

OCEAN AND ENVIRONMENTAL TECHNOLOGIES AND SERVICES

Part 1 : Ocean Focus

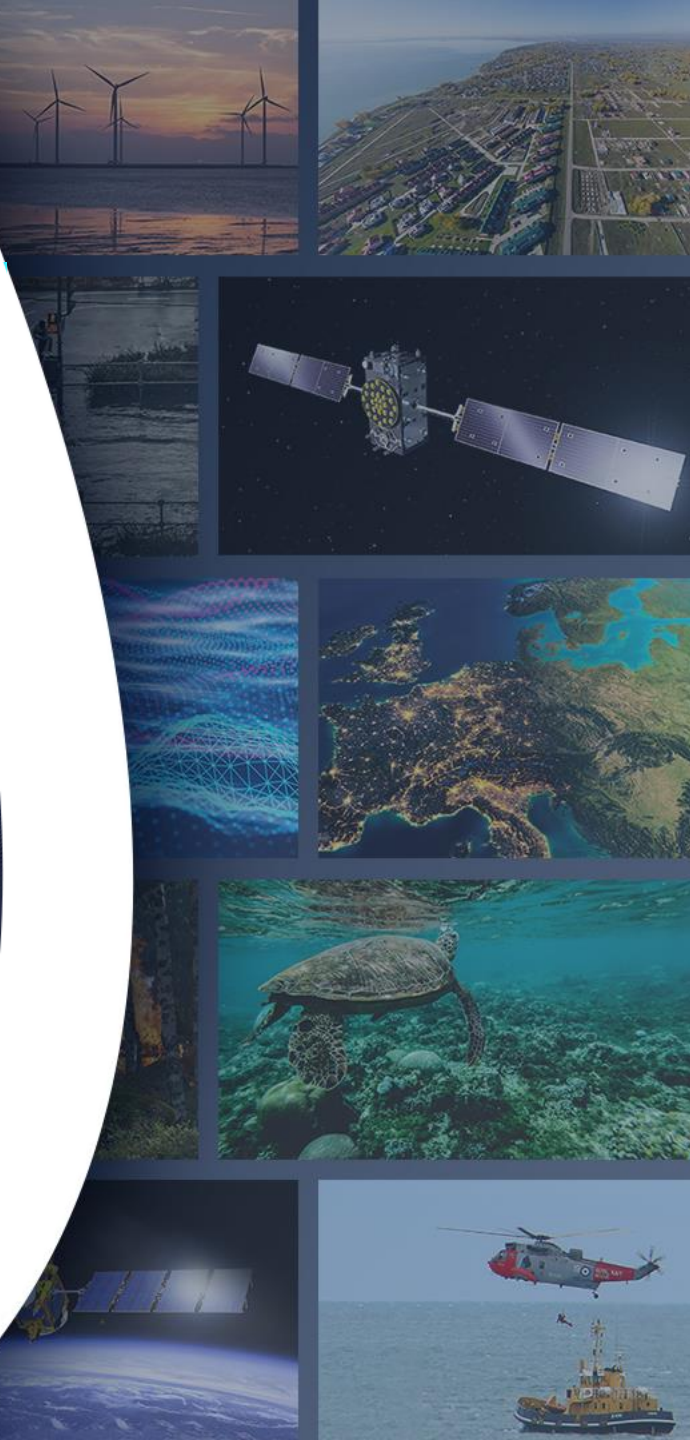
Wednesday 20 October
9:00 AM to 01:15 PM





