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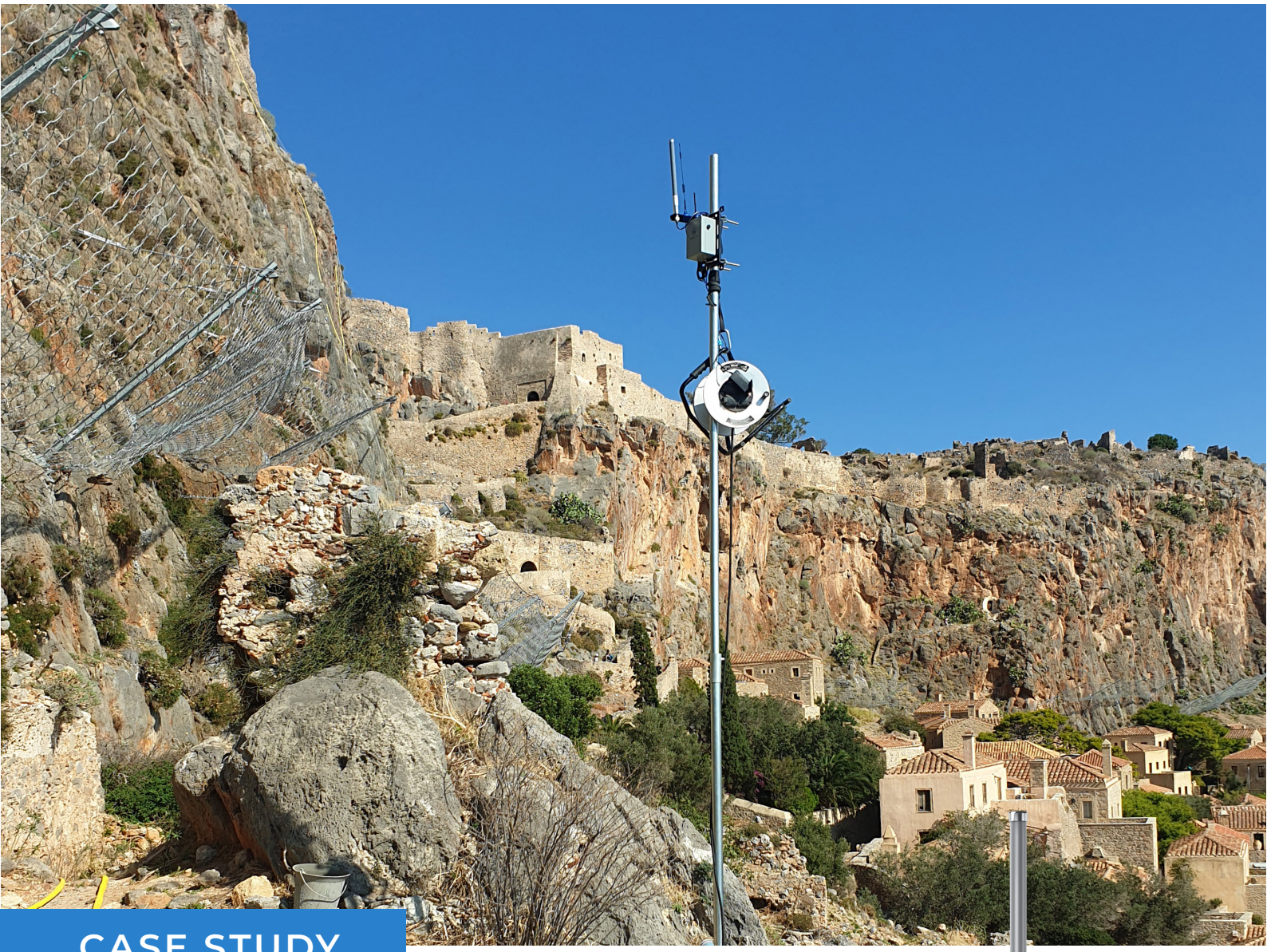
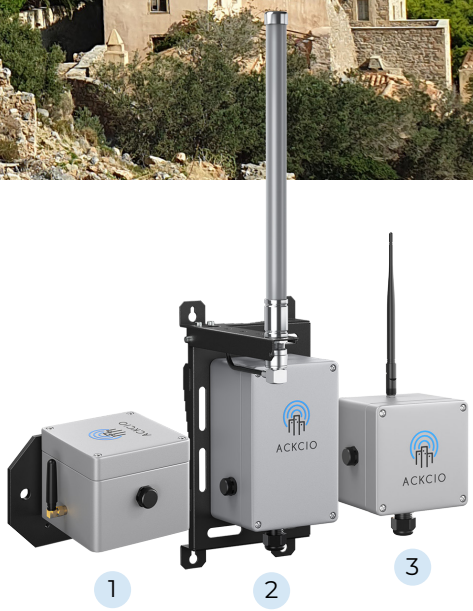


