, and adjustments to the requirements of the Israeli standard / EU standard. with regard to wireless communication, transmission and reception equipment, transceiver, transmit power, and so on;
Data transmission from the logger to Transreceiver stations is done through radio at 433 MHz and 10mW transmission power. Transmission from Transreceiver to Transreceiver is done through radio at 433 MHz and 10mW transmission power. Transmission from Transreceiver to GSM- Master Station is done through radio at 433 MHz and 10mW transmission power. Transmission from GSM- Master Station to the cloud server is done through local mobile phone network (SIM Card).

5. Please specify full information, as much as possible, about all the components of leak detection system - including a layout diagram of the system: **The Acoustic Zone Monitoring System WATERCLOUD includes the components Acoustic Loggers, Transreceivers, GSM/GPRS Module and the Cloud Software WATERCLOUD.**

Acoustic Loggers:

<u>Bi-directional programming options:</u>

Date and time; Duration of measurement window; Timing of measurement window; Frequency of Measurements; Data transfer window; Data transfer frequency; Amplification factor for noise singal; Transmission power

<u>Data collection:</u>

Statistical minimum for previous measurement window; Noise level of last 14 measurements collection; Frequency spectrum; Logger number;

Logger position

Readout

Audiofile

Correlation

2-point digital FFT- Correlation

Transmitter power

10 mW

Frequency

433 Mhz

Connection/Port

Bi-directional radio

Dimension

Ø 40 mm

Weight

approx. 450 g

Amplification factor
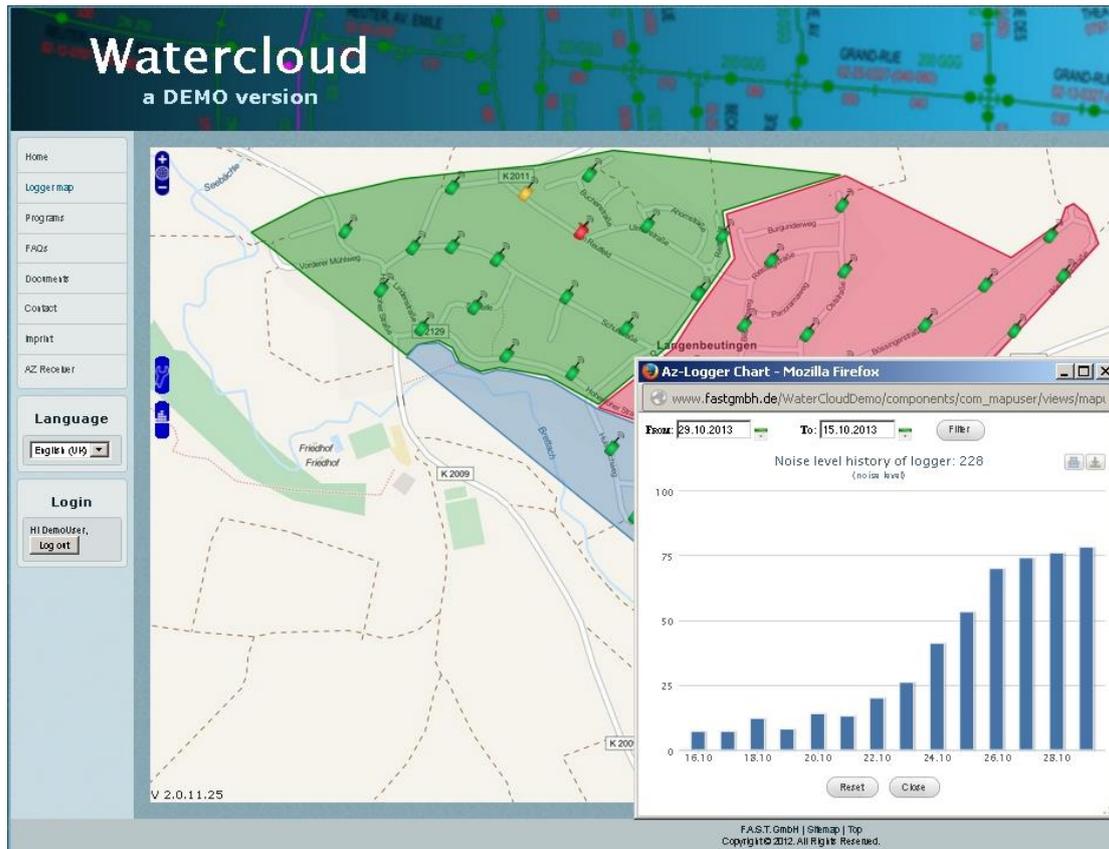
200.000 fold

Protection class

IP 68

Temperatur Range

-15 °C to +55 °C

WATERCLOUD

Example of Watercloud Software tool.

