

1. Technical Infrastructure

- **Seismo-Acoustic Test Facilities**
Two large, purpose-built water tanks are available for evaluating acoustic and seismic sensor systems under controlled conditions. These tanks support calibration, signal fidelity tests, and integration assessments.
- **Low-Frequency Standing Wave Calibration System**
A unique in-house capability that enables precise characterization of hydrophones, vector sensors, and other underwater acoustic devices operating at low frequencies relevant to geophysical applications.
- **Clean Room and Assembly Facilities**
Equipped for the assembly and encapsulation of micro/nanoscale sensor components, allowing for development of compact, robust sensing solutions optimized for harsh underwater environments.
- **3D Seismic Station**
A fully operational Short-Period 3D Seismic Station is installed at the SUASIS headquarters. It is used for continuous acquisition of ambient noise and local seismicity, offering a testing ground for real-time analytics and structural health algorithms.
- **Electronics Lab and Embedded Systems Workshop**
Facilities support PCB design, FPGA-based data acquisition systems, and low-power embedded systems essential for edge computing in remote or subsea deployments.
- **Environmental Simulation and Pressure Testing**
High-pressure test chambers and vibration tables allow for qualification of devices under simulated deep-sea and seismic conditions.
- **Field Deployment and Recovery Assets**
SUASIS maintains mobile deployment infrastructure, including mooring systems, battery packs, telemetry modules, and deployment frames to facilitate flexible and scalable testing in marine and inland water bodies.

2. Human Capital and Expertise

- **Multidisciplinary Engineering Team**
Comprising mechanical, electronic, and software engineers, SUASIS' core team is experienced in system-level design, prototyping, and ruggedization for field-ready instrumentation.
- **Geophysics and Signal Processing Specialists**
Staff include experts in underwater acoustics, passive seismic monitoring, and ambient noise analysis—many of whom have prior experience in large-scale research collaborations.
- **AI/ML R&D Team (Planned Expansion)**
SUASIS will be establishing a dedicated research unit focused on Machine Learning (ML) and Physics-Informed Machine Learning (PIML), staffed initially by two postdoctoral researchers. Their work will focus on algorithm development for real-time event detection, data fusion, and classification in seismo-acoustic applications.

3. Digital Resources and Tools

- **Data Acquisition and Visualization Platforms**
In-house software for synchronized, multi-sensor data acquisition, real-time thresholding, and GUI-based dashboard visualization.
- **Modeling and Simulation Environments**
Use of MATLAB, COMSOL Multiphysics, and Python-based frameworks for pre-deployment simulation of acoustic/seismic wave propagation, sensor response modeling, and environmental noise simulation.
- **Cloud Integration Tools**
Systems are designed for hybrid edge-cloud deployment, enabling remote monitoring, firmware updates, and automated data backups.

4. Project Experience: FP7 and Eurostars Participation

SUASIS has demonstrated its capacity for international collaboration and innovation through successful participation in high-level R&D programs:

- **FP7 Project Participation**
SUASIS contributed to EU FP7-funded projects focused on underwater sensing and communication, where it developed advanced hydroacoustic modules and signal processing techniques for passive monitoring and environmental sensing in marine environments. These projects enhanced SUASIS's capabilities in embedded firmware design, sensor integration, and data analytics.
- **Eurostars HYDROFLOWN Project**
As a key industrial partner in the Eurostars-funded HYDROFLOWN project, SUASIS developed next-generation vector sensors and underwater acoustic telemetry systems. The project emphasized high-sensitivity detection in low signal-to-noise environments and contributed significantly to the design of miniaturized, intelligent sensor platforms for deployment in challenging underwater conditions.

These international collaborations not only reinforced SUASIS's R&D credentials but also positioned the organization as a reliable technology partner capable of leading system-level innovation and field implementation within multidisciplinary consortia.