STATE OF THE ART PERMANENT ACOUSTIC LEAK MONITORING

Middle East Water Leakage Summit, Dubai

November 21, 2012

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Agenda

1. Acoustic leak detection technologies

2. ZoneScan system overview

3. Wrap up

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Complexity of Solutions in leak detection

Standalone devices

«Lift&Shift»/ «Drive-by»

Permanent Monitoring

Labour intensity	Very high	High	Low
Overall leak detection effectiveness per area	Low	Medium	High
Time to leak repair	High	Medium	Low
Level of transparency & institutional memory	Low	Medium	Very high
Relative initial investment	Low	Medium	High
Pinpoint leak locally when it is known	X	X	X
Pinpoint leak where it exists (temporarily)		(X)	X
Pinpoint leak when it appears (permanently)			X

Gutermann product range

Aquascan, Aquascope, etc.

Zonescan

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Product range

- Unmanned leak monitoring system
- Leak Locating Correlators
- Correlating Radio Loggers
- Electronic Listening Sticks
- Digital Ground Microphones
- Pipe and Valve Locators

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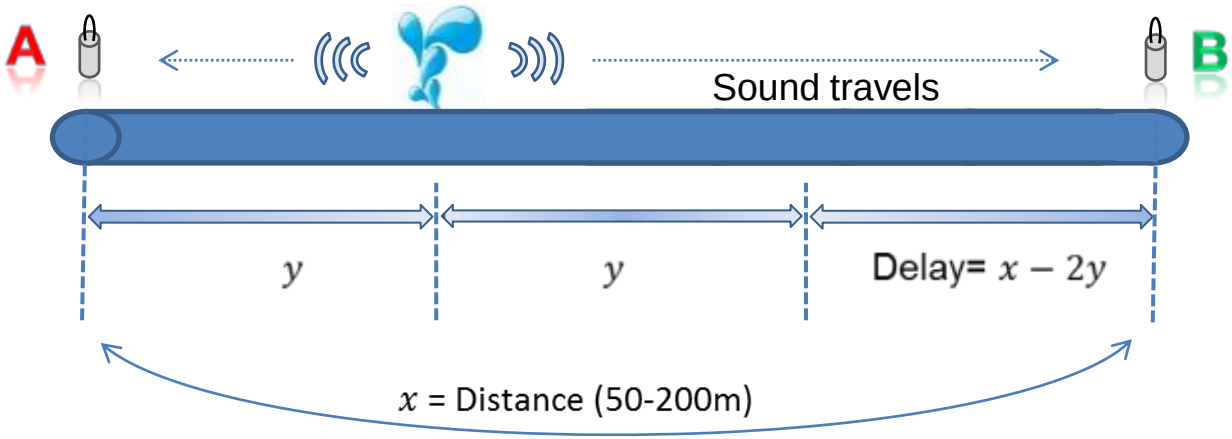
How does correlation work?

- To obtain a good correlation, the noise MUST be heard at both sensors
- Sound velocity depends on input quality of various pipe properties
- Two sensors pick up external non-leak noise sources as well
- Smart technology can locate leak when two sound signals are heard



The sound data is processed through a mathematical algorithm which compares the two sound recordings to determine the difference in the times it takes noise to travel from the site of the leak to each of the sensors

Leak correlators serve two major purposes:

1. to **detect** the presence of a leak
2. to **pinpoint** the location of the leak for repair when detected

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Overview of existing offering for permanent leak monitoring

Solutions	Noise logging	Noise logging + simple spectral analysis	Sophisticated noise logging + sophisticated spectral analysis + leak pinpointing
Attributes	▪ Very low success rate to find leaks ▪ Cannot tell one noise from another ▪ Obsolete technology – useful for leak detection?	▪ More elaborate technology ▪ Possible to increase hit-rate (filtering of non-leak noise sources) ▪ Localisation effort needed	▪ Latest technology ▪ Pinpointing of leak remotely ▪ State-of-the-art soft- & hardware to filter out «false positives»
Competitors	Competitor 1 Competitor 2 Competitor 3	Competitor 4	GUTERMANN ZONESCAN

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What is fixed network monitoring?

Basic must-have criteria:

- Permanently installed infrastructure
- Daily automatically transmitted information about your network
- Remote monitoring and diagnosis, no field trip required
- Event alarm when new leak appears

Advanced must-have criteria:

- Avoid false positives and false negatives
- Automatic, remote pinpointing of leaks
- No battery changing for several years

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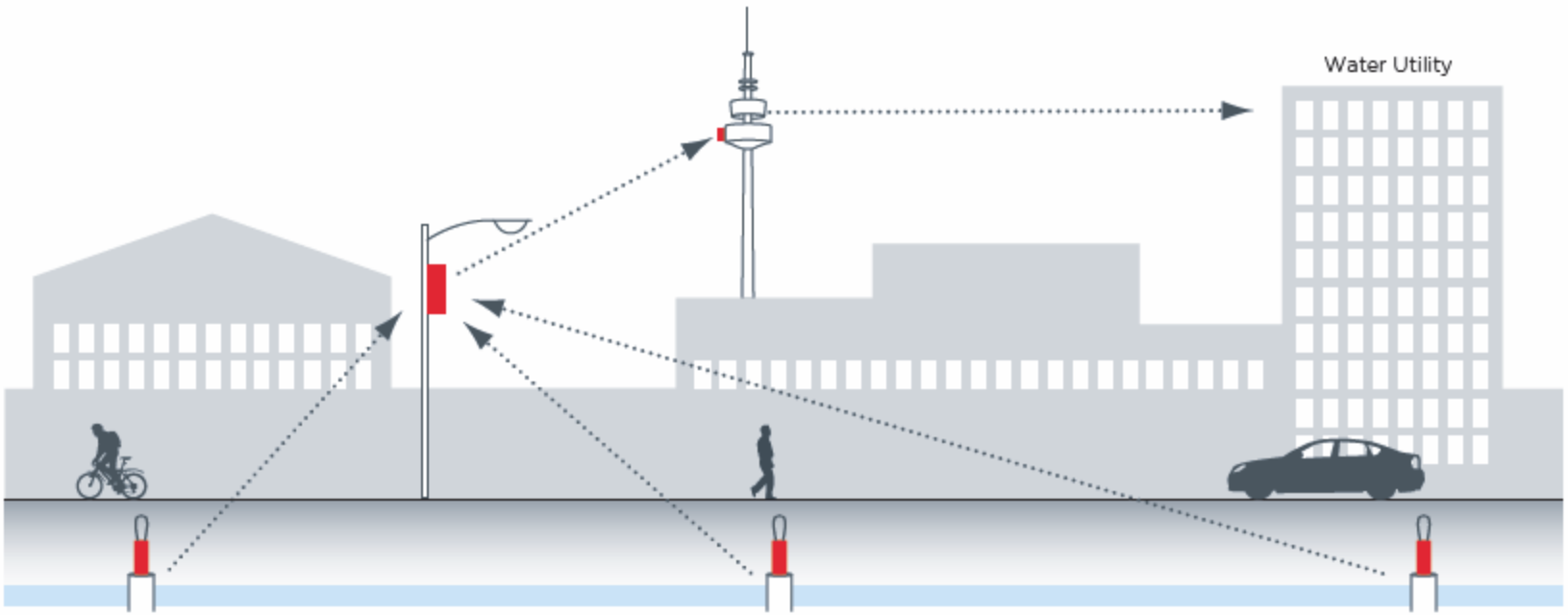
Permanent network setup



