

Detecting Underground Potable Water Leaks in Pipelines with Satellite Surveillance Technology

Water Leak Detection Project in Tashkent, Uzbekistan

Summary: Potable water leakage is a critical issue in Tashkent, Uzbekistan, where aging infrastructure and undetected pipeline damage lead to significant non-revenue water (NRW) loss. Leveraging satellite-based remote sensing technology, this project aimed to identify and address underground potable water leaks efficiently and cost-effectively. By implementing cutting-edge satellite surveillance and analysis, the client significantly reduced water loss and improved infrastructure resilience

Client and scope of the project

The client, **SuvSoz**, is a State Unitary Enterprise responsible for managing Tashkent's urban water supply and sanitation infrastructure. With a mandate to ensure a sustainable and reliable water supply, SuvSoz sought innovative solutions to address escalating water loss challenges caused by outdated and deteriorating pipeline systems.

Challenge

Aging Infrastructure: A substantial portion of Tashkent's pipeline network was decades old, with limited maintenance records.
Geographic Complexity: The urban layout and densely populated areas made traditional detection methods slow and labour-intensive.
High NRW Rates: Over 52% of potable water was suspected to be lost due to leaks and inefficiencies, straining the city's resources.
Limited Budget and Resources: The client needed a solution that minimized excavation and disruption while staying within financial constraints.

Solution

MAYA deployed its satellite-based soil moisture monitoring and leak detection technology and proprietary work techniques. This solution used Remote Sensing (RS) to analyze pipeline networks and pinpoint areas with unusual soil moisture patterns indicative of underground leaks.

Key steps included:

- **Data Acquisition:** Satellite imagery was collected and processed to assess soil moisture anomalies across Tashkent.
- **Analysis and Detection:** Advanced algorithms isolated high-probability leak locations by cross-referencing with pipeline layouts.
- **On-Ground Verification:** Invasive method inclusive of Ultrasonic and acoustic leak detection tools were used to validate satellite findings.
- **Recommendations:** A comprehensive report outlined leak locations, severity, and repair priorities.

Results & Conclusion

The satellite-based detection approach identified over 85% of the leaks with a 100m' radius accuracy, enabling the ground pin-pointing marking of actual leaks with a remarking accuracy of 1m' and targeted repairs that eventually reduced NRW by 65% within six months only. After repairing all the leaks, the water depreciation dropped from 52% to 18% in the first year.

The client achieved:

Cost Efficiency: A 40% reduction in detection and repair costs compared to conventional methods.

Operational Efficiency: Faster resolution of leaks with minimal disruption to urban life.

Sustainability: Preservation of water resources in a region facing increasing water scarcity.

This project demonstrates how satellite surveillance can revolutionize leak detection in urban infrastructure, offering a scalable, cost-effective, and non-invasive solution to address NRW challenges.

