



W • S E N S E

# ArcheoSub exploitation scaling up the Internet of Underwater Things

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**70% of our planet is covered by water...**  
...however, wireless connectivity is hardly available underwater



## Unleashing the potential of Underwater IoT

# How it all started: EASME ArcheoSub

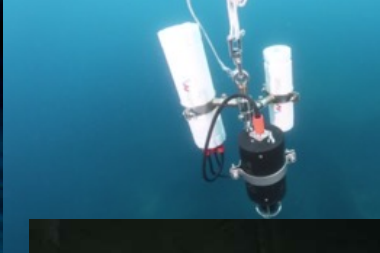
The background of the slide is a deep blue underwater scene. In the center, several divers in silhouette are swimming. To the right, a submarine is visible in the distance. The water is filled with bubbles and light rays, creating a sense of depth and activity.

ARCHEOSUb project timeframe: 2017 - 2018

The ARCHEOSUb Project has been co-funded by the European Union under Grant Agreement n.EASME/EMFF/2016/1.2.1.4/01/SI2.749264 within the Call “Blue Labs: innovative solutions for maritime challenges”

Before ArcheoSub: The teams involved in the project had received funds under FP7 to develop fundamental knowledge on underwater robotics and underwater wireless networks. These results were then ready to be exploited (had been included in EC Innovation Radar, had resulted into innovation awards)

## PICTURES FROM ARCHEOSUB TESTS



Motivation: 1000+ UCH sites offshore the Italian coast, UNESCO convention recommends in situ conservation.

ArcheoSub target innovations (all targets met):

- Low cost underwater AUV supporting archaeologists across all phases of operation, equipped with a general purpose module for information compression and real time transmission.
- Localization system for divers and AUV navigation (underwater GPS)
- Acoustic real-time transmission of AUV site acquisitions and of data from underwater cameras
- Empowered by innovative “Underwater Internet of Things technologies”
- Underwater surveillance systems: underwater sensor nodes with an integrated videocamera
- Networks of divers: Underwater tablet+ APP for diver navigation and enhanced site experience (underwater Whatsapp)

Prototypal systems available at the end of the project.

Increase SME teams after 3 years from the end of the project:

- MDM Team + 4 people
- Wsense: +40 people, offices in Italy, Norway, UK, first investment round (Dec 21), global partnerships with leading stakeholders

# EASME ArcheoSub impacts

BlueLab achieved targets:

1. Contamination of backgrounds had a positive impact on development of companies
  - For instance Wsense has entered the underwater robotic field and today provides underwater wireless networks for future autonomous resident systems in the energy sector, european defense sector
2. Involved young innovators have fast developed their career: they are partners of the two SMEs, technical team leaders in industry.
3. Impact on Policy Makers: Wsense won a european bid (MUSAS project), resulting in a best practice brought by MIC to COP 26, and promoted within european policy expert groups. Wsense innovations have been presented at Expo Dubai by Lazio Region. Also MDM Team has been showcased at Expo Dubai.





# EASME Blue Economy Pilot project



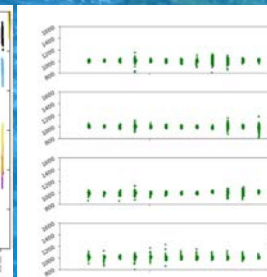
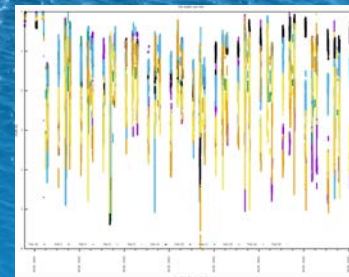
W-Gateway