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System components

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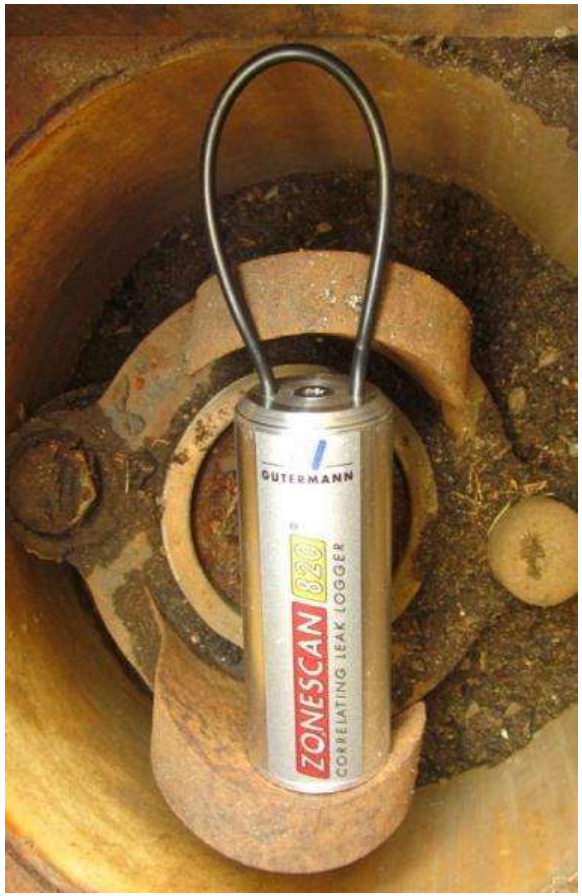
Zonescan system installation (1/3)

Radio Loggers



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Zonescan system installation (2/3)

Repeaters and Alpha

Water towers, floodlighting, street lamps, sewer vents, communication towers, buildings, traffic lights & road signs

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Zonescan system installation (3/3)

Simple step-by-step installation with handheld device equipped with Camera, GPS, Bluetooth and bar code reader

1. Install Alpha units
2. Register logger or repeater
3. Deploy device at its position
4. Test 2-way radio connectivity

Done!

Average deployment of 25-50 end points per day for team of 2-3 staff

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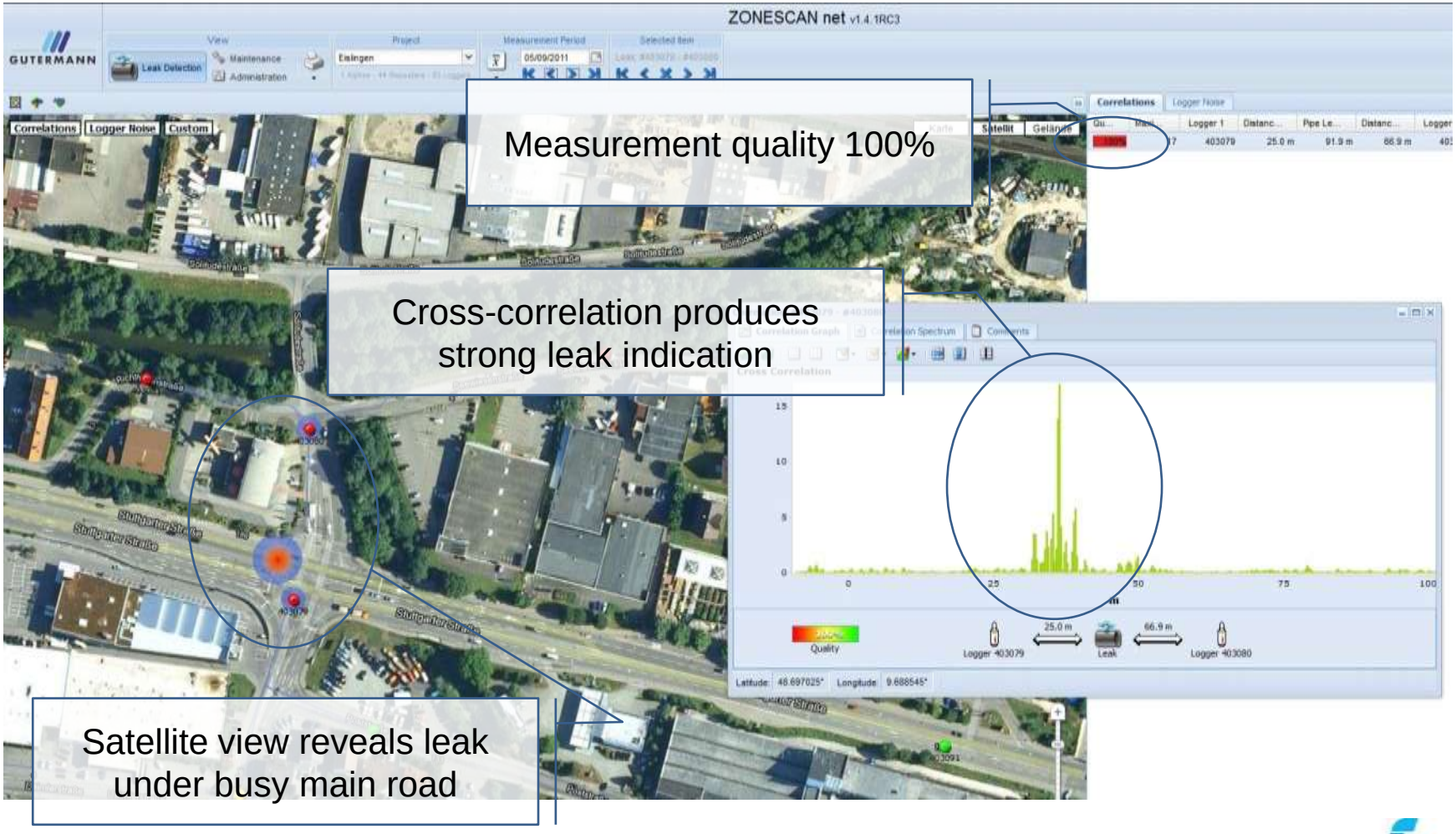
ZONESCAN NET:
Platform for «Smart Water Management»