CASE STUDY

Reliable Wireless Slope Monitoring to Protect an Important Historic Site in Greece



PROJECT TYPE: Monitoring the stability of cliff

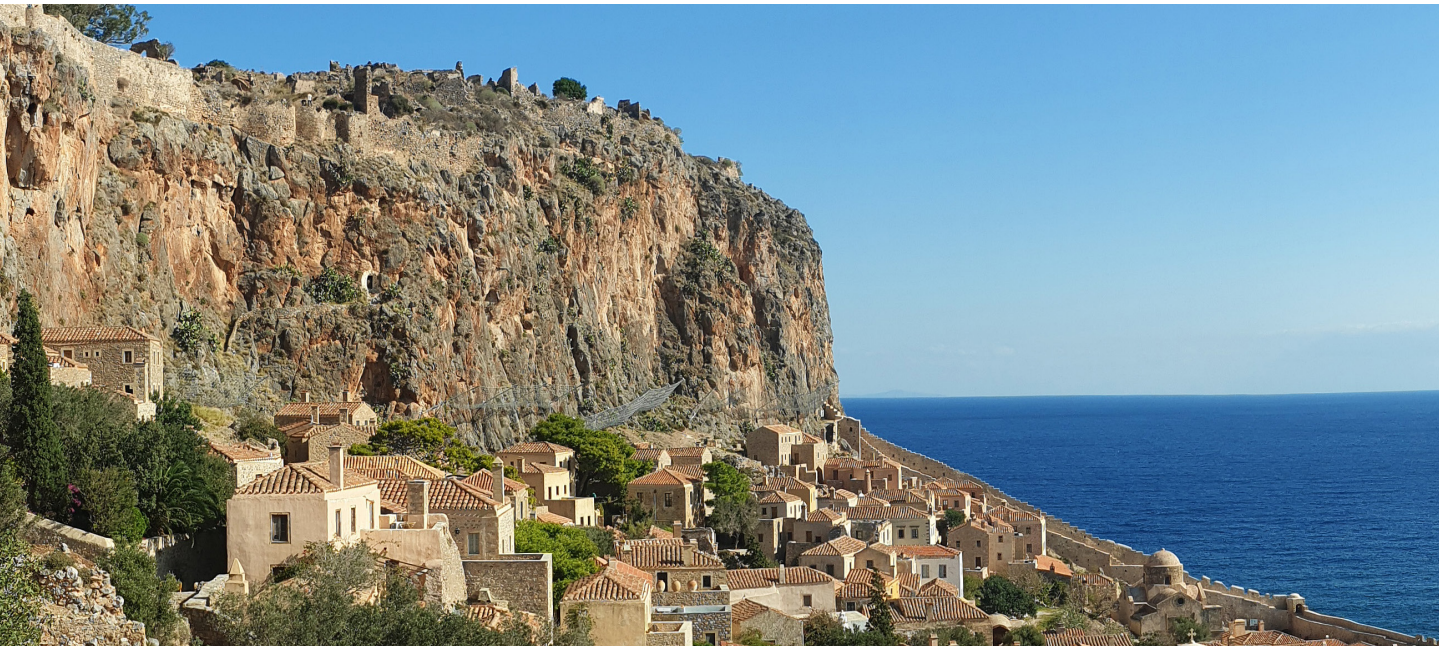
COUNTRY: Greece

INDUSTRY: Geotechnical

MAIN PRODUCTS:

1. Ackcio Tiltmeter Node (BEAM-TM)
2. Ackcio Gateway (BEAM-GW)
3. Ackcio Analogue Node (BEAM-AN)

CHALLENGE



On the high limestone cliffs of the tied island of Monemvasia, the country's first entirely wireless slope monitoring project is underway. The project combines various cutting-edge technologies to measure displacement and tilt in a challenging setting.