Prof. Chiara Petrioli
Founder and R&D Director

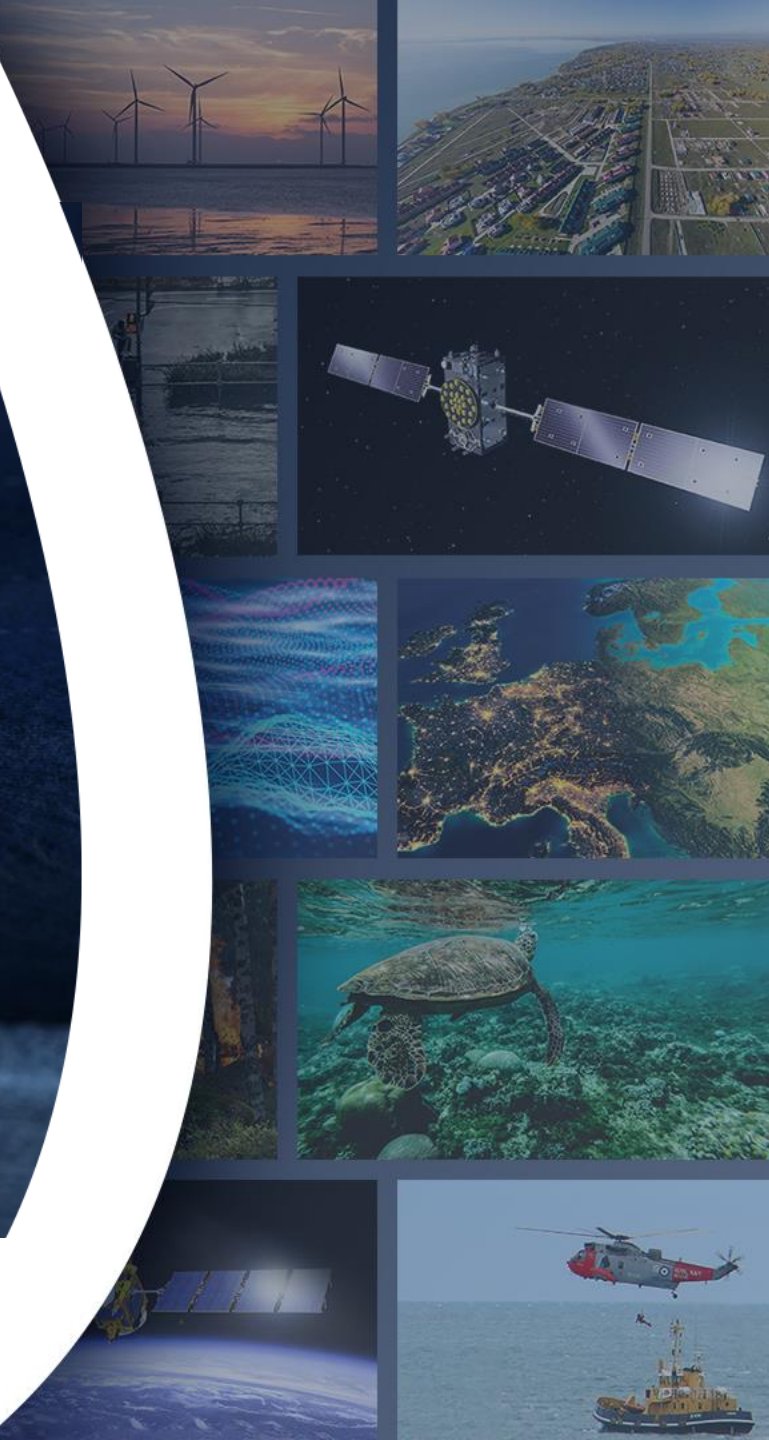
Underwater Internet of Things





Underwater Wireless Comm.

Solutions Enabling Blue Economy
with Internet of Underwater Things





Wireless Internet Technologies allow us to remotely operate robots exploring far away planets...