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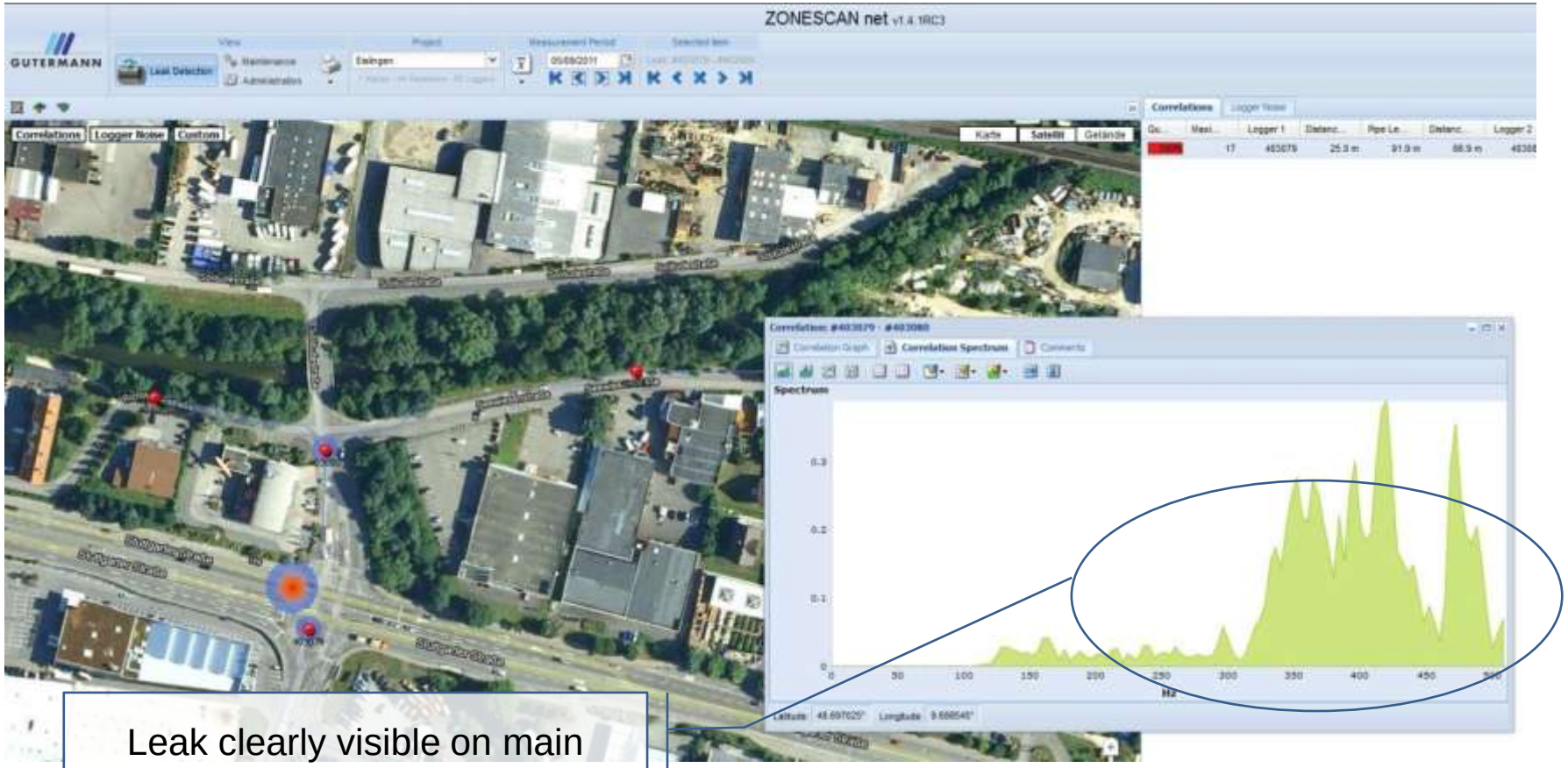

Leak clearly visible on main road. Correlation spectrum typical for large leak

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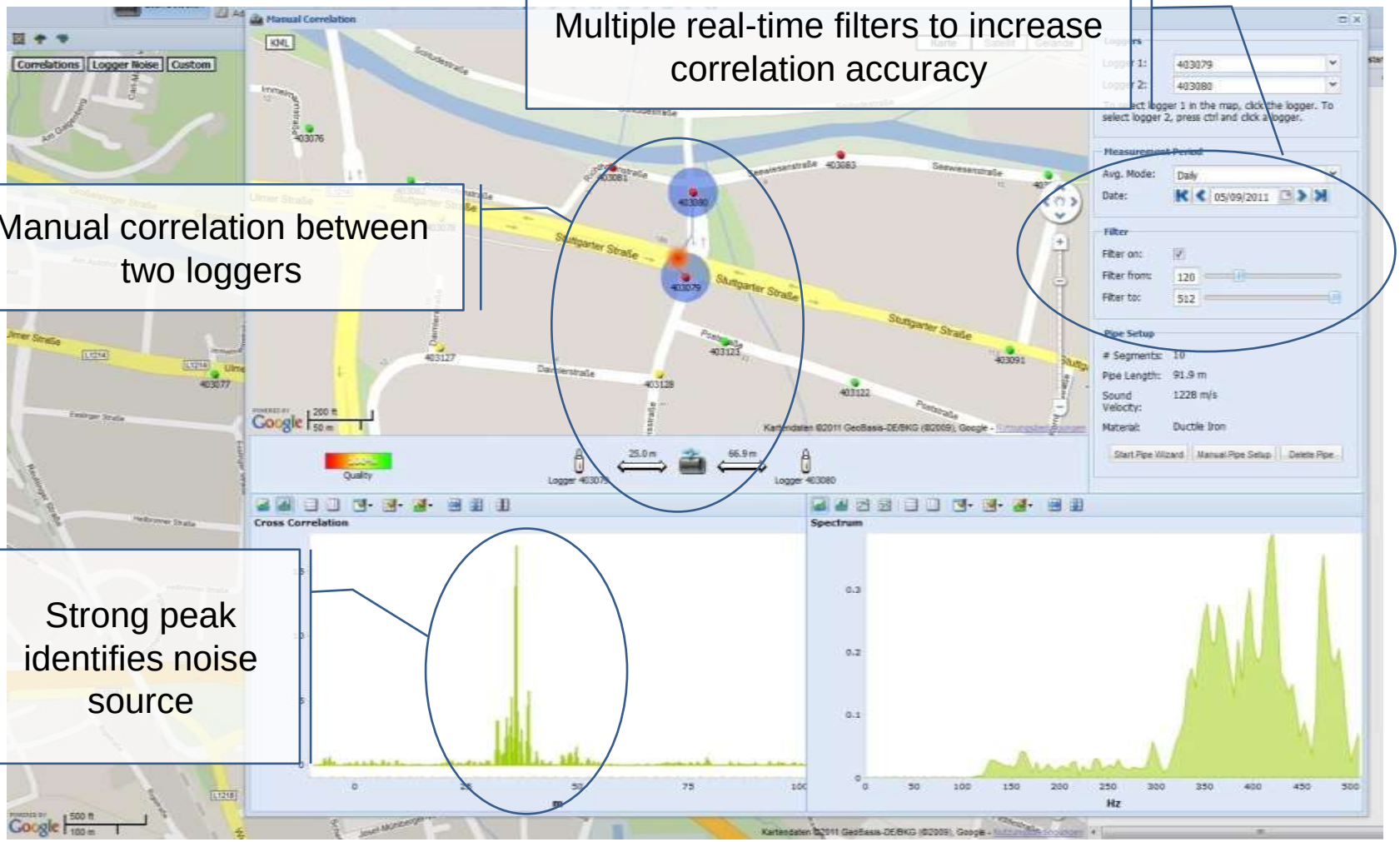
ZONESCAN NET:
Platform for «Smart Water Management»

