

# Using a cloud-based warning system to protect the Amazonian rainforest

**Country**

Brazil

**Project type:**

Tailings dam monitoring

**Sector:**

Mining

**Main product:**

Monitoring Solution

---

## Challenge

Tailings dams and sludge pools are essential to mining activities but can pose hazards to local environments and communities in the event of a failure. Brazilian mining companies are especially alive to this threat after having experienced serious incidents in the last decade. Ensuring the safety of tailings dams and sludge pools is a particular concern at Mineração Rio do Norte (MRN), a bauxite mine operator that has maintained four decades of sustainable operations in western Pará, close to the Amazon River. But when it came to monitoring conditions at its tailings facilities in Porto Trombetas, in the municipality of Oriximiná, MRN faced a challenge. The area that needed to be monitored around the facility was immense, spanning roughly 10 km by 5 km of rainforest where ancient trees could easily block radio signals and excavations for wireless gateway poles would be difficult if not impossible.

---

## Solution

It was clear MRN would need a monitoring technology with reliable and extraordinarily long-range capabilities—and the ability to raise an alarm automatically should things go wrong. Because of this, MRN chose to install a Worldsensing monitoring network based on LoRa Star, a Low Power, Wide Area networking protocol designed to wirelessly connect battery-operated devices as part of Internet of Things (IoT) deployments. The IoT monitoring installation included 1,200 pore pressure measuring piezometers linked to Worldsensing LS-G6-VW and LS-G6-VW-1M vibrating data loggers, plus 230 in-place inclinometers sensors connected to Worldsensing LS-G6-DIG2 digital data loggers. Thanks to the equipment's LoRa capabilities, MRN was able to cover the entire area with just four concentrator points, including one for redundancy across the whole deployment.

**DISCLAIMER:**

All Content published or distributed by Worldsensing is made available for the purposes of general information. You are not permitted to publish our content or make any commercial use of our content without our express written consent. This material or any portion of this material may not be reproduced, duplicated, copied, sold, resold, edited, or modified without our express written content.

“Worldsensing’s CMT Cloud multi-gateway solution exceeded our expectations. The redundant gateways proved to be very effective during a real failure event in which, for some time, the pole gateways of each region went offline and only the two gateways in the tower kept the entire system online. This prevented the inclinometer data loggers from losing communication, keeping all monitoring of the structures functional. The inclinometer of a distant structure stayed online even though it was more than 8 km away from the tower.”

---

**Rodrigo de Campos Penteado**

Project Manager, MRN

---

## Benefits

Monitoring data is transmitted to an IntelliTech Slope Health Monitoring System via a single, easy-to-maintain and highly secure Worldsensing CMT Cloud multi-gateway platform using MQTT, a lightweight machine-to-machine network protocol. MRN can now monitor potential failures in real time and take remedial action where needed, helping to safeguard local communities and the unique aquatic flora and fauna of the Amazon ecosystem. MRN can do this with minimal cost and effort because Worldsensing’s LoRa-based technology means a large area can be covered with just a few devices and their batteries can last for years on end without requiring a maintenance check.

## Advantages

- Worldsensing’s integration capabilities make it easy to add new devices at any time.
- The cloud-based Connectivity Management software (CMT Cloud) offers 24/7 access to device, data and network information.
- LoRa communication reduces the cost and complexity of the monitoring system.



Tailings facility in Porto Trombetas, Brazil

Source of image, MRN