**Underwater Wireless Communication**
Springing big data from underwater to the cloud
for a sustainable and actionable blue economy

W • SENSE

14 LIFE BELOW WATER

13 CLIMATE ACTION

7 AFFORDABLE AND CLEAN ENERGY

# GENOVA MARE DIGITAL TWIN FOR A SUSTAINABLE BLUE ECONOMY (GRETA)



**Wireless Environmental Monitoring**



ITALIE LES VOLCANS ENGLOUTIS DE SICILE

**Chat and Localization for divers**
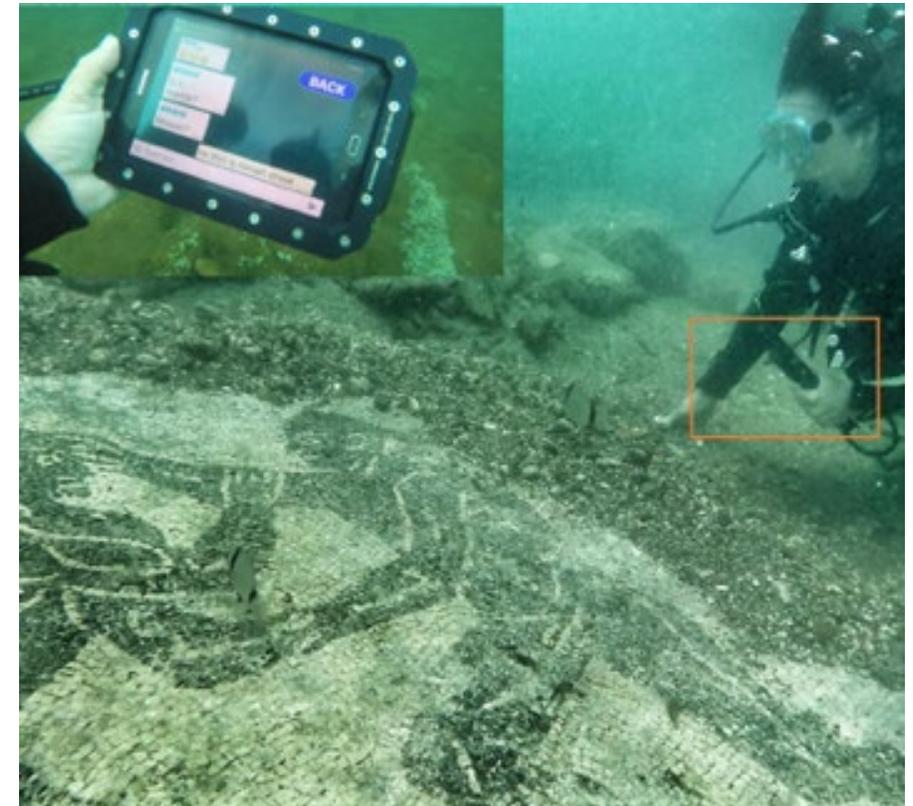
## Deep Tech Scale Up

- Headquarters: Rome
- Spin off of Sapienza University
- Offices in Norway, UK
- 50+ Employees
- 50% PhDs
- 12 customers
- Operations since 2017
- Investment to date: €4M

**70%** of our planet is covered by water, absorbing over 30% of the $CO_2$ from the atmosphere

## 80% of the Ocean remains unexplored

Lack of underwater real time data generates a **huge knowledge gap** and might lead to uncontrolled adverse phenomena and impact

**Satellite technologies** provide only low-depth information: they need **calibration with real time data from the ocean**

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Environment

5 minute read · September 28, 2022 5:41 PM GMT+2 · Last Updated 3 months ago

## Analysis: Nord Stream gas leaks raise climate fears, but impact hard to quantify

By Shadia Nasralla and Kate Abnett



[1/2] Gas leak at Nord Stream 2 as seen from the Danish F-16 interceptor on Bornholm, Denmark September 27, 2022. Danish Defence Command/Forsvaret Ritzau Scanpix/via REUTERS

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# underwater noise pollution: EU adopts limits that require Member States action

December 5, 2022



Blue whale breaching with cargo ship in background Photo: Christian Loader / © IFAW