Multiple real-time filters to increase correlation accuracy

Manual correlation between two loggers

Strong peak identifies noise source



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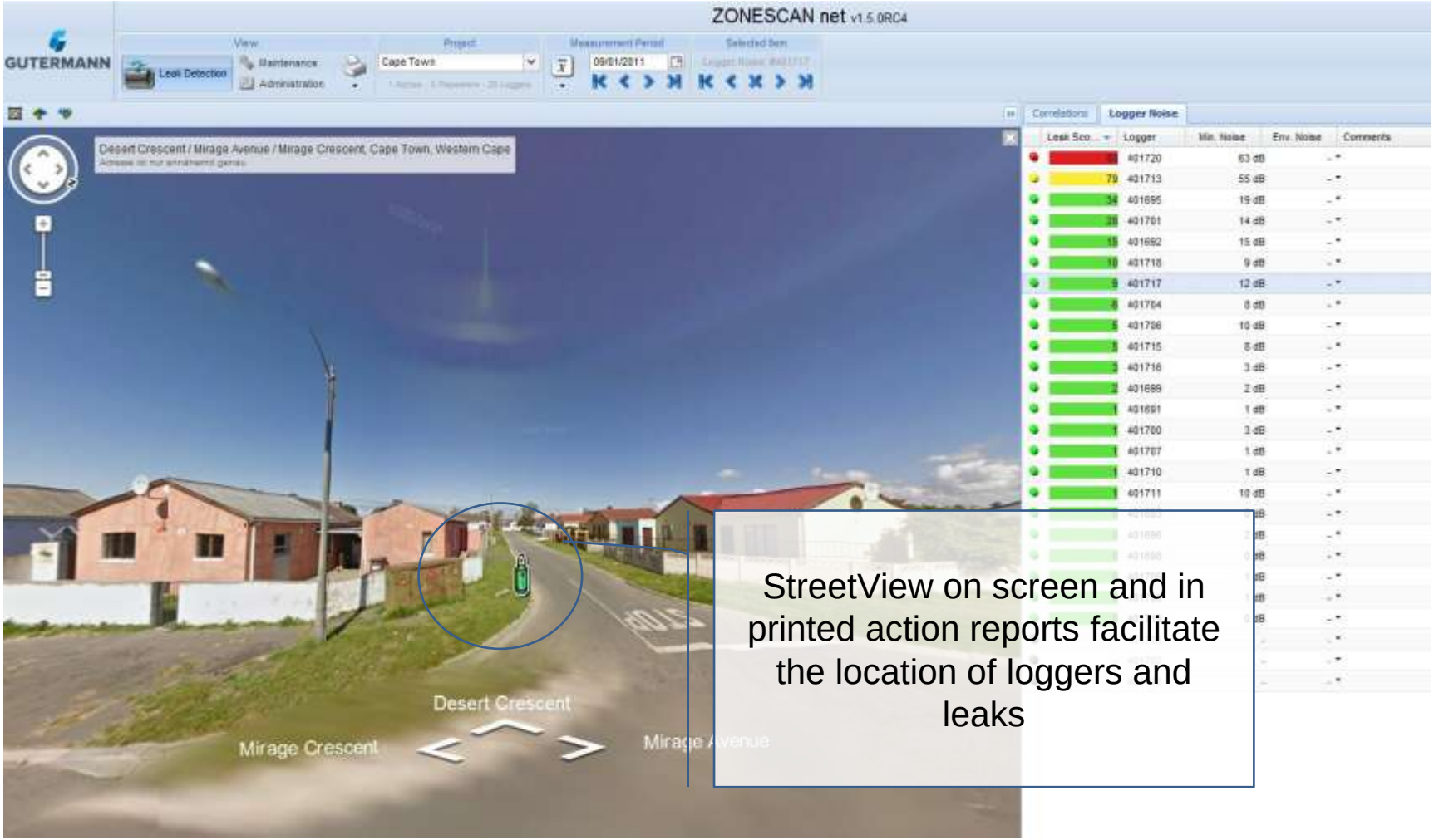

StreetView on screen and in printed action reports facilitate the location of loggers and leaks