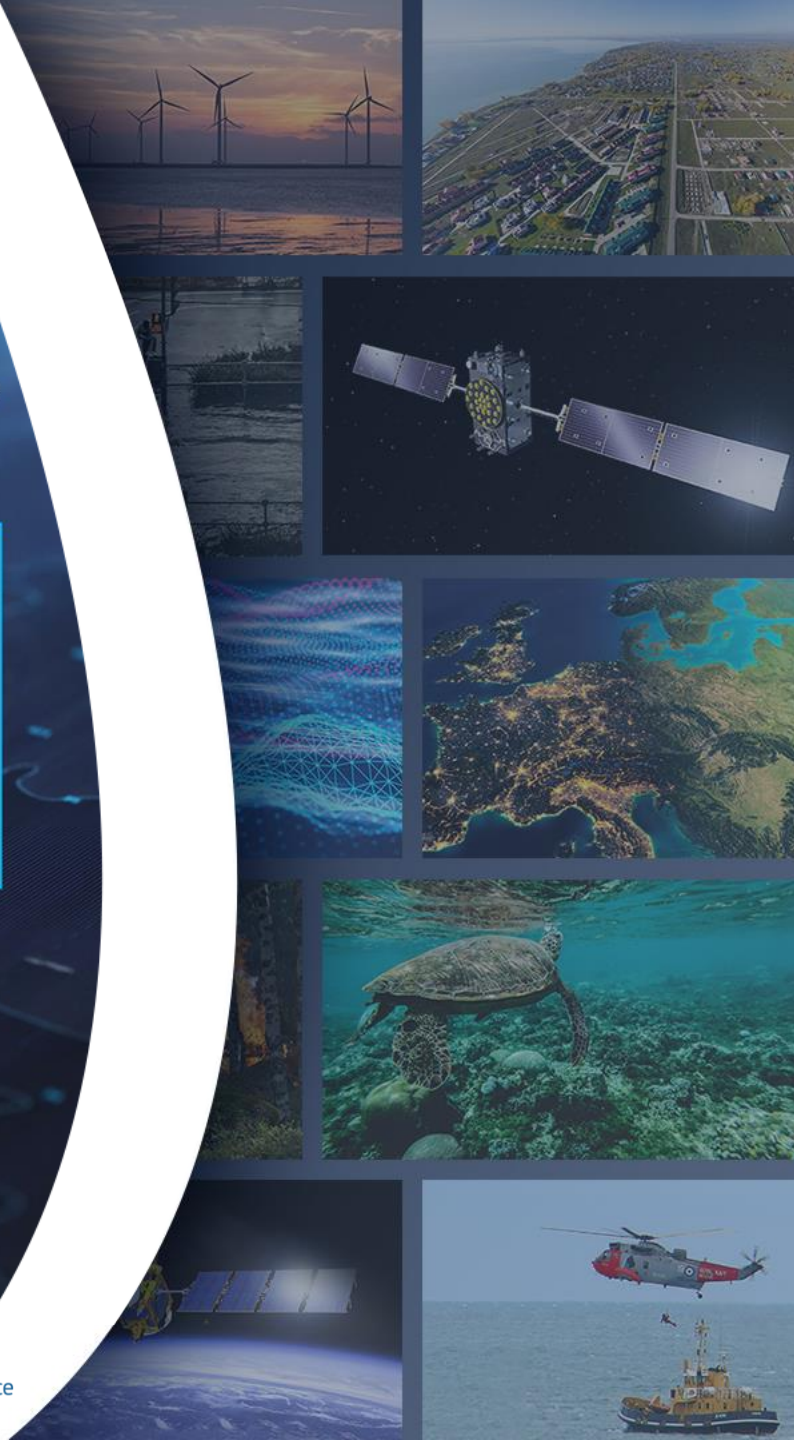




But when it comes to the two thirds of our planet covered by water we cannot use these technologies



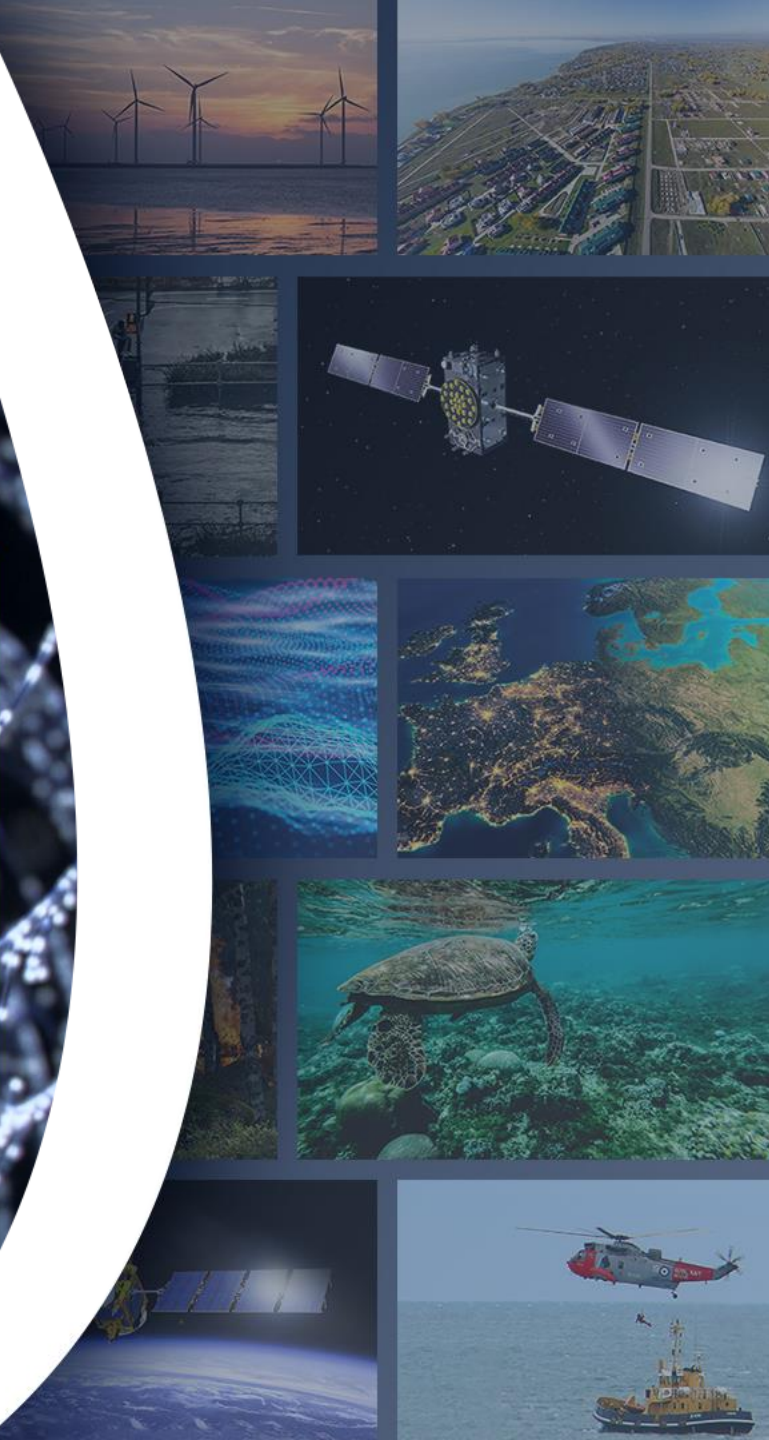
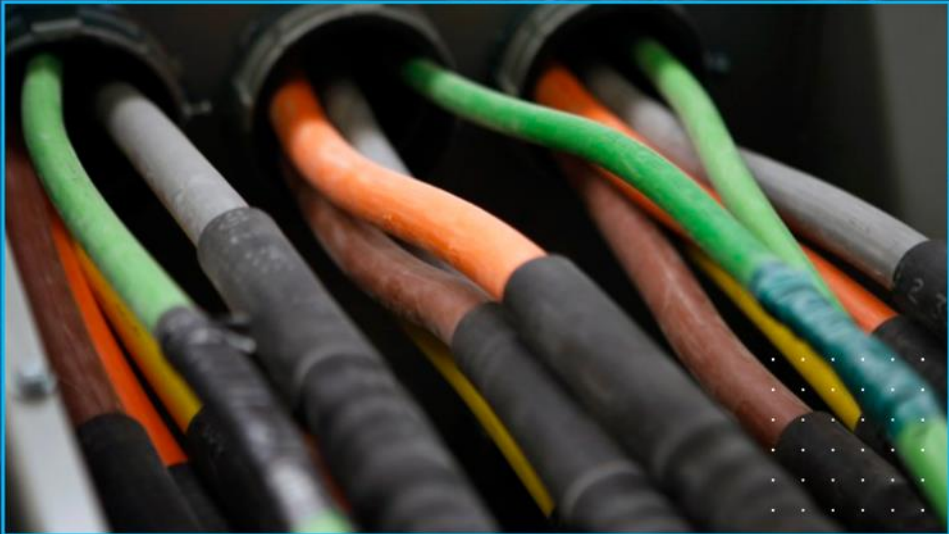
We rely on ...