## EXISTING TECHNOLOGY

## WSENSE SOLUTION

- **Complex**
- **Marginally Versatile**
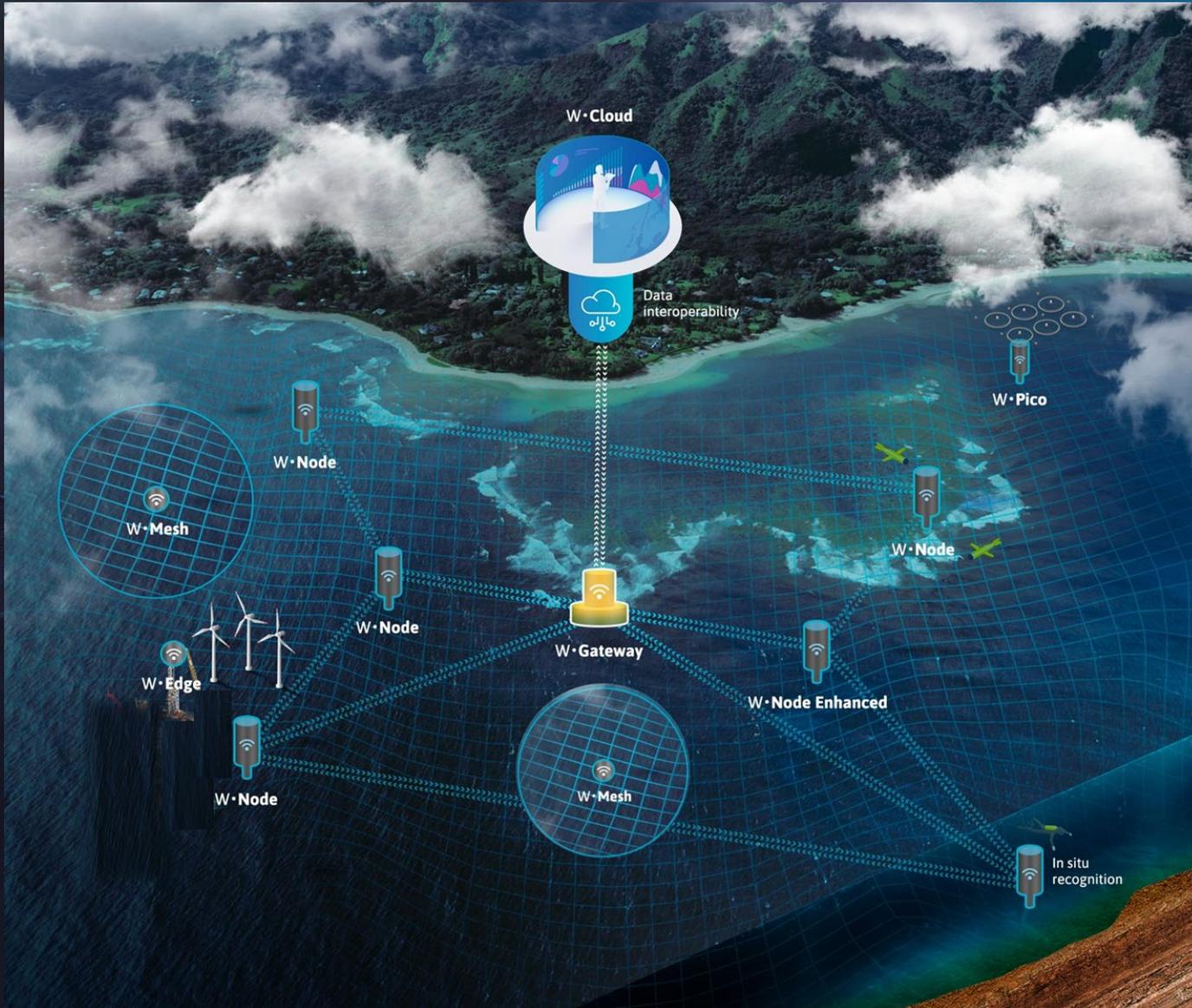- **Expensive** and
- "**Cable-intensive**"

Underwater wireless Mesh networks



| **Real time Bidirectional** communication | **Easy integration** to any vendor's sensors and devices | **Interoperability** and **long-lasting** autonomy (years) | **Cost effectiveness** |
|---|---|---|---|