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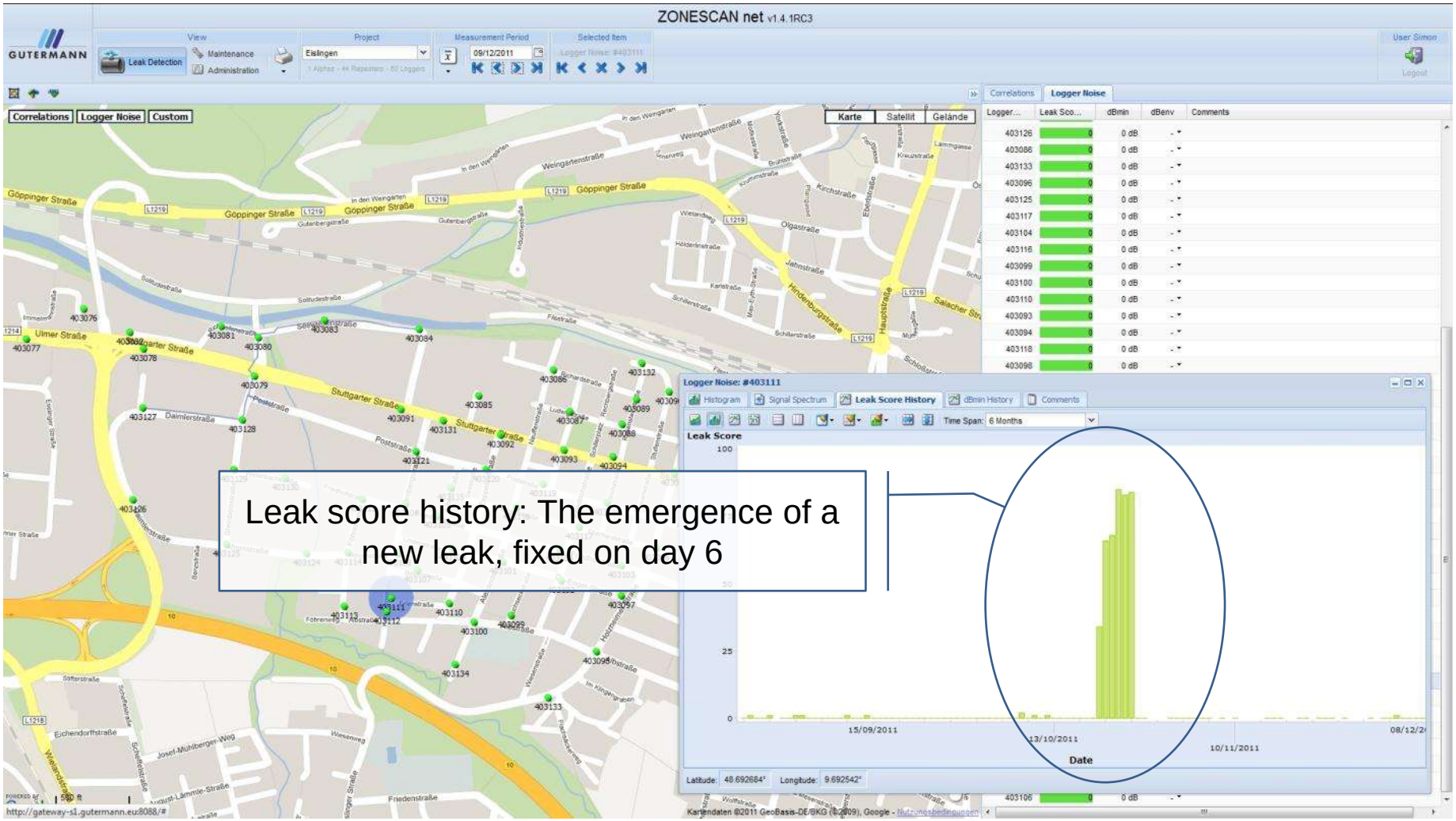

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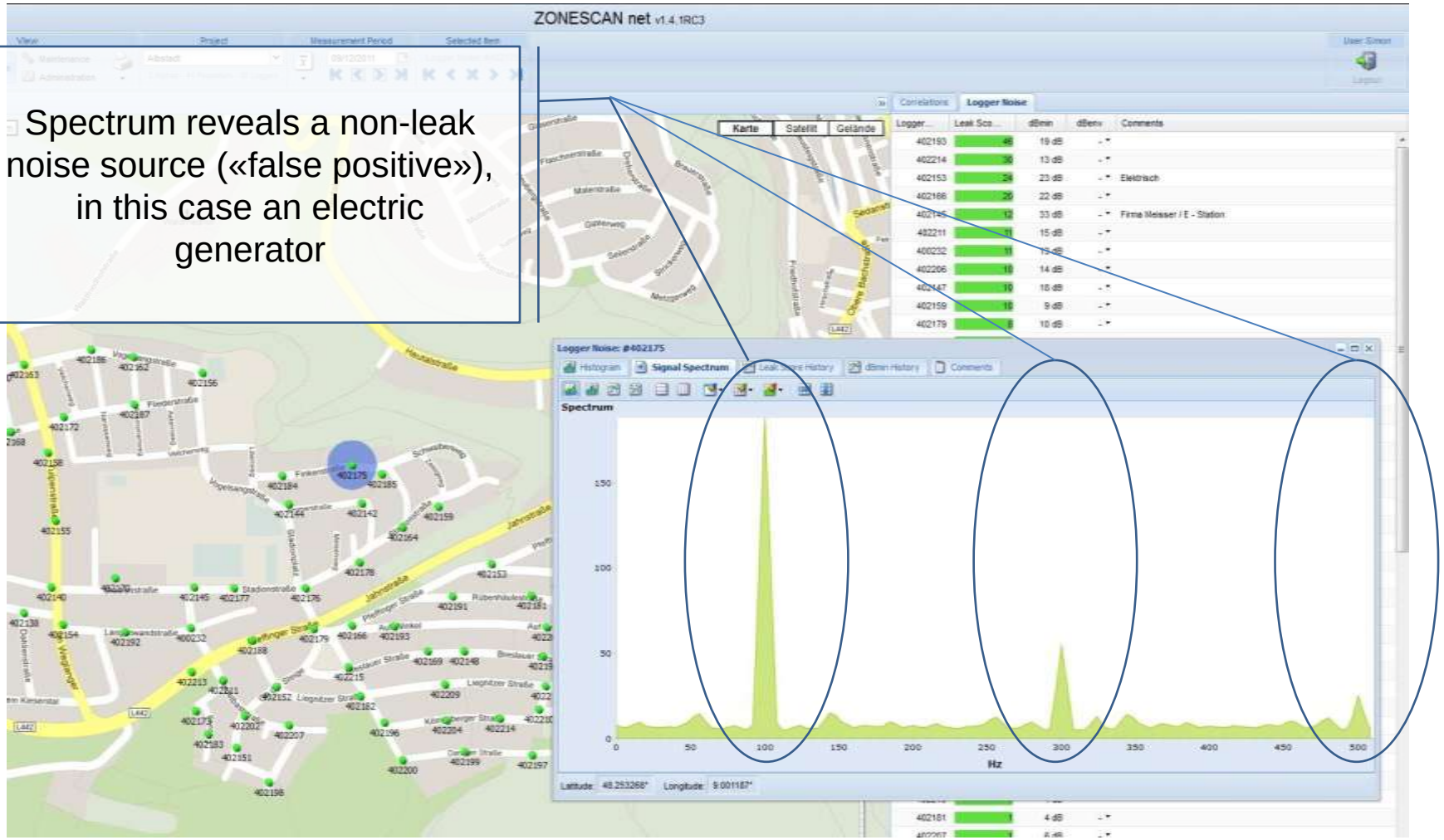