W-Piconode



5cm



**Cage 208**  
Temperature: 3.96°C  
pH: 92.05 µM  
O2 saturation: 95.67 %  
Conductivity: 3.11 S/m  
Salinity: 0.08 FTU



W-Cloud

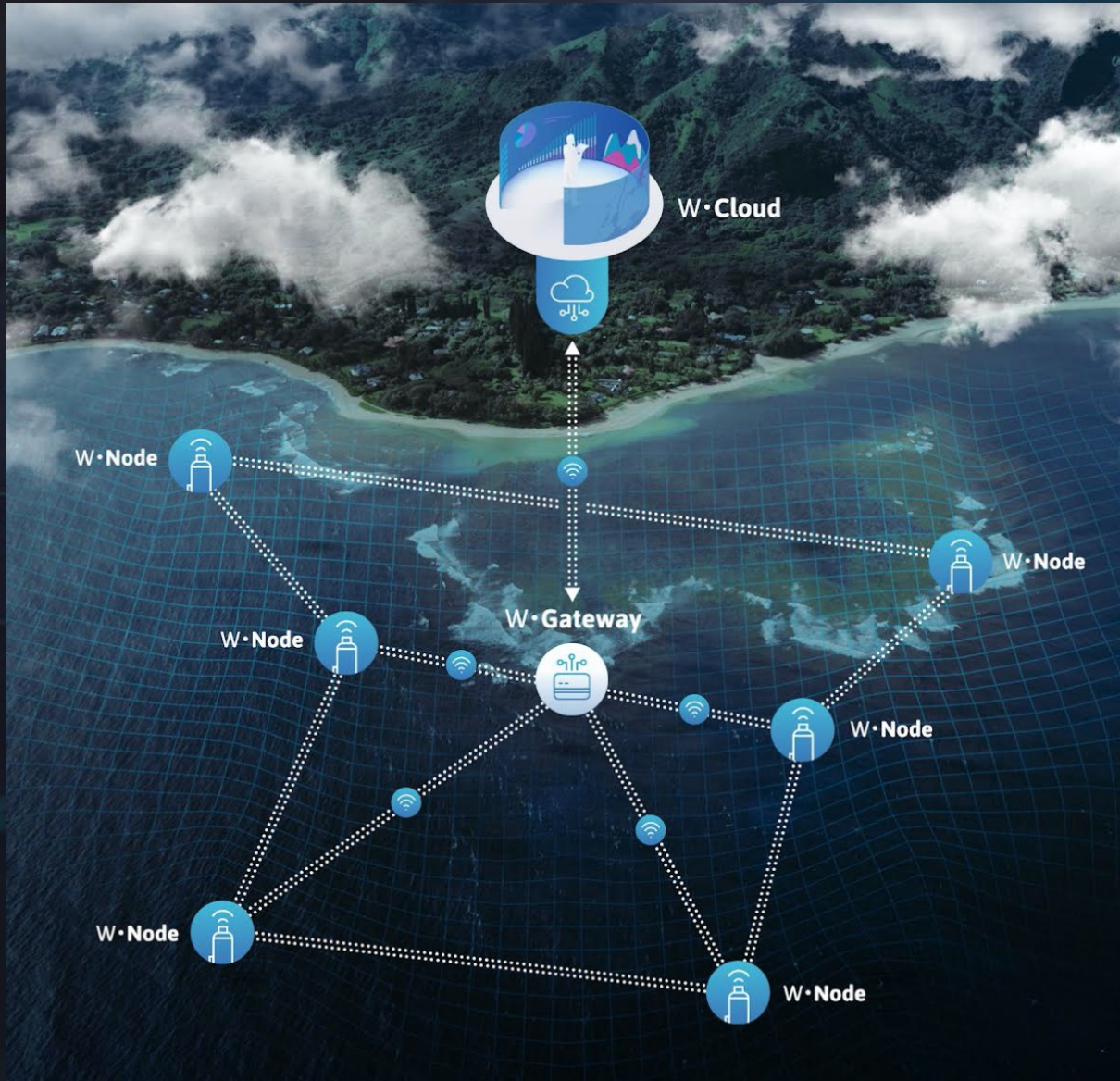
# The future of Offshore Wind

## 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







## W-Cloud



- Highly customizable cloud-based software platform
- Sensor data and alerts are displayed at the regional, deployment and sensor level; Historical data is stored and can be searched, combined, filtered and displayed
- Patented 3D Web interface for effective territory monitoring