**W-Cloud:** highly customizable cloud-based data collection and visualization platform for data analytics

**W-Gateway:** bridge between underwater and terrestrial networks

**W-Mesh:** patented multi protocol underwater adaptive networking & multivendor interoperability layer for wireless data reliability and security

**W-Node:** underwater multi-sensor node with acoustic modem for shallow water

**W-Node Enhanced:** underwater multi Sensor node for Deep water and onboarded AI
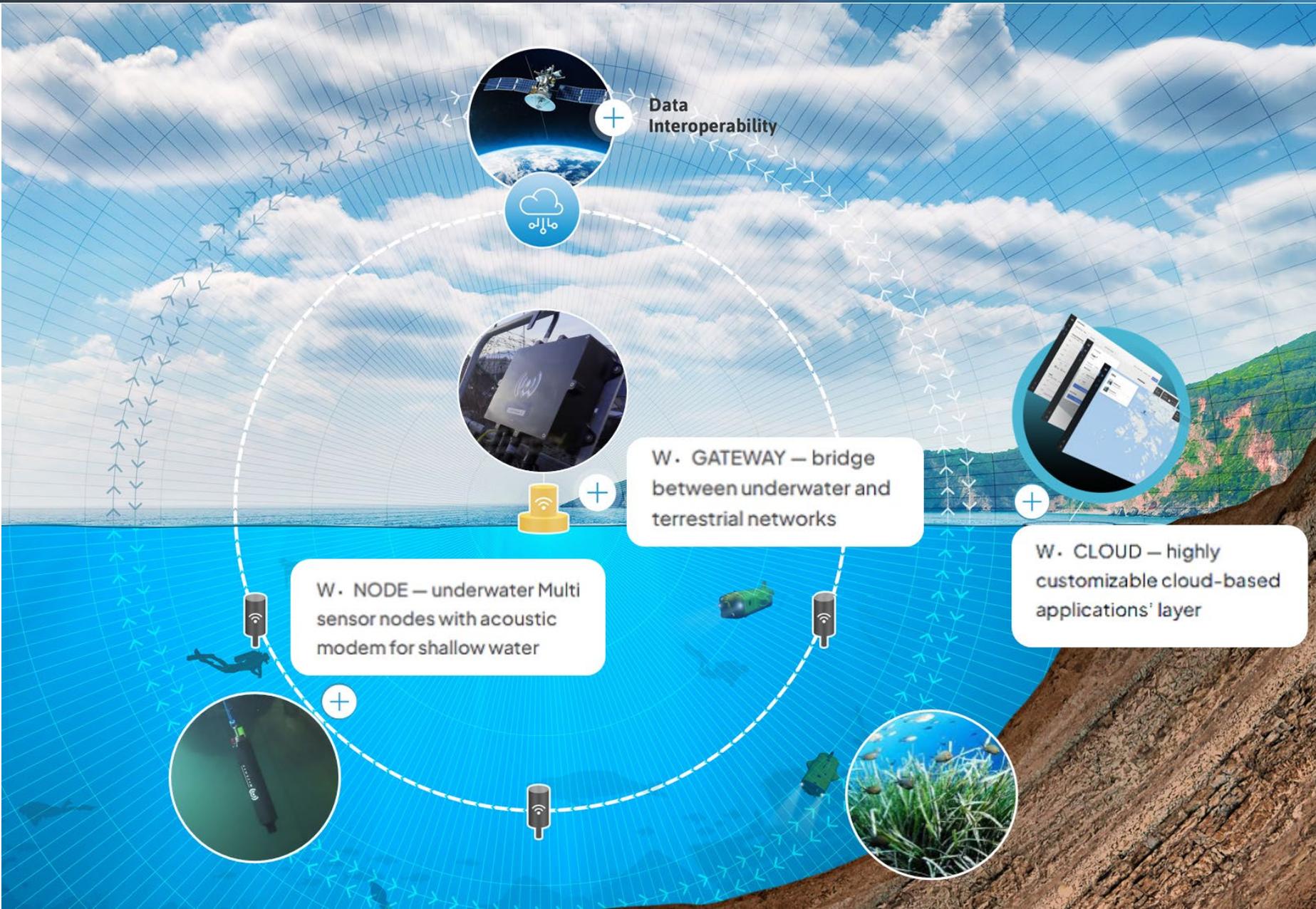
- **Real time alerts** of water quality degradation for instant quantitative evidence
