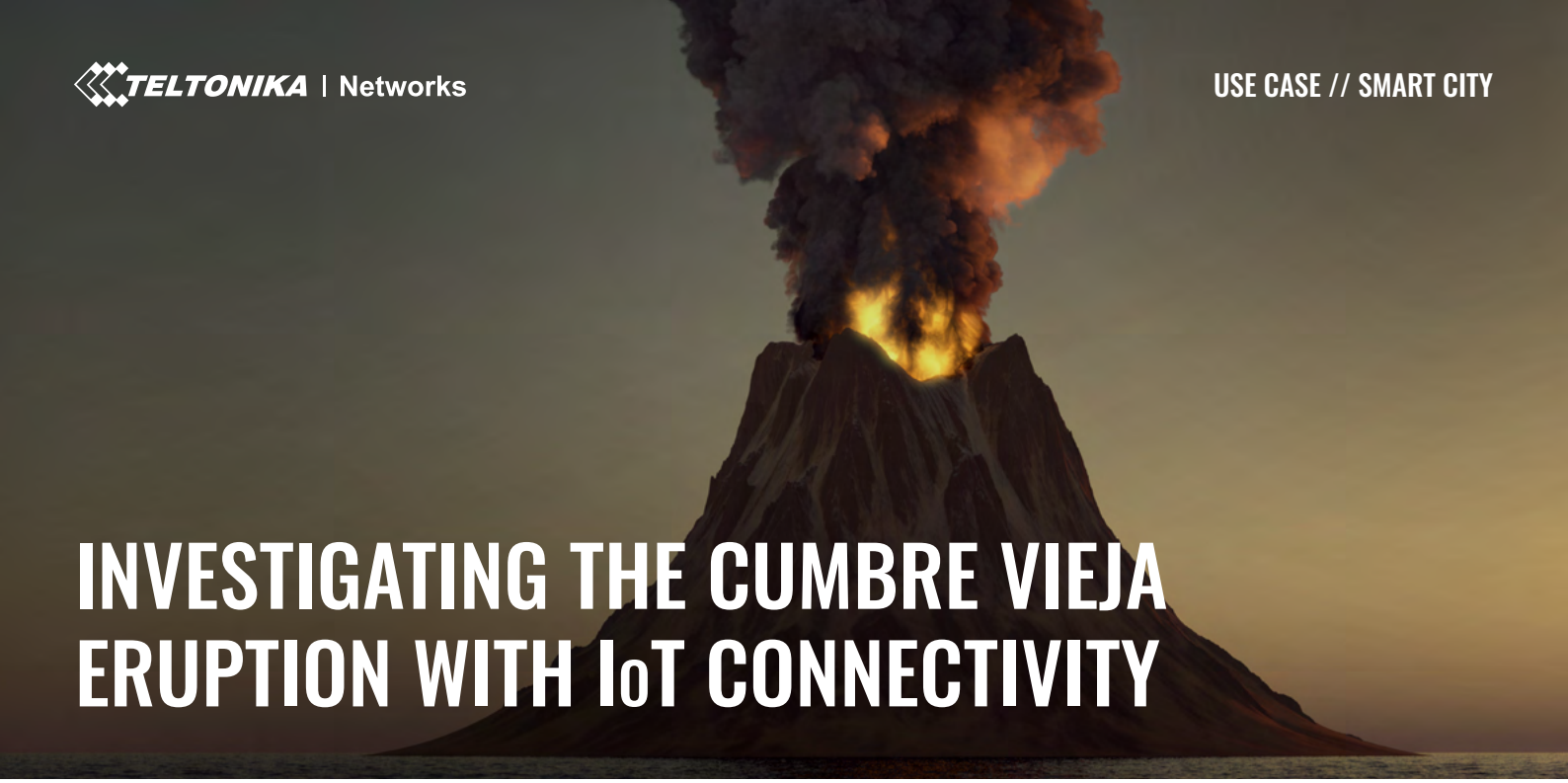


INVESTIGATING THE CUMBRE VIEJA ERUPTION WITH IoT CONNECTIVITY

HIGHLIGHTS

- The devastating effects of the 2021 Cumbre Vieja volcanic eruption in Las Palmas caused colossal damages, not only for the island's ecosystem but also for the surrounding seawater. However, the full extent of the damage was unknown.
- A group of researchers from the Polytechnic University of Catalonia, BarcelonaTech, Spain, were asked to investigate the effects of this volcanic eruption on the island's surrounding seawater. The group created a bubble-looking instrument consisting of our TRB245 cellular gateway, which enabled reliable seawater status collection remotely.
- Apart from robust connectivity, features like compact design, low power consumption, and ease of use have made the solution as convenient and efficient as possible.

THE PROBLEM – VOLCANIC PANIC

While volcanoes can be mesmerizing, there is a very fine line between captivating and catastrophic. One eruption can potentially wipe out an entire local ecosystem with its waves of lava, endangering not just nature, but also the animals and people living in it.

Unfortunately, with one eruption per week worldwide, such a disaster occurred on the Spanish island of La Palma in 2021. This volcanic eruption lasted for a record-breaking 85 days from September to December and caused colossal financial damages. From the devastating impact on the lives of every citizen of the island to its nature – it seemed that every living organism suffered.