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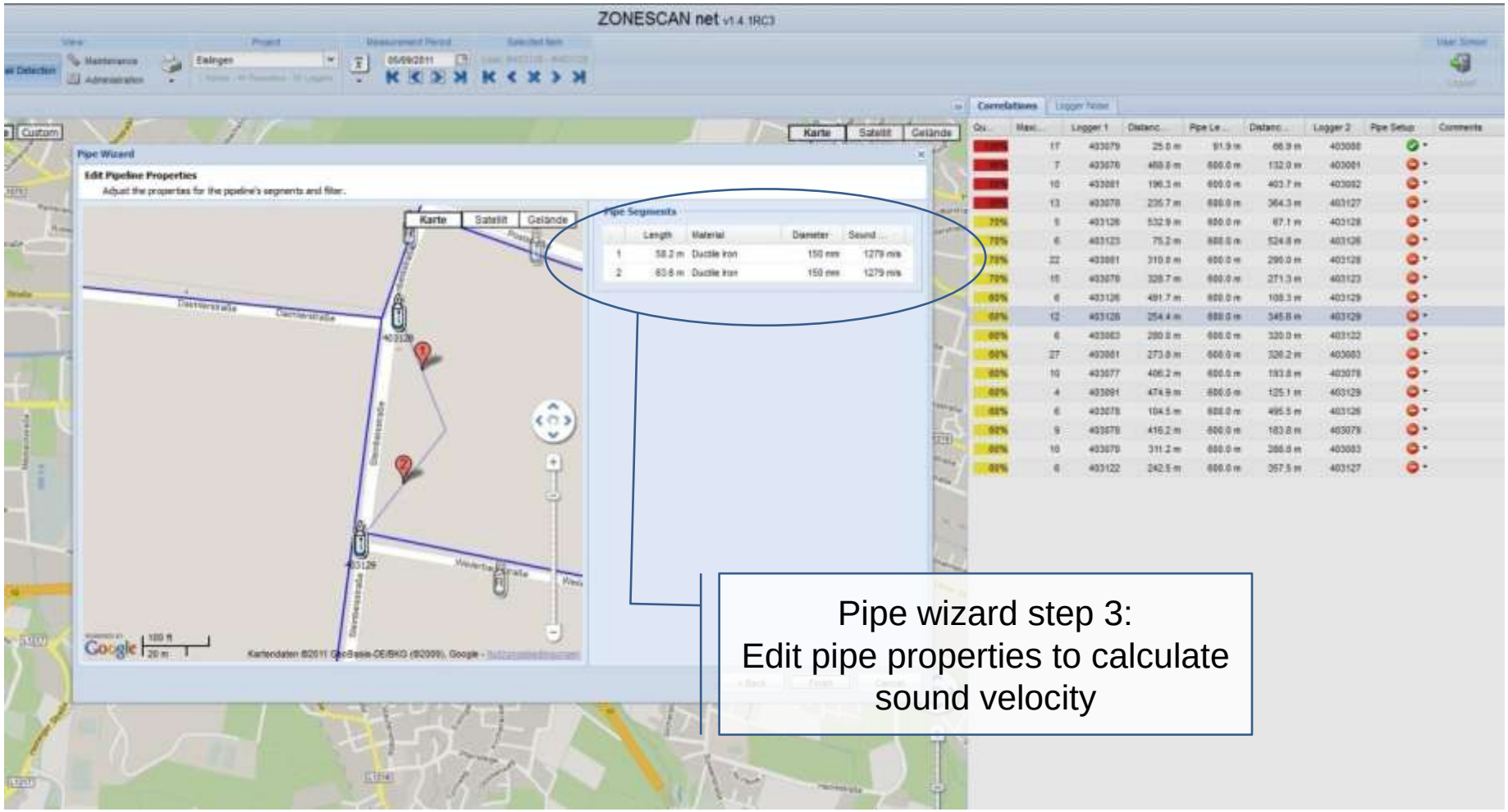

Pipe wizard step 3:
Edit pipe properties to calculate sound velocity

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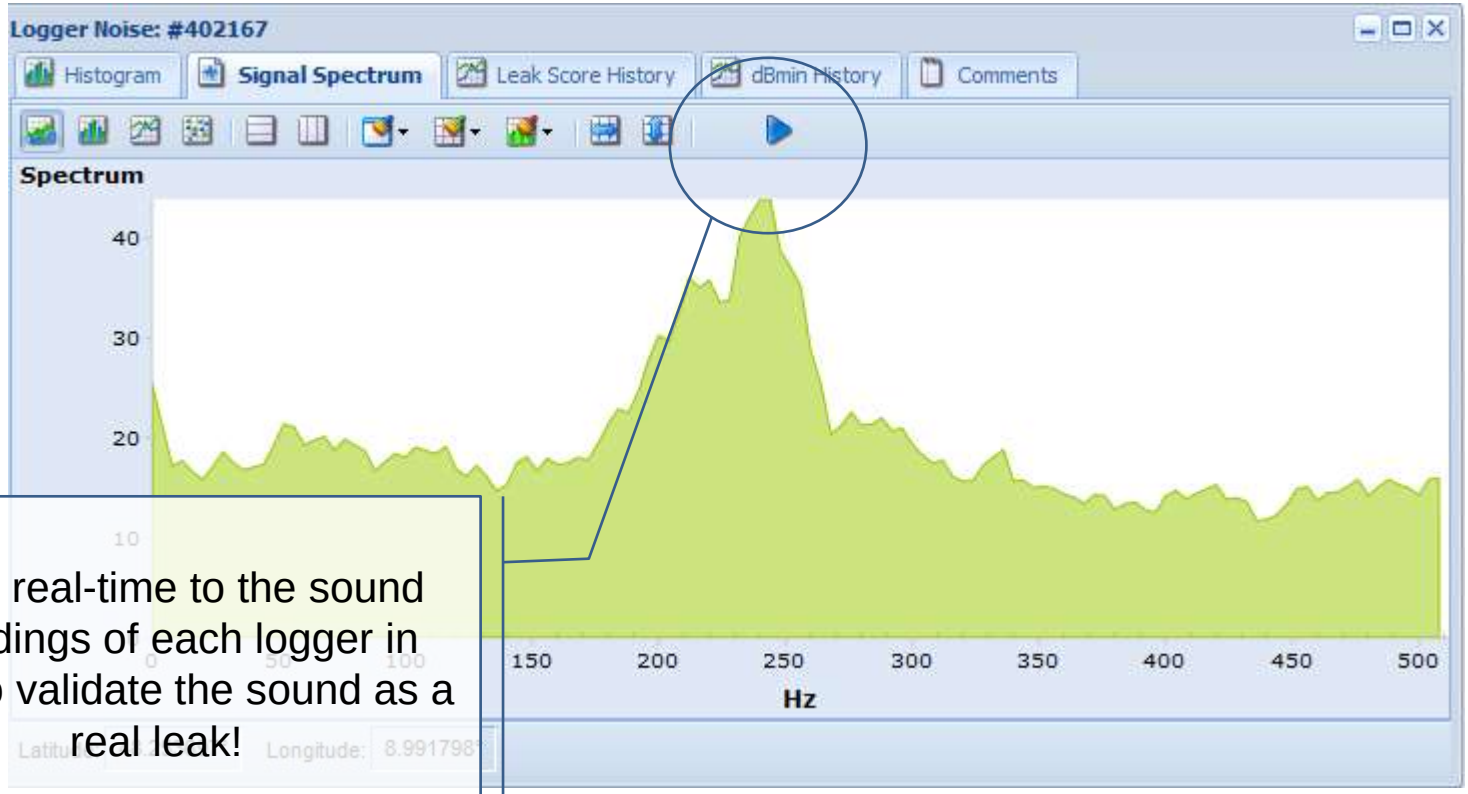
Platform for «Smart Water Management»