- Monitor **noise pollution** to evaluate biodiversity changes
- Easy and quick installation within the existing infrastructure
- Create **early warning systems based on geo-physics** parameter monitoring
- Real time **underwater 3D visualization** using cameras and AI image recognition and compression
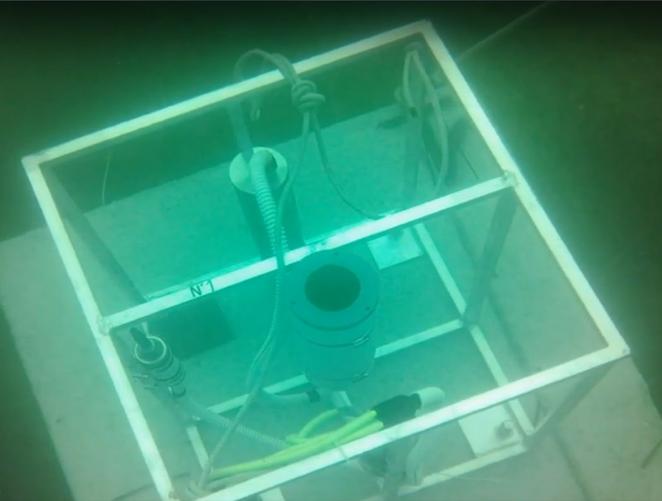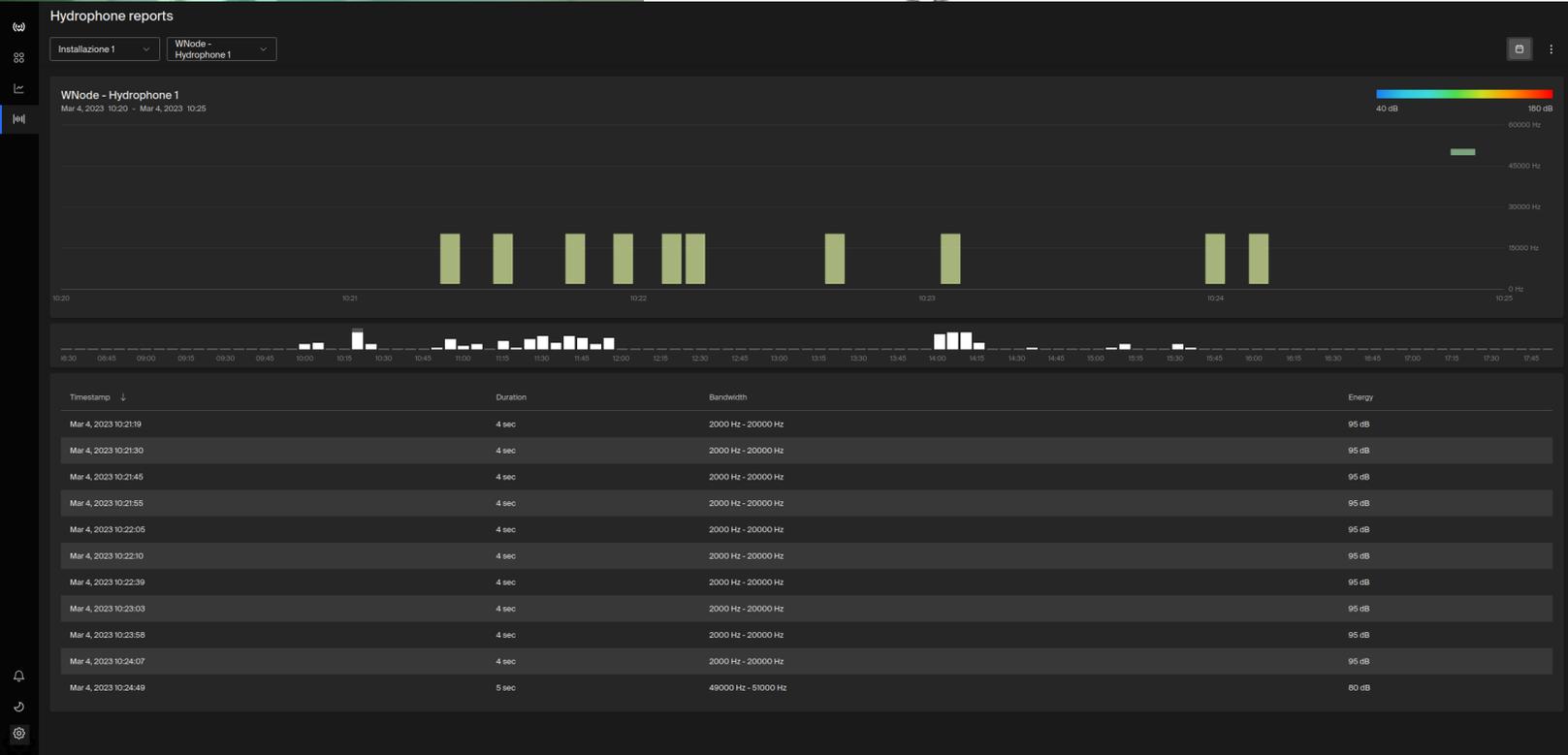