2. SLOWING INNOVATION

- Cabled
- Complex
- Expensive
- Lagacy system





3. BLUE ECONOMY



- 3T\$ Market
- Growing at double the rate of any other sector





4. WHY IT IS SO COMPLEX DEVELOPING UNDERWATER WIRELESS SYSTEMS?

- Harsh Environment
- High pressure
- Thermocline
- Biofouling
- Salty
- Noise
- Animal life impact



WE ARE *the* UNDERWATER WIRELESS FUTURE





5. CUTTING EDGE TECHNOLOGICAL SOLUTIONS

- Underwater wireless mesh networks
- Real time, bidirectional communications
- Multimodal comms
- Adaptive learnings systems
- Enabling
 - Cooperation towards complex tasks
 - Real time data gathering
 - Remote control and reconfiguration





6. WSENSE SOLUTIONS

Key Benefits

- Large area coverage
- High performance, highly reliable
- Enabling Autonomous Operation
- Risk Reduction
- Multi-Vendor Interoperability
- Support of emerging standards
- Underwater Cyber Security
- Low power, long lasting (years)





7. MARKET SIZE: TENS OF BLN



Underwater IoT: System Components

W-Cloud



- Highly customizable Cloud Software platform running on Amazon Web Services
- Sensor data and alarms are visualized at the regional, farm, cage - and sensor level; Historical data are stored and can be searched, combined, filtered and displayed
- Patented 3D web interface for effective cage control