Listen real-time to the sound recordings of each logger in order to validate the sound as a real leak!

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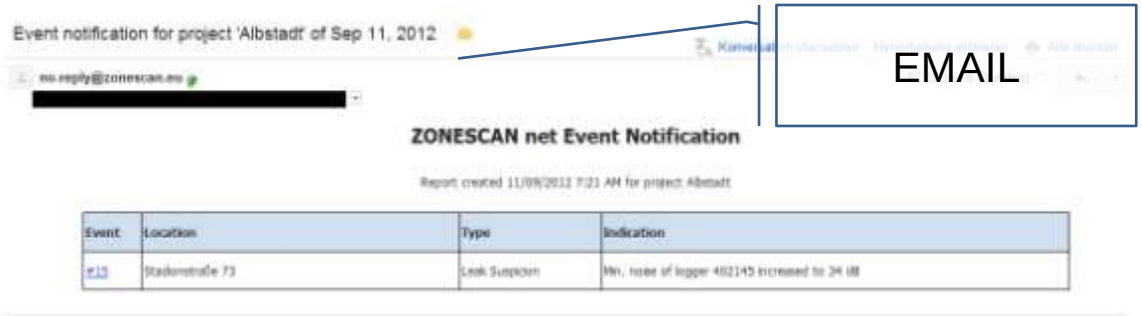
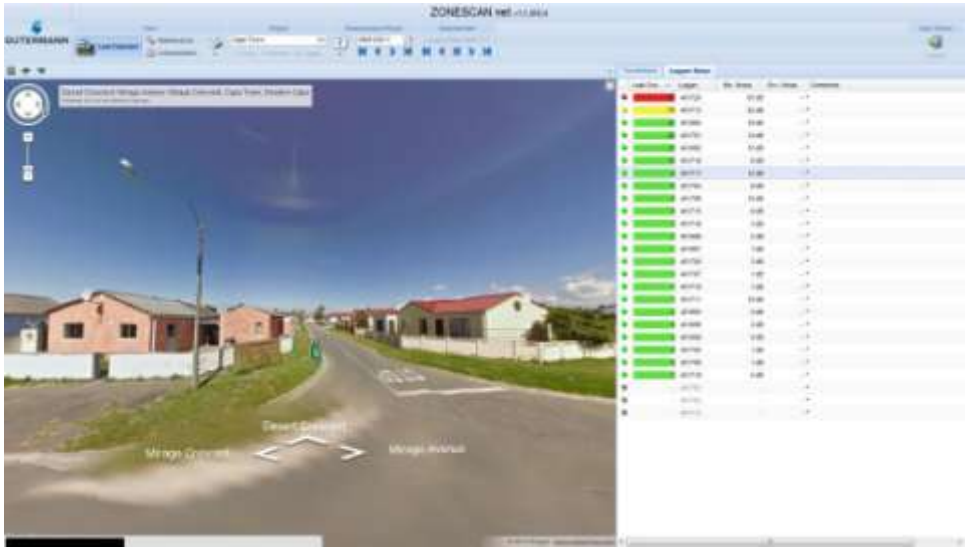
ZONESCAN NET:
Most Advanced Reporting Tools