Case Studies
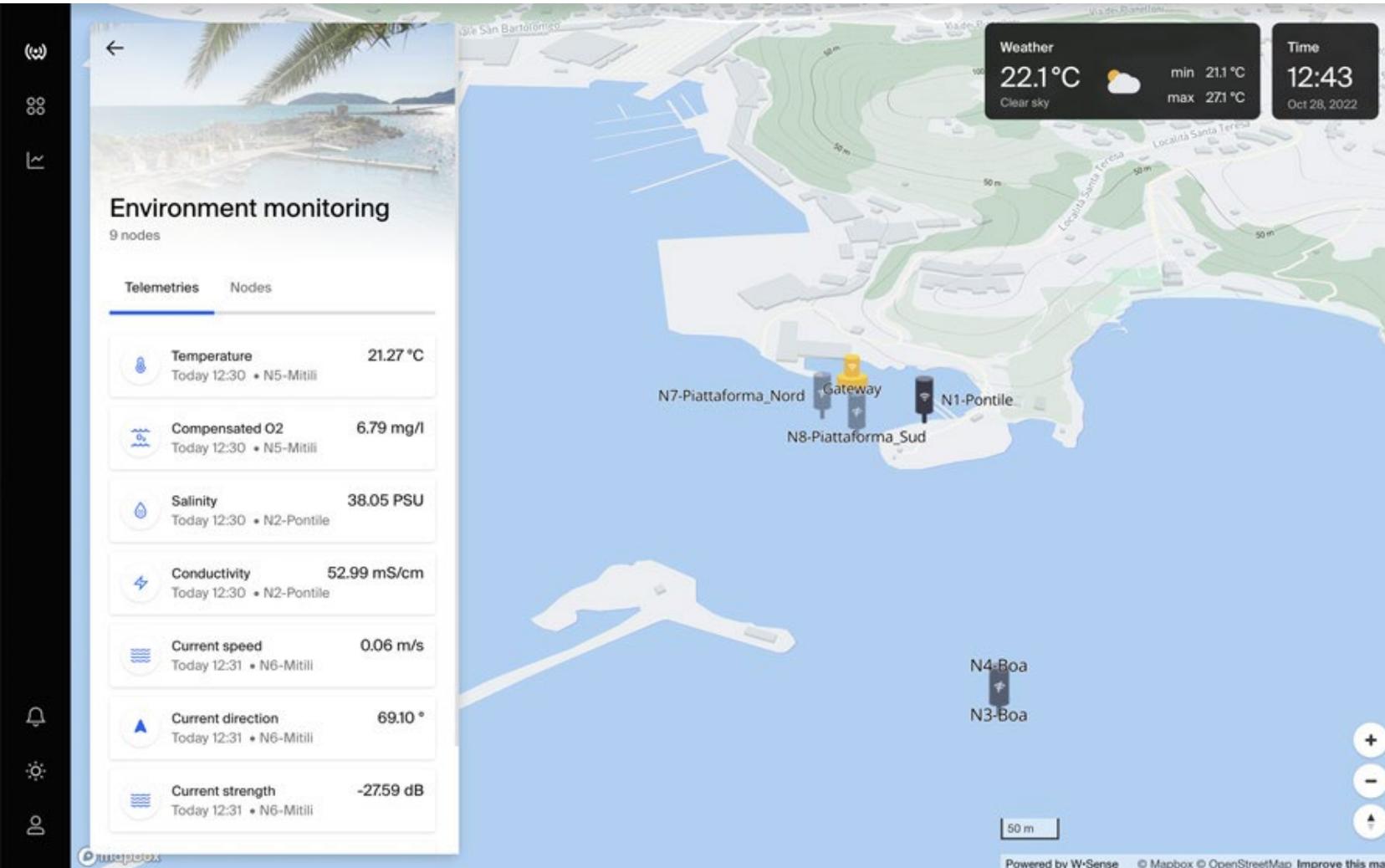
**WSENSE SOLUTION:**
Replace buoy point solution with underwater mesh network
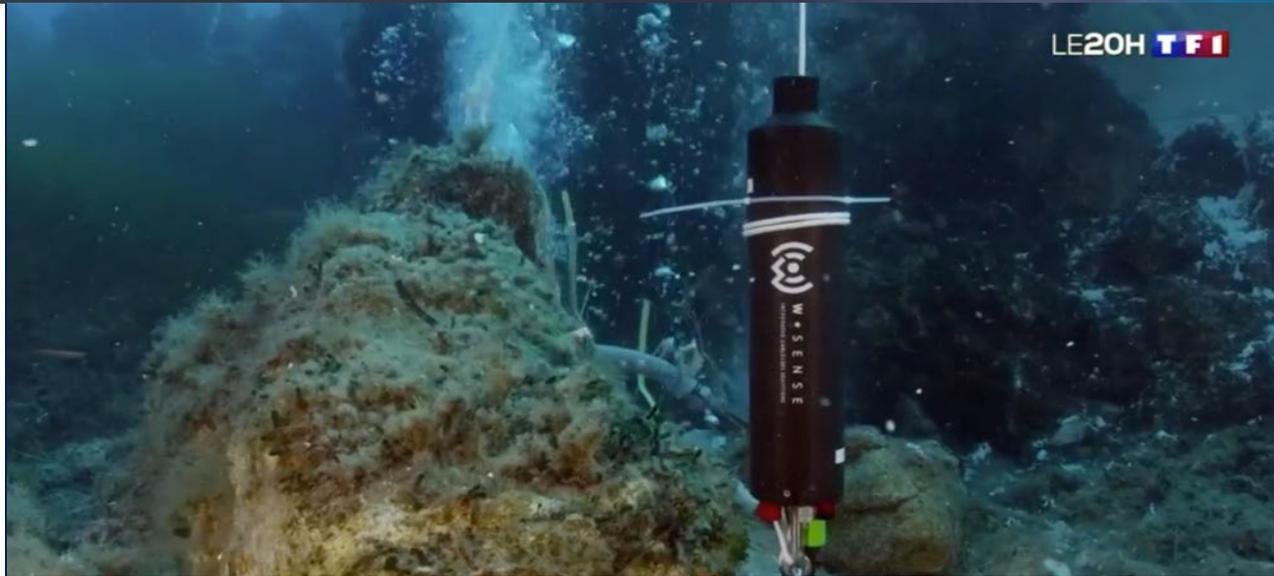
❏ Was able to **identify and reduce pollutants** that were causing hundreds of thousands of damage to inventory