W-Gateway

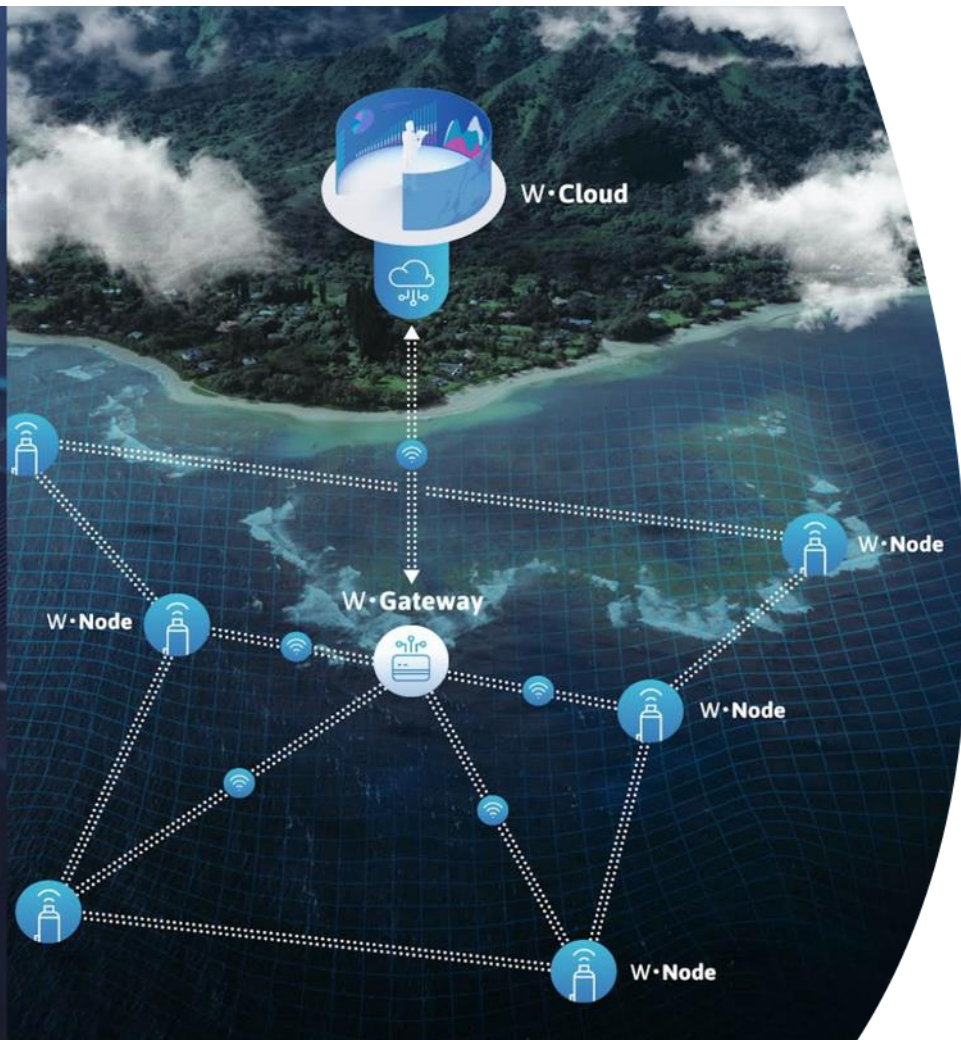


- Bridge between underwater and above- water networks
- Supports communication through 3G/4G and WiFi networks for above water communications
- Supports up to three underwater modems to communicate with the underwater network
- Optional: Underwater GPS; AquaCloud IoT Hub.

W-Node



- Multi-parametric, battery-operated underwater sensor nodes equipped with acoustic modems
- Bidirectional acoustic communications, also through multi-hop networks.
- Integrated multi-vendor sensors of DO, O2, Temperature, Depth/ Pressure, Salinity levels, Currents.
- Integrated load cells for structural monitoring.





FULL MONITORING AND CONTROL OF MARINE ENVIRONMENTS

Environment, fish health and structural monitoring provided by the W-Sense underwater network will provide a holistic real-time overview of the situation in a marine environment. Low power operation: 1 year of use per charge. CE-certified nodes and batteries

A FULLY CUSTOMIZABLE SOLUTIONS FOR YOUR ACTIVITY

- We customize our system to your specific needs, in terms of components required and how data is presented
- Modem range: 500m. The wireless system allows networking and multi-hop communications. An underwater wireless network from W-Sense therefore covers large areas

SIGNIFICANT BENEFITS

- **High efficiency and cost saving**
 - The wireless system is easy to move or remove when needed
 - It has been designed for safe connection to any deployed offshore infrastructure (e.g., moorings, chains, ropes, nets, buoys), to be easy to deploy, retrieve, move to a new site.
- **Cost-saving and reliable**
 - No need for water-resistant cables out to every sensor
 - There will be no downtime or expensive repairs because of a broken cable
- **Low power, secure and performing**
 - Our power management module optimizes the lifetime not only of the nodes but also of attached sensors
 - Secure communications
- **Highly Improved risk assessment and prediction capabilities with the W-SENSE alarm function**

The Internet of Underwater Things Revolution means...

REAL-TIME DATA - WIRELESS, EFFICIENT AND SUSTAINABLE

- **Water quality**
 - Environmental monitoring
 - Upgrade current equipment, enable it to communicate wirelessly
- **Offshore infrastructures structural monitoring**
 - 3D visualization of how the infrastructure moves over time and of stress values
- **Fish health**
 - Fish talk to me - placement of miniaturized sensors inside or on the fish
 - Provides data about fish health of a selected group of fish

COMPLETE THIRD-PARTY INTEGRATION SYSTEM

With a W-SENSE wireless system, you can fit your current components to the underwater wireless network, such as oxygen - and temperature sensors, current meters, etc