The tied island, in Peloponnese in Southern Greece, is an important cultural and historical site, home to Monemvasia Castle, a medieval fortress situated high on the cliffs. The instability of these steep, rocky cliff face is well-documented. There have been rockfalls, and significant undermining of the castle frontiers has been observed, posing a risk to the historic site and the town below.

As part of a project co-financed by the District of Peloponnese and the European Regional Development Fund to stabilize Monemvasia Castle's rocky slopes, the Greek firm NEOTEK was contracted to supply and supervise the installation of a network of wireless crack meters and biaxial inclinometers. The steep cliffs are not easily accessible, so installation was done by specialized aerialists in November 2022 after extensive training on installation practices. The sensors collect measurements to monitor the cliff face behaviour preceding stabilization work by another contractor.

The extreme nature of the site necessitated a monitoring solution that could provide automated readings and did not require a power supply, as there was no electrical infrastructure in place.

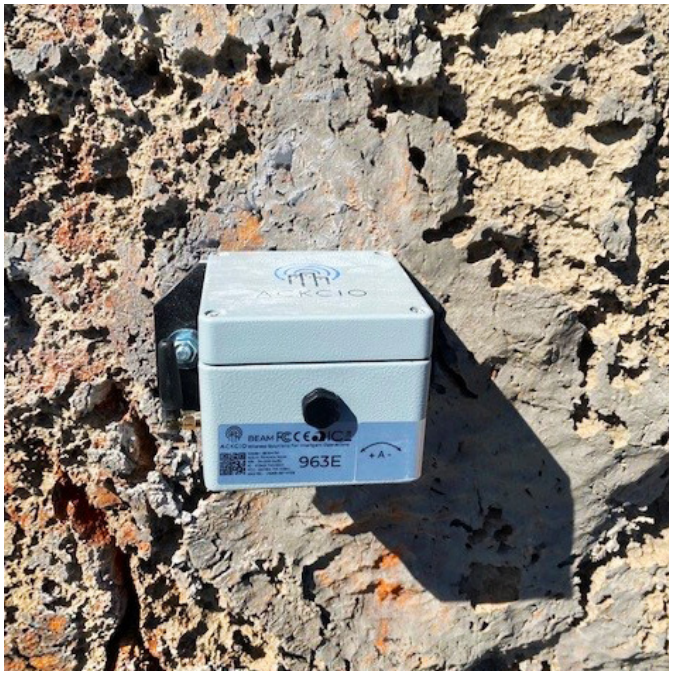
SOLUTION

NEOTEK chose the Ackcio Beam system for the reliability and stability of its automated wireless network. Ackcio's patented, long-range mesh communication protocol eliminates measurement losses, even if a transmitter goes down, ensuring uninterrupted data transmission.

