Using satellite technology to prioritise limited leakage reduction resources



Manx Utilities 2024 Case Study

The Manx Utilities Authority in the Isle of Man, grappling with water preservation due to droughts and high demand, faced a shortage of leakage technicians. They partnered with SUEZ to use ASTERRA's satellite-based leak detection services. This technology, requiring no ground equipment, helped the limited team to efficiently identify and repair 113 leaks over three months, reducing the leakage rate by 5%. The satellite technology significantly optimised their resources, addressing the island's unique challenges.



Client issue

In the Isle of Man the Manx Utilities Authority faces a significant challenge: preserving their water reserves. The island has been hit by severe droughts in recent years necessitating hosepipe bans.

Water demand is high with the island's residents having the highest per capita water consumption in the UK (370 litres per person per day) and particularly for the fortnight of the famous Isle of Man TT races.

It's a small island with a relatively small network and consists of 1800km distribution mains, divided into 74DMA's, serving a population of 85,000, which swells by 43,000 people during the races. Complicating matters, the island's water system lacks metering, and its hilly topography leads to an average system pressure of 58m (5.7 Bar). Average water production is 30MI/day with current leakage or NRW at 7.14Ml/day. With the drive to reduce leakage but only one engineer and two technicians, the utility looked for a way to prioritise their leakage reduction activities.

Solution implemented

To effectively manage water supplies, Manx collaborated with SUEZ to utilise ASTERRA's satellite-based leak detection services.

The decision to choose SUEZ and ASTERRA was influenced by their proven track record in leak detection and the unique challenges faced by the Isle of Man, including its isolation and a limited workforce. The remote capabilities of satellite technology were particularly appealing as it would identify probable leak locations, thereby minimising field inspection time and maximising the detection of leaks.





leakage reduction in 3 months



Using satellite technology to prioritise limited leakage reduction resources

Manx Utilities 2024 Case Study



Results

Over the course of three months 83% of the POIs (144) were investigated and 113 leaks were found. This resulted in a performance metric of 1.55 leaks found per km and 3.3 leaks found per crew day. The breakdown of the leaks by subtype is shown in the table below. Ten leaks were found to be of significant size.

Between June and August the leakage rate per property was reduced by 5% from 6.2 liters per property per hour to 5.9 liters per property per hour.

Implementation

The first system survey was performed on July 12th 2024 and totalled 1000 km of pipe which included 27 DMA's that were believed to have the most leakage. 173 points of interest (POI) were identified.

How it works

A satellite image is taken using remote earth observation L-Band Synthetic Aperture Radar (SAR) by means of microwave illumination of the area of interest and backscatter pulses are collected for analysis.

Once the satellite image is obtained, it is overlaid with the water pipe network GIS and the pipes where water leaks were detected are highlighted. Data from satellite images are provided to the customer as part of a subscription-based service and can be delivered to the handheld devices of their field technicians.

The SUEZ leakage technicians worked directly with the Manx team for the first week to run through the results and assist in investigating the Points of Interest (POIs).

Differentiating factors

Satellite leak detection allows utilities to survey an entire network for leaks, at scale, without installing any equipment in the ground.

The satellite technology allows field crews to 'see' below the surface and identify leaks that otherwise might have remained hidden for years. The technology is pipe material agnostic, and can find leaks across trunks mains, service pipes, and customer side leaks.

Manx Utilities Leaks Detected by Sub Type

Pipe Main	Service Pipe	Valve	Fitting	Hydrant	Curb Stop Tap	Meter	Customer
8	13	4	28	7	27	1	25



Using satellite technology to prioritise limited leakage reduction resources

Manx Utilities 2024 Case Study



We are very happy with the results we have achieved, and continue to get. We achieved our lowest ever leakage level last month, and I would like to think the satellite project has played a big part in that, with leaks steadily being repaired.

- Manx Utilities Authority

The future

The customer intends to implement satellite leak detection as part of their ongoing NRW reduction workflow.

About Manx Utilities Authority

The Manx Utilities Authority (Manx Utilities) is a Statutory Board of the Isle of Man Government sponsored by the Department of Infrastructure. Manx Utilities' purpose is to supply households, businesses, public and third sector agencies on the Isle of Man with high quality, reliable electricity, clean wholesome water, and a sewerage network and treatment system to take sewage and surface water away and return it safely to the environment. In addition it also provides natural gas transmission and telecommunications services.

Manx collects, treats, stores and distributes over 29 megalitres of water per day to Isle of Man residents, businesses and visitors through 50,000 connections over an area of 250 square miles. The demand for water rises to 35 megalitres per day during the summer months. Leakage rates amount to 7.14 megaliter per day, or 25%. The system includes 1,880 km of pipe, 4 impounding reservoirs, 2 water treatment works, 20 pumping stations and 27 service reservoirs. The distribution system is divided into 74 DMA's.

About SUEZ

Faced with growing environmental challenges, for more than 160 years, SUEZ has been acting to deliver essential services that protect and improve the quality of life. SUEZ enables its customers to provide access to water and waste services, with resilient and innovative solutions.

With its 40,000 employees present in 40 countries, the Group also enables its customers to create value over the entire lifecycle of their assets and services, and to drive their ecological transition, together with their end-users.

In 2023, SUEZ produced drinking water for 57 million people worldwide and sanitation services for more than 36 million people. The Group generated 7.7 TWh of energy from waste and wastewater.

The Group generated 7.7 TWh of energy from waste and wastewater. In 2023, SUEZ generated revenues of 8.9 billion euros.