Sustainable Aquaculture



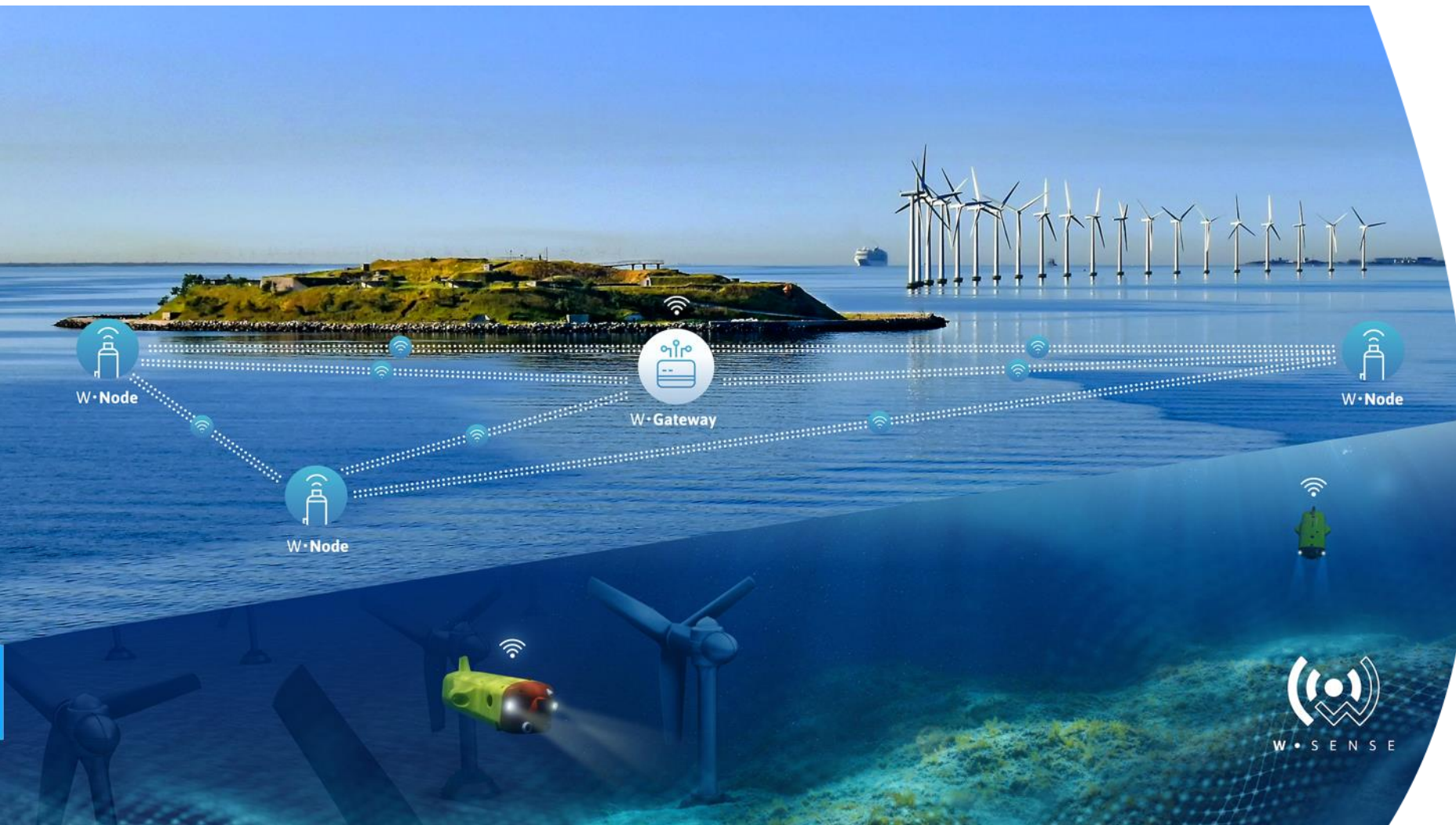


AQUACULTURE

Wsense in action - Norway



Autonomous Systems for Renewables



The future of Offshore Wind

Advanced monitoring & intervention via distributed underwater sensing technologies

- Nowadays, offshore wind farms (OWF) are inspected and maintained via legacy IMR methods derived from oil & gas
- The future floating OWF installation will call for advanced solutions and reduced costs, to win the LCOE challenge
- In the underwater domain, distributed sensing technologies will unlock real time monitoring and digital twin implementation, bundled with unmanned inspection and intervention capabilities