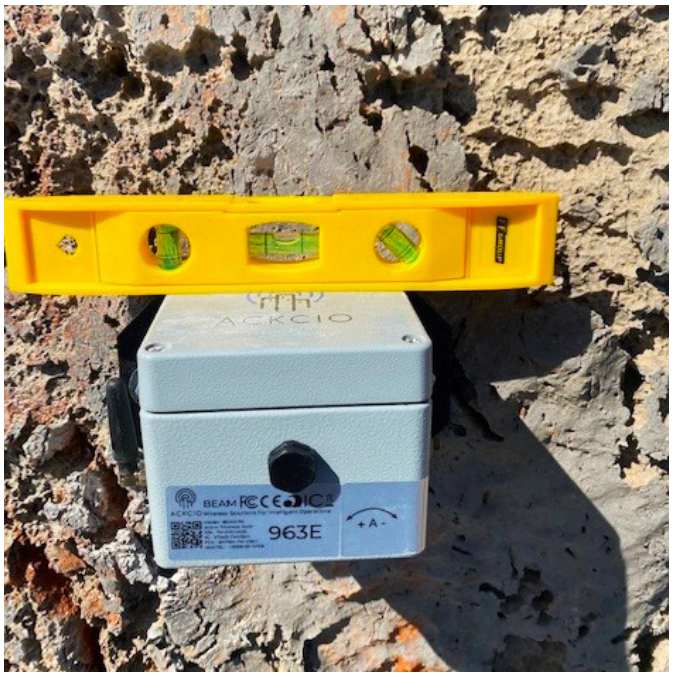
NEOTEK needed durable equipment that could stand up in this harsh seaside environment, as well as a battery-operated solution with a long lifetime, as the rugged site does not have a power source; Ackcio fit the bill on both counts.

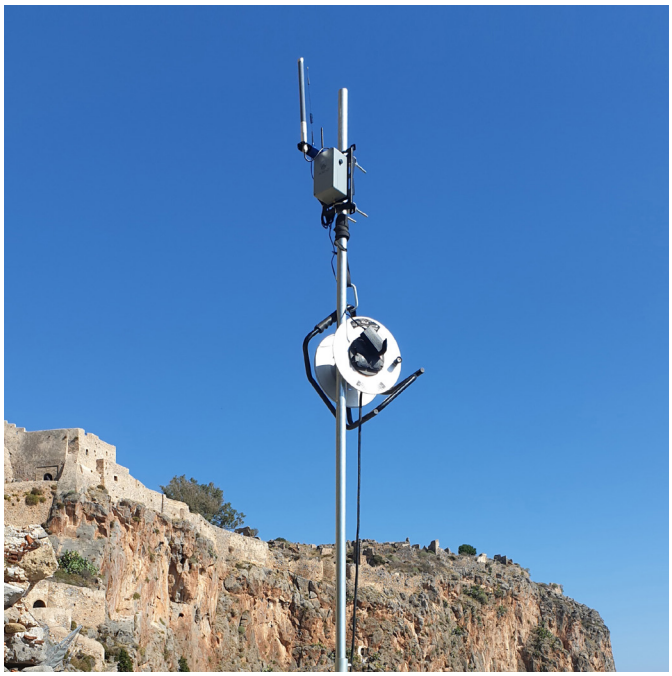
The project's monitoring instrumentation consisted of Elastisense elastic flexible displacement sensors placed over the cracks of small openings and Waycon wire-type sensors installed to monitor the cracks of larger openings where it was not possible to mount a sensor on both sides of the opening.

The crack meters are connected to Ackcio Analogue Nodes to log and wirelessly transmit the displacement measurements of the crack opening at selected intervals. To monitor the horizontal and vertical movements at specific locations, NEOTEK installed Ackcio wireless tiltmeters BEAM-TM.



All measurements are wirelessly transmitted to the Ackcio Gateway (BEAM-GW), the master device that coordinates the entire system. The Gateway receives sensor data from the Nodes and pushes them to a Geosysta cloud-based platform, which allows for early warning alarms at specified limits set by the user.





The installation of the first station is complete, and two more phases are planned for spring 2023 in this pioneering wireless monitoring project. A total number of 100 Ackcio wireless Analogue Nodes (BEAM-AN), 20 wireless biaxial tiltmeters (BEAM-TM) spread over 3 central Gateways (BEAM-GW) will monitor a face cliff 30m in height and 400m in length.