❏ Have resulted into **high quality dense data** to understand risk to the ecosystem

❏ Have **reduced the cost of monitoring** while achieving a higher accuracy and quality of data protection

❏ In a **shared eco-system** it was critical to getting different wider and better data for all partners (harbor, authority, scientists, marine parks, mussel farmers)

❏ Demonstrated need of **in situ monitoring to improve satellite** remote sensing data

Alta

Letsea AS
(Sandnessjøen)

Leroy Seafood AS
(Angelskår)

Fyllingsnes fisk AS
(Eikangervåg)



**WSENSE SOLUTION**:
- Underwater mesh networking overcame obstacles such as underwater hills that provided stable and flexible data monitoring solutions which doesn't require **costly cabling systems**
- Network could **easily be relocated** without an impact to data collection
- Able to easily **change position and distance between monitoring** units since you are not tied to a fixed cable length.

LE2OH TF1



VIDEO TF1  https://www.tf1.fr/tf1/jt-20h/videos/italie-les-volcans-engloutis-de-sicile-70972769.html

WSENSE's Subsea Wifi system installed in the heart of an underwater volcano on coast of Italy
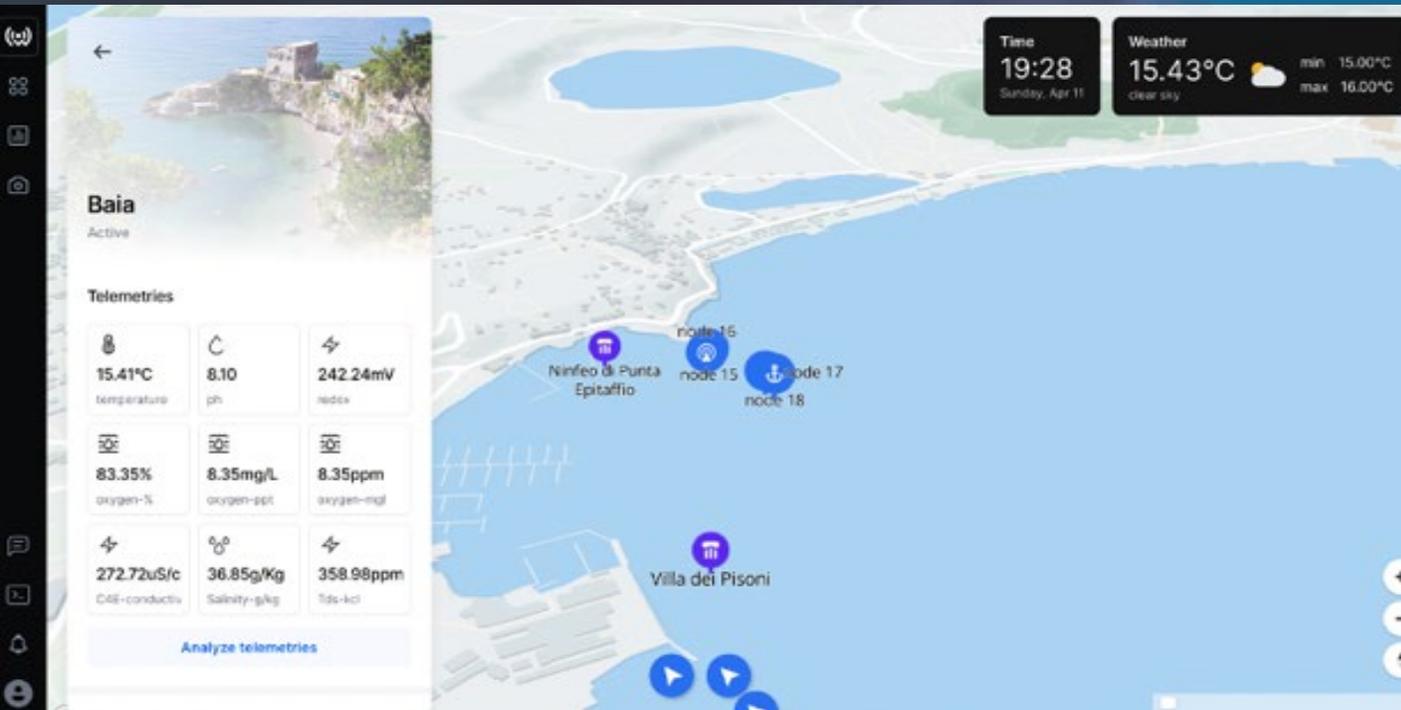
**WSense Solution:**
- Provides **real-time data and monitoring of hazardous** gases, methan and currents (CO2), salinity, and volcanic activity.
- National Institutional of Geo-chemistry monitoring real-time data is helping **build models** critical for understanding the risk of eruptions and **create early warning systems.**