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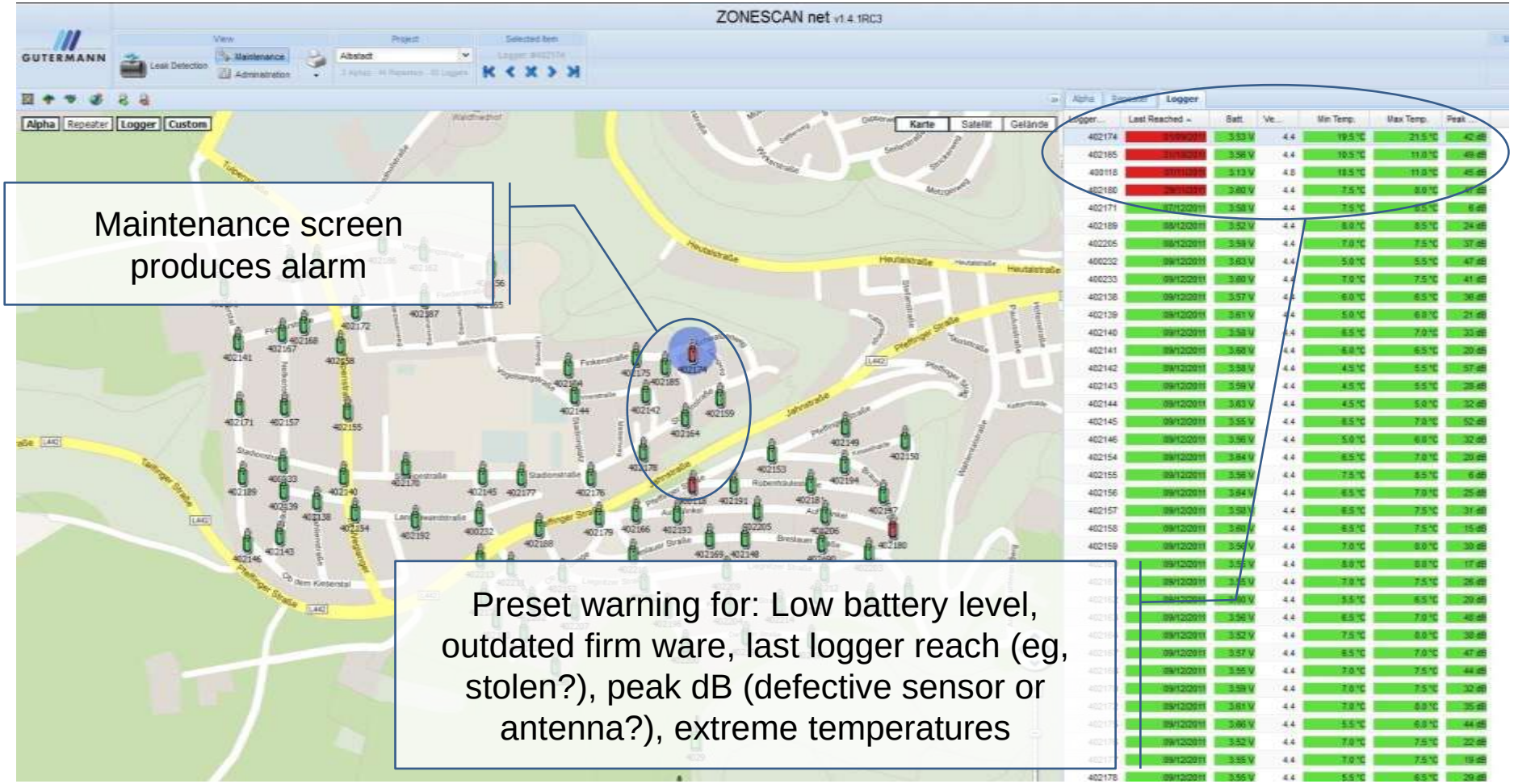

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Financial benefits

- Reducing the run-time of a leak
- Reducing the man hours spent searching for known leaks
- Focusing on looking for leaks in the areas with leaks
- Increasing knowledge of the network (investment decisions)
- Raising awareness of a leak when it occurs and before it becomes a major incident
- Reducing the amount of night-work and over-time
- Finding quiet leaks that are inaudible during the day or are masked by louder leaks (finding more leaks)
- Reducing repair costs through earlier intervention

*Save **manpower** costs*

*Save **water** costs*

*Save **infrastructure and social** costs*

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Why is the ZoneScan superior to any other leak detection system?

- Highest level of signal processing in the industry allows for pin-pointing of leak location through correlation of noise signals. Typical accuracy around 1m.
- Elaborate analysis of sound spectrum allows for highly efficient elimination of interfering noise sources (s.a. generators, aircondition, etc.) to deploy leakage teams to the right spot
- Powerful analysis tools in software allows professional to optimally assess leakage situation
- Small shape allows for optimal deployment of devices into tight chambers
- Use of Google Maps allows integration and display of customer specific data (s.a. pipe network)
- Modular upgrade path based on one hardware platform allow tailormade migration path depending on clients‘ needs
- Battery life of over 5 years allows for long term use without maintenance. Batteries can be replaced at end of lifetime.

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ACLARA STAR ZoneScan

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Aclara STAR® ZoneScan

LEAK-DETECTION SYSTEM

Find and fix leaks fast with the Aclara STAR ZoneScan leak detection system. The industry's only remotely correlated acoustic leak-detection system cost-effectively identifies small leaks before they become major problems.

The STAR ZoneScan solution combines the fixed STAR Network system with leak-detection technology from Gutermann International. The system checks and analyzes noise characteristics on water lines at regularly scheduled intervals.

Acoustic samples from each ZoneScan unit are collected by an Aclara meter transmitter, located in the pit lid, and then transferred to the utility via the network's 450- to 470-MHz radio-frequency signal. There, the STAR ZoneScan leak detection software correlates the data to pinpoint the location of leaks, enabling focused, efficient operation of water utility resources.

Each STAR ZoneScan system delivers

Hands-off approach
Performs automated data gathering with minimal attention by operators

Secure and reliable technology
Delivers accurate and reliable data through acoustic profiling

Installation options
Deploys permanently or temporarily, depending on the requirements of the utility

Conservation efforts
Assists in containing leaks and water loss in all areas

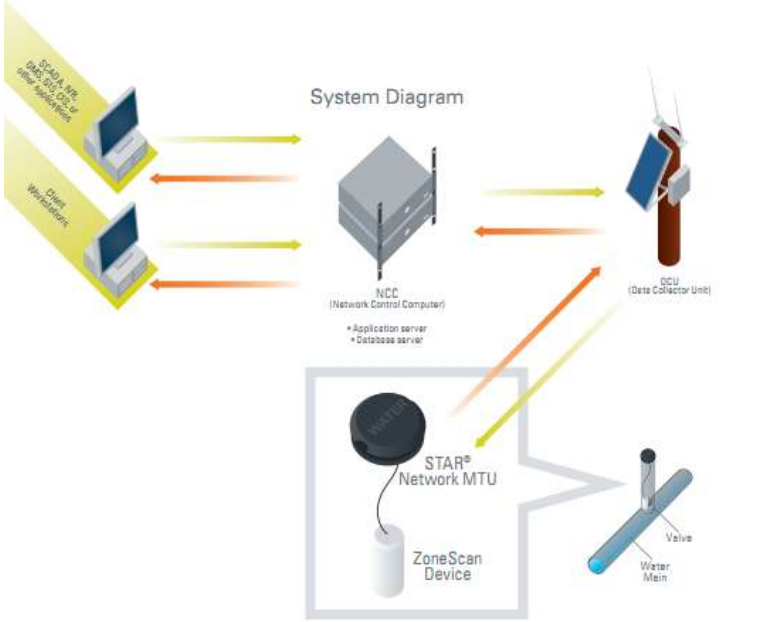
Environmentally sealed design
Prevents damage from elements such as snow and rain

Flexibility in pipe constructions
Works on metallic, plastic, concrete, and other non-metallic pipes

Capturing data. Liberating knowledge.™

www.Aclara.com

Aclara STAR® ZoneScan



The self-powered, intelligent, leak-monitoring units are deployed throughout the water pipeline network at regular intervals. Leak-intelligence units attach to the valve spindles, and continuously monitor and analyze noise characteristics.

ACLARA

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