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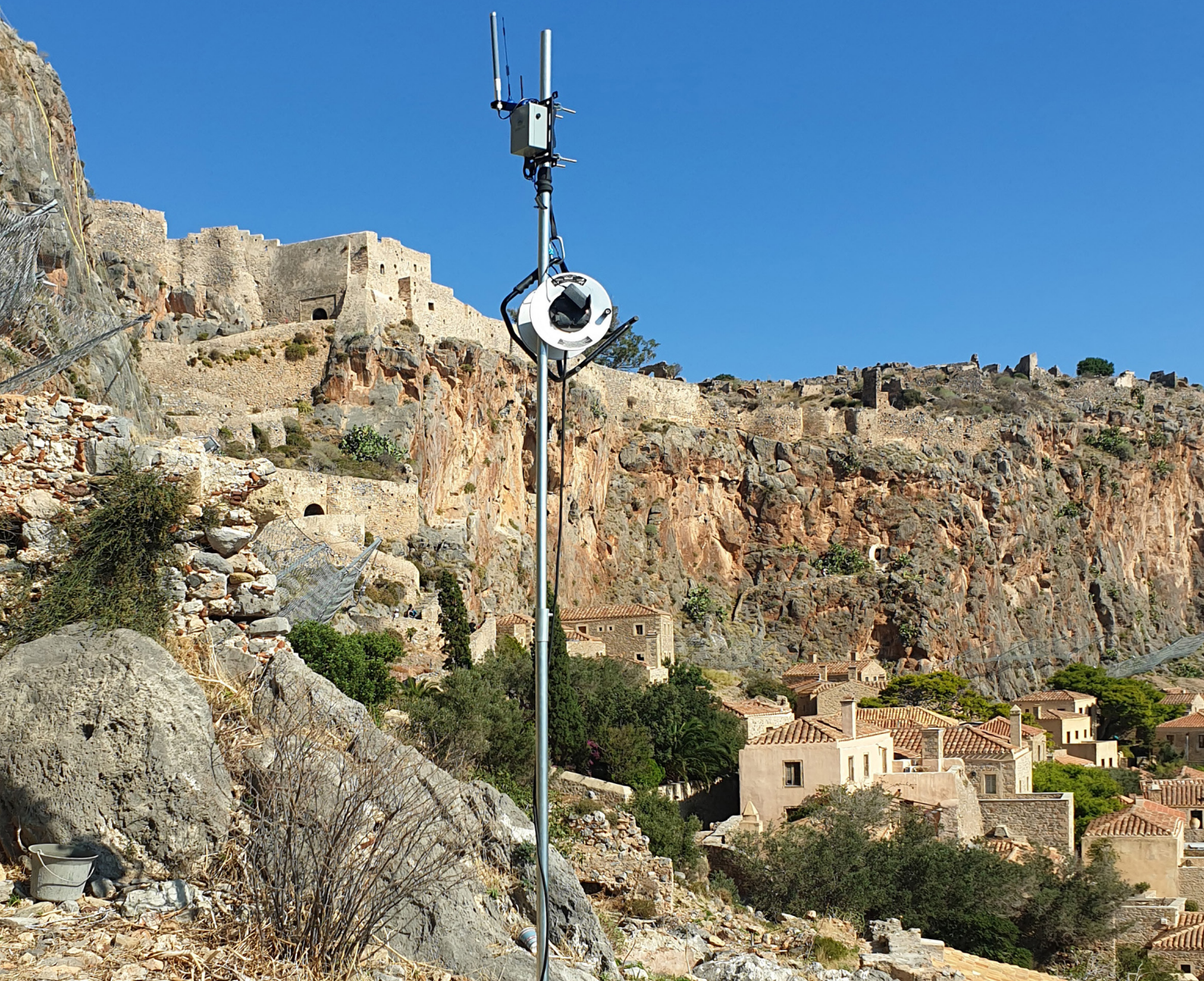
RESULTS

- ✓ Remote, real-time data access
- ✓ Reliable, stable readings from a challenging site
- ✓ Increased infrastructure, building safety
- ✓ Improved risk management