6. Please specify the computing system screens: display screens, forms, reports, data display geographical maps, alerts, an interface to email or SMS messages, etc.;

   Please visit our WATERCLOUD demo version: www.watercloud.de with username "demo" and password "demo" to access and get an impression about the functionality.

7. Which standards are supported by the proposed system?
   The equipment complies with European Standard.

8. What is measured in correlation method? What is the percentage of accuracy in meters of the proposed system in relation to the existing leaked section?

   2 point digital FFT correlation process. Accuracy < 1ms

9. Do you have data regarding locations in the country / abroad during the last 3 years including leakage detection system was installed proposed? Please be specific locations, dates, authorities etc. therefore, we would like to get

installation's reports, system performance, system reliability, disclosure of liquidity, false alarms, the percentage of depreciation measured before and after construction, and other data.

Please see attachment article about Ville de Luxembourg "From Hunted to Hunter: How one Water Company achieved a Tenfold Decrease in Water Leakage from 36% to 3,7%".

10. Do you have a specification of systems installation which includes reference to the following points:
    10.1.   Acceptance testing system components (field tests)
    Visual control, Function test (office and field)
    10.2. Method of marking and identifying system components
    By serial number (water-/sun proofed label)
    10.3. Discovery accuracy of the system? What is the percent deviation from meters and disclosure?
    10.4. Percentage real discovery, the percentage of false alarm detection
    10.5. Please refer to the following detailed request for information::

Equipment required application: **Access to distribution network through valve chambers, man holes, hydrants etc.**

Weather Conditions / Limitations Application: **Works at all weather conditions. Limitations: heavy ambient noise during measurement period (therefor measurement window is preferred at night)**

Guidelines for quality control during application, **No guideline. But it is important to get to know the distribution network "properties" related to acoustic zone monitoring. Knowledge transfer through trainings and own experience will be best method for quality control during application. Data base build up during application is done automatically through WATERCLOUD.**

Final product acceptance testing: **Done by customer / engineer / 3rd Party inspection (if customer pays for)**

Statement on the existing system: **Well advanced and "state of the art" technology. Less costs of the system due to data collection at GSM- Master Station of 50 loggers and only then transmission of data through mobile phone network. Competitors system often use mobile phone network for each single logger.**

Undertaking escort / Technical Consulting: **Will be done by manufacturer and local agent.**

11. What is the level of responsibility of your system? How long? Which includes warranty (preferably attached example)? how do we check compliance with the responsibility?

Product liability for personal injuries / death. Whole life cycle of the product. Compliance can be checked by copy of insurance letter.

12. What is acceptable warranty includes, how do you run the warranty?

2 years warranty. Replacement and / or repair (depending on what will be available quicker!) Will be discussed with customer accordingly. Also possibility to repair / replace through skilled local agent.

13. Please note the system cost estimates, including raw materials and installation.

Material costs of about 1000€ per kilometer network length (depends on local conditions). Mobile phone network cost (SIM Card price and price per MB of transmitted data -> check with local mobile phone provider). Usage of WATERCLOUD software and cloud application: 2 years included when purchasing the system, afterwards approximately around 60€ per annum. Installation will be charged according to expenditure of time (at rate of 100€ per hour for engineer plus travelling expenses). Good preparation of site with local personnel will help reducing this cost a lot.

14. Please specify the cost estimates, system maintenance, including depreciation, utilities, maintenance costs and annual service.

System maintenance will mainly be the change of Logger battery (approx. every 4-5 years at 65€ per logger), Transreceiver battery (every 4-10 years at 65€ per logger) and GSM- Master Station battery (every 2 month, or it has connection to power grid -> then no maintenance is required).

15. Free answer: respondent invited to bring ideas and technologies, unexpected problems, and any other related matter...

The WATERCLOUD acoustic zone monitoring system already includes the technology to correlate two noise signals of two receiving loggers. However it will not replace the necessity to do on site investigation on the designated leak spot through a different method (ground microphone, analogue correlator or others)