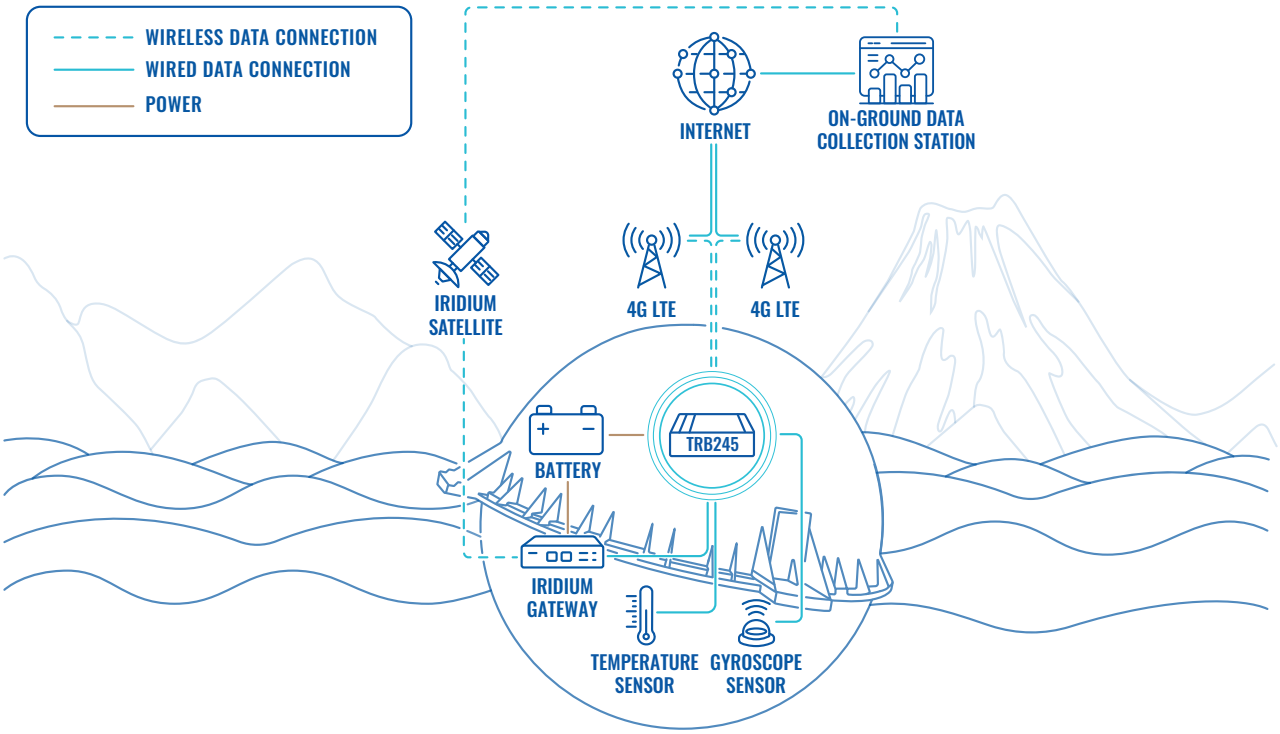
But what about the waters surrounding the island?

This was the question posed to the scientists and students of the Polytechnic University of Catalonia, the largest engineering university in Catalonia, Spain.

To answer this question, a group of researchers was dispatched to the site with the aim of observing the consequences of the volcano's eruption on the surrounding seawater. For this to be evaluated, measurements of water quality, currents, and temperature changes had to be continuously sent to the on-ground station for measurements and data logging.

However, retrieving data from equipment was often complicated or even impossible. This is due to the equipment being placed in a sphere on the surface of the water, and having a tendency to drift with the sea's currents. The group of researchers knew that network connectivity support for the entire system was the answer to the issue of the sphere's unpredictable drifting, yet they still needed to identify the most suitable networking device for their needs. Luckily, they stumbled upon our device portfolio and found the perfect option.

TOPOLOGY



THE SOLUTION – THE CONNECTIVITY WAVES PROVIDE THE DATA

Once the researchers got acquainted with our TRB245 M2M gateway, they were able to dot all the I's and cross all the T's and make their solution reliable, convenient, and efficient. Or in other words, work *swimmingly*. The TRB245 helped the researchers achieve their goal in three ways: cellular connectivity, compactness, and ease of use.

The most essential requirement for this solution was to overcome the accessibility issue caused by the equipment's drift and ensure the collected data is continuously transmitted in real-time. This was a piece of cake with our TRB245 gateway thanks to its LTE Cat 4 connectivity. With cellular connectivity in check, the equipment inside the sphere, like sensors for water temperature and a gyroscope for measuring waves and currents, attained robust access to the Internet and was able to send the data to the on-ground station in real-time. Consequently, the researchers could release the solution into the sea without worrying about the strength of the network connection and continuity of live data.

All measuring instruments were connected to the TRB245, enabling each to receive network connectivity and thus send all collected data of water quality, currents, and temperature changes to the on-ground station. In cases where the sphere ended up in locations with no GSM coverage, an IRIDIUM gateway and satellite connection were used as a preemptive measure to ensure the continuous monitoring of seawater wouldn't get disrupted. For this to work, the IRIDIUM gateway was connected to the TRB245 via Ethernet.

Our gateways are well-known for their remarkable compactness, and that includes the TRB245. This gateway is small in size and weight, making it easily applicable in space-limited scenarios like this sphere! Also, the gateway's power consumption ranges from <1.2 W to <5 W, which is significant because the entire solution must be powered by a battery.

The TRB245's ease of use makes every step of the instrument's setup easy and convenient, as its configurations require no particular know-how in the networking field. All of these features ensure that researchers can effectively track and log the required seawater parameters. And as a result, these parameters allow them to continue their studies on the effects of the Cumbre Vieja eruption on the island's surrounding seawater.