- The solution may the difference between life and death **mission critical decision-making**
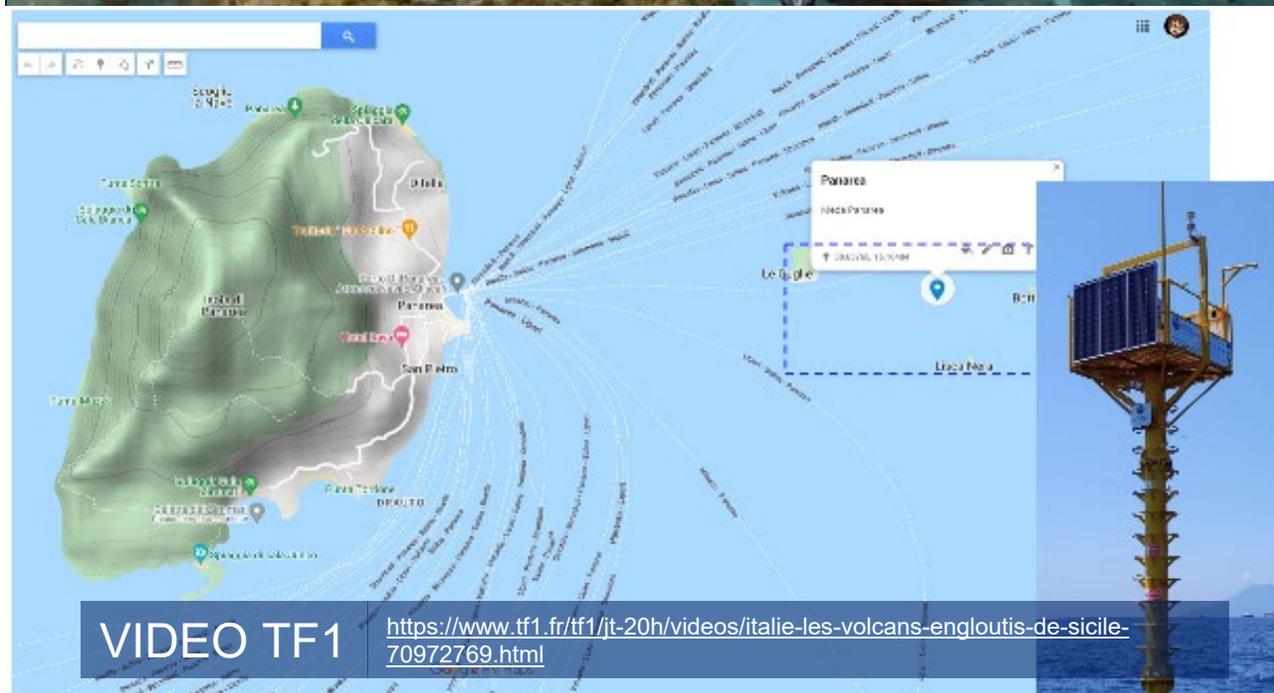
**WSense system for real-time water quality and live camera feeds to protect underwater cultural sites**

**WSense Solution:**
- Provides **real-time camera footage** of the protected site. Surveillance and detection against unauthorised visitors
- Wsense Subsea Wifi allows for **connected divers** and visitors ensuring safety, security and opportunities to central command center to **communicate with divers** underwater
- **Touristic enriched experience** when visiting the site

3D reconstruction

Saipem signs agreement with WSense for development of communication networks for underwater drones (Oct 2021)

https://www.saipem.com/en/media/news/2021-10-04/saipem-signs-agreement-wsense-development-communication-networks-underwater





## Wsense at REPMUS22 in Portugal (Sep 2022)

We had successful digital communications over 2 km in two different serials using our JANUS acoustic modem during the DISSUB (rescue operations related to submarine in distress) operations.

The operations involved heterogeneous assets from NATO CMRE, Portuguese and Italian Navies and Italian companies, enabling the digital exchange of Automatic Identification System (AIS) and emergency messages, as well as chatting with the submarine crew!

Target critical infrastructure and deep ocean technology.

Safety/security projects with NATO with a JANUS encryption wifi underwater technology

Contacts
[wsense@wsense.it](mailto:wsense@wsense.it)