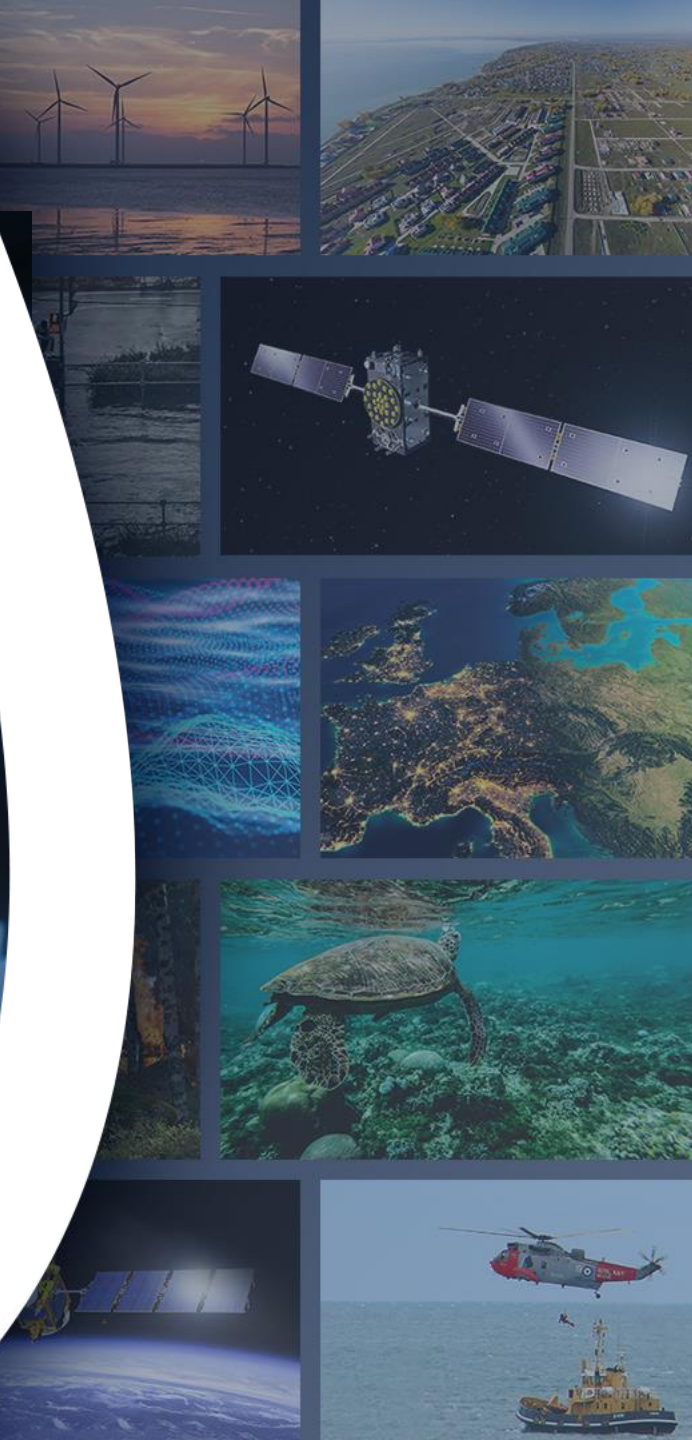


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Environmental monitoring: everywhere, everytime

In situ, continuous, real-time multi-parametric monitoring of the water column through underwater wireless sensor networks



Underwater IoT also means increased safety It helps raising awareness on Green & Blue



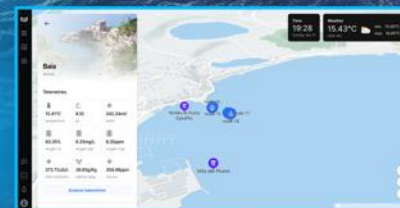
Underwater GPS services
Divers and assets localization
Underwater Whatsapp
Underwater cultural heritage and marine environment monitoring, surveillance and valorization





ENVIRONMENTAL MONITORING

Wsense in action - Italy





HIGHLIGHTS, WSENSE SOLUTIONS

STANDARDIZATION

- STANAG 4748
- NIAG 190
- NIAG SG 243
- AquaCloud 2.0

MARKET-READY SOLUTIONS

- IoT: low power, small factor, multi-vendor interoperable, underwater sensor networks.
- Smallest underwater modem.
- Autonomous networked robotic systems.

A REPUTATION IN INNOVATION

- Partnership with global stakeholders to answer strategic needs and develop solutions not in the market.
- Leading contract for future underwater wireless capabilities, Italian navy.

PATENTED DISRUPTIVE TECHS

- WSENSE owns patents on how to develop effective and reliable underwater wireless networks.





WSENSE: AWARD WINNING INNOVATION

+ 30 people employed in Italy and Norway
On the market since three years

sifted / **FT FINANCIAL TIMES** Analysis/
The 28 Italian startups to watch, according to VCs
Which are the most promising Italian startups? Sifted spoke to three Italian VC funds — P101, 360 Capital and United Ventures — to find out.
BY BEN MUNSTER IN ROME / 8 APRIL 2021

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Italian technology firm makes a splash with the underwater Internet of Things

#EUWOMEN4FUTURE

- Fabiola Gianotti**
Science is not only the foundation of knowledge and progress, but also the promoter of indispensable and irreplaceable values for a sustainable, inclusive and equitable world.
Category: Science, research and Innovation
- Chiara Petrici**
As a kid I was always fascinated by the abysses described by Jules Verne. Today I help exploring them with the technology I invented. Hold on to your dreams! Da bambina ero affascinata dagli abissi descritti nei libri di Jules Verne. Oggi contribuisco ad esplorarli con le tecnologie che ho inventato. Mantenete vivi i vostri sogni!
Category: Science, research and Innovation
- Giovanna Tinetti**
Our greatest limits are often only in our mind. I nostri limiti più grandi sono spesso solo dentro di noi.
Category: Science, research and Innovation
- Martina Bacigalupi**
The moment is now and the challenges are ours. Let's believe in Culture and Philanthropy for Social Transformation. La cultura e la filantropia al servizio dei cambiamenti sociali: è il tempo di raccogliere la sfida!
Category: Culture
- Samantha Cristoforetti**
Perhaps if we looked at things from a cosmic perspective, we'd be more likely to forgive each other our pettiness, to help each other live peacefully during our brief time on Earth. Forse guardando le cose da una scala cosmica saremmo più disposti a perdonarci a vicenda la nostra piccolezza, ad aiutarci l'un l'altro a vivere con serenità il nostro breve tempo sulla Terra.
Category: Science, research and Innovation
- Lucia Monaco**
Let us guide science's giant leaps towards concrete solutions for all people living with a rare disease. Guidiamo i passi da gigante della scienza verso soluzioni concrete per tutti coloro che vivono con una malattia rara.

