



Predicting Water Leaks using Unique Insights



WATER LEAKS

A significant problem

- Water companies are still losing almost 3,000 million litres of water every day, from over 346,000 kilometres of mains water pipes.
- Leakage reduction must improve if it's to hit the regulator's target of a 50% reduction from 2017-18 levels by 2050.

But why focus on stopping leaks, if affordable innovation could help to predict them?

The burden is shared but the onus is still on water companies

Everyone recognises that reducing leakage is vital to ensure resilient water supplies. Customers, regulators, companies; shareholders as well as technicians.

However, lower leakage would put less stress on valuable environmental resources and, ultimately, bring down the cost of having access to water. That would be a positive note for the economy and our everyday lives, to say nothing of the effect on roadworks and their costs to UK PLC.

When the regulator set its first stretch targets for the 2020-25 period, the response from water companies was holistic: stopping leaks became the priority.

Some firms still deploy manual leak detection (leak-spotters and sniffer dogs included), and some have made progress through data capture and analysis, thermal imaging drones, and satellite technology. But that activity all focuses on detection – leaks that have already happened.

Our Spatialise team wants to help predict where leaks will occur

We understand the need to capitalise on economies of scale. Targeted, specific leak predictability is highly desired, but hard to deliver with no specialist resources. With that in mind, we're exploring the art of the possible. Finding ways to predict leaks – to mitigate those risks and rising cost – rather than just plug them.



SPATIALISING

Predicting Leaks

Our Spatialise team uses high-density modelling and complex analytics to blend a diverse range of data inputs. We believe there's an affordable way to increase the predictability of water leaks at scale.

We use network data, vegetation, trees, sub-surface structures, slope inclines, the age of existing infrastructure, location itself – and many other datasets – to derive extraordinary insights. Satellite imagery and specifically SAR (synthetic-aperture radar) sensors provide another hugely powerful dimension to detect water leaks from space. This technology is particularly impressive in being able to detect background leaks or those that have historically been very difficult to locate.

The acquisition of high resolution satellite data is still relatively expensive at the scale a water company needs, but at \$20 per sq km the investment could be considered sound, given the enormous costs and disruption caused by leaks and increasing fines from the Regulator. These days, the ability to task satellites to capture specific territory for under \$40 per sq km means that access to key data resources is becoming increasingly commoditised.

However, the challenge remains how you manage and interpret the data to build the insights, especially when site intelligence needs to come from many sources. Building a spatial framework for this key intelligence is no mean feat, but once in place it can tell a powerful story, particularly if we build in historic data on water leaks, roadworks and other potential disruptive impact.



COMPUTING POWER

& location expertise

The right data analysis tools are so advanced, with machine learning capability and cloud computing enabling unlimited processing power. We can define what constitutes a leak by analysing historical leak data against satellite images and SAR, but knowing where there are no leaks can be as significant as knowing where there are, since this data helps to build a more robust predictive learning algorithm.

The changes in the makeup of a single satellite image pixel or RADAR reading can tell us many things over time, not simply detection of changes in moisture levels. Knowing where leaks are is still valuable, but the costly outages are known to water companies, many of whom have dedicated and highly capable teams tackling these. It is predicting the next big outage that is so hard but so valuable, and that is what drives our learning models as we refine our input parameters and test our results with real world data.

Generally, leakage is affected by operational strategies (pressure management, for example); actual usage and changing demand, and ultimately the condition of assets – this is a highly complex challenge for water companies and smart metering has revolutionised real time data and analytics capability.

The historical impact of the 2011 Private Sewer Transfer Regulations has meant water companies have inherited a vast unmapped private network of infrastructure connecting to their pipes, making their modelling even more complex. With so many unknowns it is hard to be truly predictive, but we offer water companies another spatial dimension to leverage, by using our own datasets; customer base composition, environmental and adverse weather factors. That's a complex set of parameters.

The key to a successful project is a close working collaboration with the customer, sharing key data and learnings and building on (not replacing) what are often very effective custom processes. By combining these processes with our own expertise, extra insights and the necessary computing capacity, we can derive unique, valuable and affordable insights about future leakage.

There is no single solution to the problem of water leakage, but we do know how to improve predictability that will deliver enough insights to make for a compelling business case.

PREDICTING WATER LEAKS

Previously, this kind of insight was too costly or hard to solve in-house, too expensive to outsource at scale. But our experience with the water industry and depth of understanding of spatial data adds a new dimension to preventing leaks.

While most companies are using satellite or aerial imagery to identify problems on the ground as they become visible, we believe we can build a data insights model to predict problems in advance

All water companies suffer from water leaks and will continue to do so. It is not feasible to replace an aging infrastructure at scale to eliminate the risk, so what is the answer?

A way to identify those risks before they become an expensive problem – making it easier to prioritise essential remedial work in advance.

So, where do we go from here?

NEXT STEPS

Spatialising your data

Broadly speaking, we offer a water company innovative data modelling, spatial data services, and data analysis at a fraction of the cost you might imagine.

Our Spatialise team can offer:

- Flexible third party data licensing options to leverage value from satellite or topographic mapping
- Design leakage models, tailored to your region and asset register
- Buildings' data intelligence at address level
- Arboriculture intelligence, giving insights to likely root damage
- Subsurface soils and geology
- Environmental and extreme weather impact
- Historic roadworks and maintenance
- Customer profiling

We invite you to collaborate with us, explore the science and challenge us to make a difference.

Email us now customersupport@emapsite.com or call us for a free consultation on 0118 973 6883

Why Emapsite?

For over 20 years, Emapsite has been one of the UK's leading specialists in mapping and location data services. Emapsite combines geo and business data to help SMEs, Enterprise level businesses and government users create insights, analyse and find value in their data.

Our cross-sector experience lets us bring innovation and insight to our product development, which in turn delivers user-friendly, insightful products for you and your clients.

The Emapsite team is always on hand to provide customer support and helpful advice from geospatial experts to help you get the most from the service.

Proven partnership

We work in partnership, we're supportive, and we're committed to reducing our own and our clients' impact on the environment.

Unrivalled Resources

We simplify the supply and management of mapping products, plans and reports. Blending diverse datasets to uncover hidden commercial insights.

Intuitive, scalable and sustainable

Our Spatialise products and solutions deliver geospatial insight to locate and overcome some of the most challenging industry issues.

Business intelligence

Our spatial intelligence enables our clients to pinpoint areas of risk and reward, and to make better business decisions faster.

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