## W-Gateway

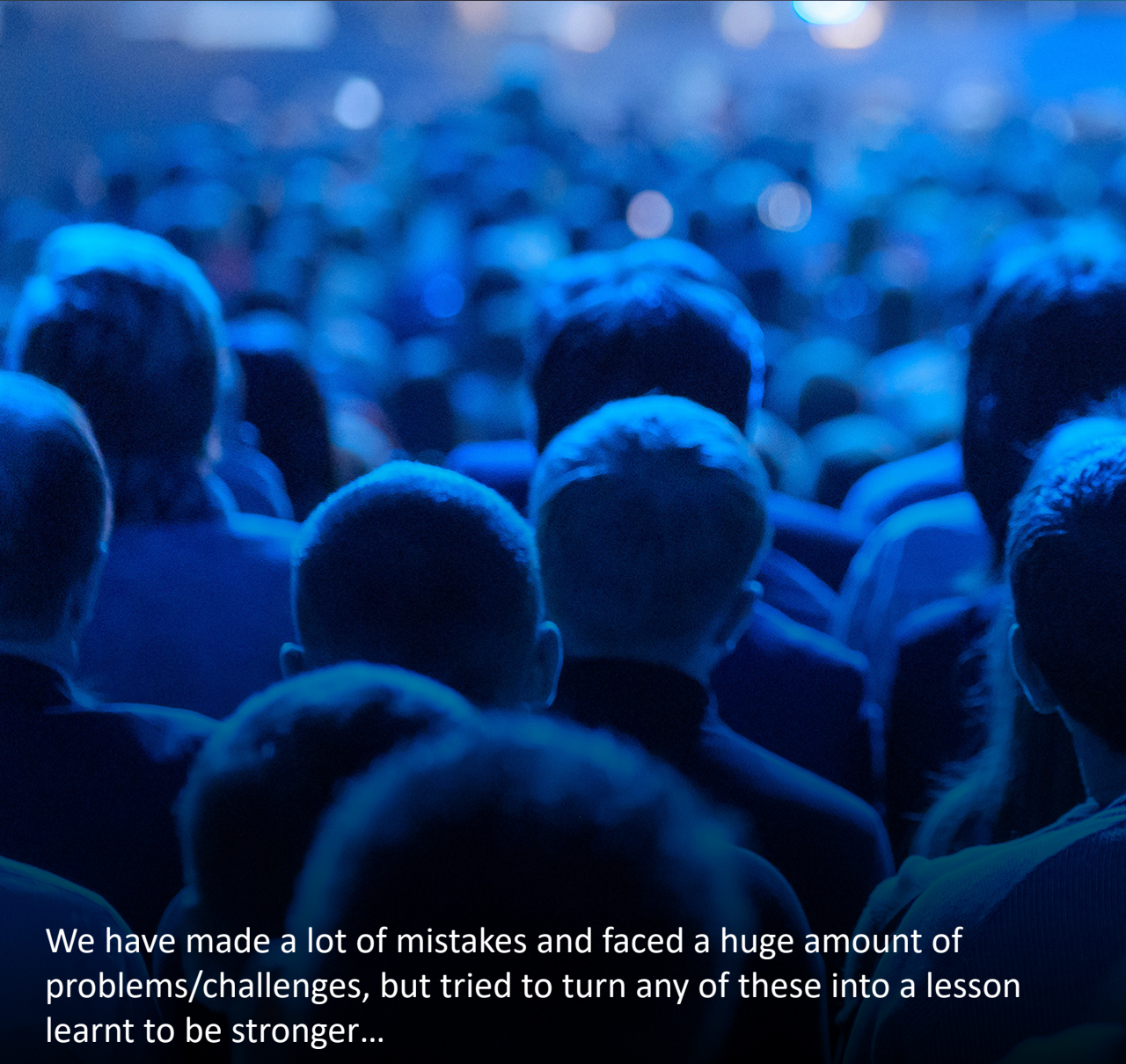


- Bridge between underwater and terrestrial networks
- Supports communication over 3G / 4G / 5G networks, Satellite and WiFi
- Supports up to three acoustic modems to communicate with underwater network
- Supports localization by underwater GPS system

## W-Node



- Battery-powered multi-parameter underwater sensor nodes equipped with acoustic modems
- Bi-directional acoustic communications, also through patented multi-hop networks
- Integrated multi-vendor sensors of DO, O<sub>2</sub>, Temperature, Depth/Pressure, Salinity Levels, Currents and many others
- Integrated video camera (optional)
- Underwater GPS system support
- Up to 300 meters depth



We have made a lot of mistakes and faced a huge amount of problems/challenges, but tried to turn any of these into a lesson learnt to be stronger...

Scaling up a deep tech is a quite a challenging task:

- Solutions need to fulfill real needs, the company needs to be strong and at the edge to be selected by big players
- Access to finance is critical and never enough: bank loans are slow to get (despite EIF and EIB are helping a lot); there are too few VC funds in the Blue Economy sector and in deep tech, and investment processes are too slow. There is no risk attitude, which penalizes deep tech and B2B. Female companies are penalized.
- High TRL R&D funds for SMEs are a highly valuable instrument for piloting which should remain as well as tax credits for R&D.
- Funding should favor the fact SMEs move from project-based to industrial off the shelf model, as it is key they focus also on:
  - Building up the company management and business development;
  - Solution industrialization, market need analysis and market penetration;
- People matter: It is a lot of work and ultimately you need a team with the leadership and talent but also passion – sharing vision and wanting to pursue the tough path towards success.
- Wsense has closed its first round of investment and has now in the management top executives and getting. In deep tech it is more likely to get entrepreneurs/executives investing rather than VC. EC funds could match also such investors.
- **The biggest challenge: Implementing a real European single market - be supported into raising awareness on innovative technologies.**



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Thanks.  
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