MADE IN ITALY INNOVATION EXCELLENCE
WOMAN ENTREPRENEURSHIP FOR GOOD

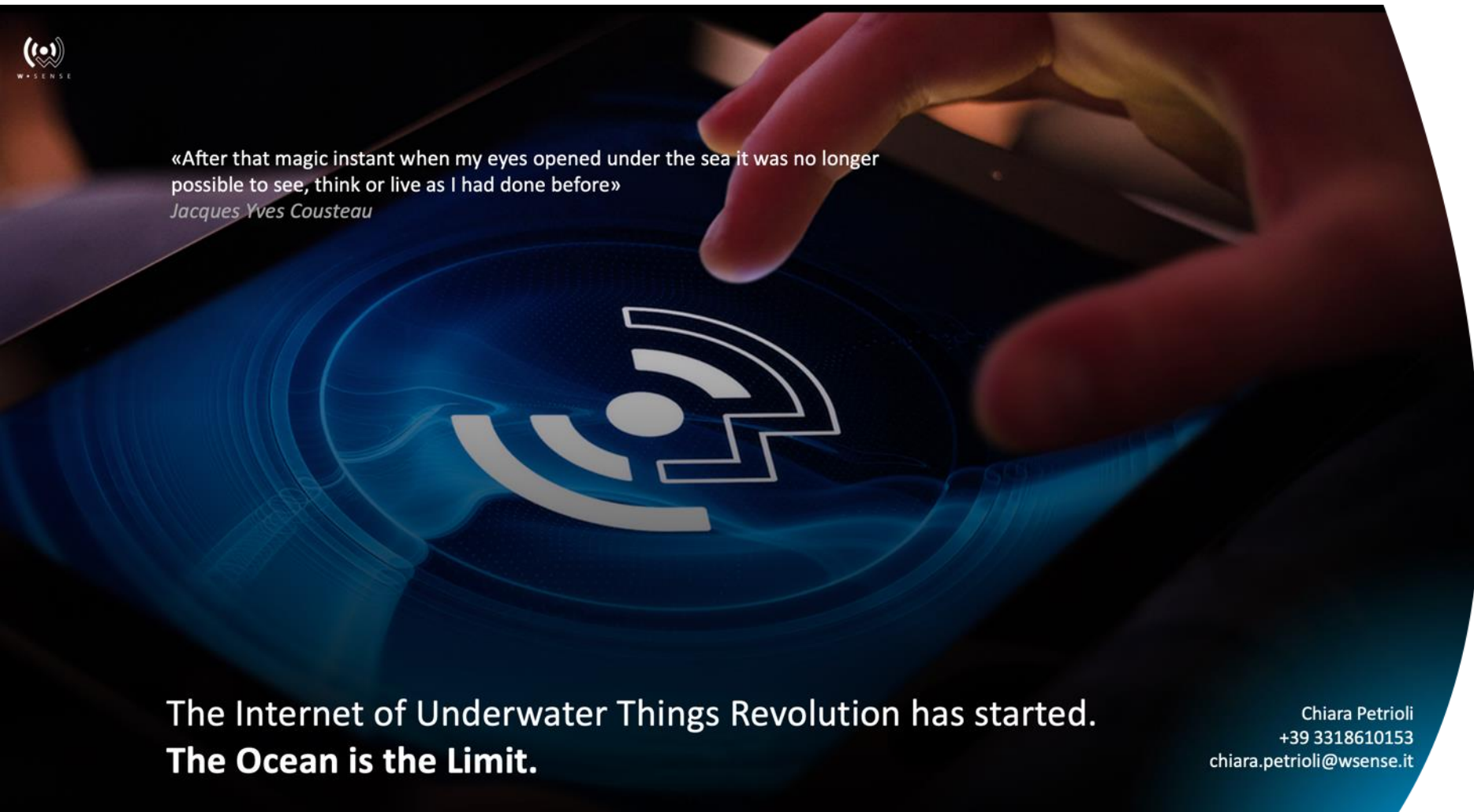




Internet of Underwater Things is...

- Respectful to Oceans
- Compliant to climate neutrality
- Clean revolution & decarbonisation catalyst
- Overshoot opponent
- Global resources saver
- Big hope for the future
- Food safety champion
- Nature major defender





«After that magic instant when my eyes opened under the sea it was no longer possible to see, think or live as I had done before»
Jacques Yves Cousteau

**The Internet of Underwater Things Revolution has started.
 The Ocean is the Limit.**

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