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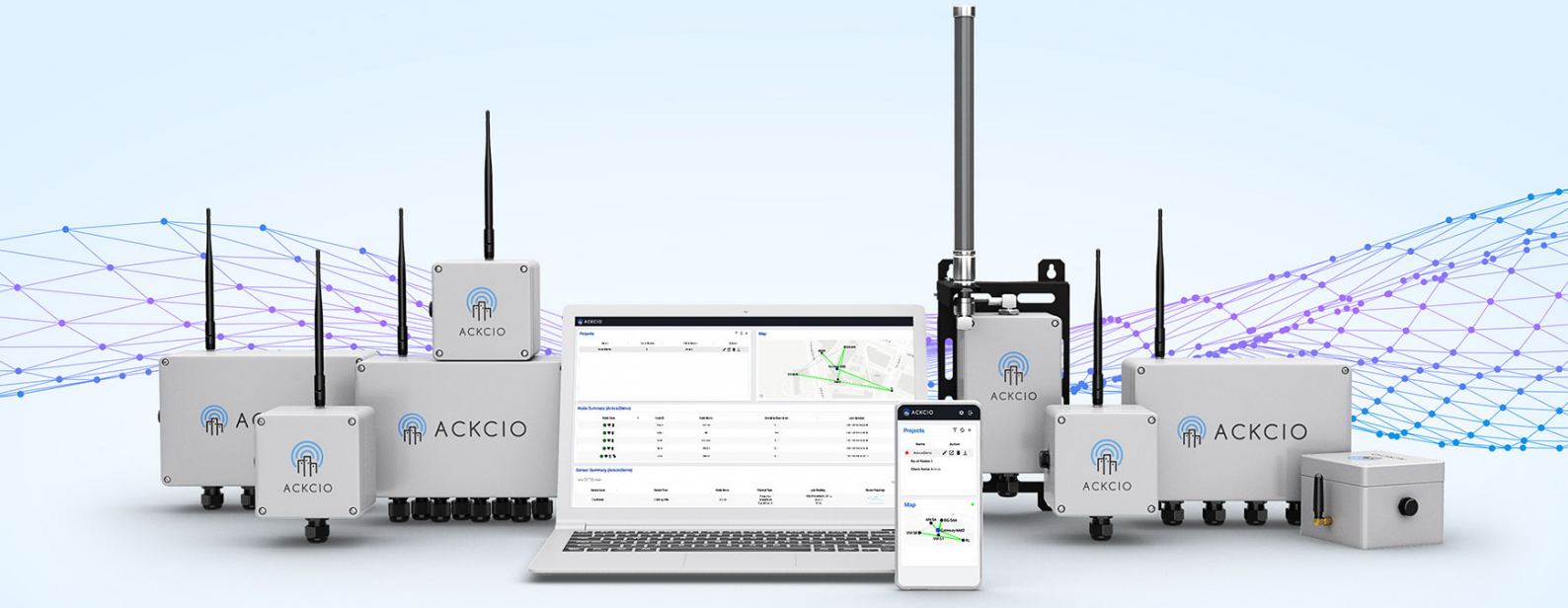
BENEFITS

Automated wireless readings

No power source needed

Integrates with other manufacturers' sensors, platform

Automatic alarm thresholds



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TESTIMONIAL

NEOTEK was involved in this project from the very beginning. Due to the complexity of the terrain and the lack of mains power, the only way to effectively monitor the stability was a wireless solution. Having bad experience with LoRa technology in the past with similar projects the ACKCIO Mesh wireless solution was the way forward. Connecting the sensors, setting up the nodes and installing took minimum effort, while Ackcio support was seamless every step of the way. This is one of a kind wireless monitoring solution in Greece and we are excited to have supplied and installed a solid and flawless system.

— **Katerina Xystri**
Sales Director
NEOTEK

ABOUT NEOTEK Founded in 1969, NEOTEK is a Greek company actively specializing in the supply and technical support of instrumentation involved in scientific research and industrial applications in the fields of civil, mechanical, geotechnical, structural and seismological engineering.

ABOUT ACKCIO Ackcio builds reliable wireless data acquisition systems for industrial monitoring applications. The company automates monitoring processes and provides remote, intelligent data to enable increased safety and efficient risk management in mission-critical industries, including construction, infrastructure, mining, and rail. Ackcio's flagship solution, Ackcio Beam, is an industrial data acquisition platform that uses a patented long-range wireless mesh network to monitor sensors accurately and reliably in both above-ground and underground environments. Ackcio is headquartered in Singapore and supports clients across the world. In 2021, the company was included in Forbes Asia's inaugural '100 to Watch', a list of small companies and startups on the rise across Asia Pacific.

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