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MILESTONE N° 39: Sensor packages ready for deployment

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Introduction

This milestone report outlines the successful development and readiness for deployment of three sensor packages developed within the JERICO-S3 project: the Plankton Dynamics Sensor Package (PSP), the Autonomous Coastal Observing Benthic Station (ACOBS), and the Water-Sampler Filtering & Preservation Device (WASP). These systems have been bench-tested and are now ready for full-scale deployment to enhance monitoring and data collection for coastal ecosystem processes. Detailed reporting of the related activities will be available in JERICO-S3 deliverables D7.4, D7.7 and D7.9.

Plankton Dynamics Sensor Package (PSP)

- **Description:** The PSP is designed to measure essential physical, biogeochemical, and biological variables crucial for understanding plankton dynamics. It is powered by the Coastal EGIM (c-EGIM), providing an IoT-enabled platform for real-time sensor integration.
- **Main Features:**
 - Integration of multiple sensors including Fluoroprobe for chlorophyll, MP6 for dissolved oxygen, and ISUS for nitrate measurements.
 - AI-driven sampling controller that adjusts data collection frequency based on phytoplankton bloom detection.
 - Real-time data transmission to the cloud.
- **Bench Test Results:** The system was successfully deployed and tested, showing efficient handling of high-resolution data for plankton dynamics.

Autonomous Coastal Observing Benthic Station (ACOBS)

- **Description:** ACOBS is designed to monitor benthic processes, particularly oxygen fluxes at the sediment-water interface. It includes a range of sensors for seawater characteristics and benthic activity.
- **Main Features:**
 - Integration of microprofilers, benthic chambers, and Eddy Covariance systems for continuous oxygen flux measurement.
 - Sediment Profile Imager for monitoring benthic macrofauna activity and sediment reworking.
- **Bench Test Results:** The ACOBS has been tested with promising results. Field deployment in the Arcachon Lagoon is scheduled for late winter/early spring 2024, ensuring the system is ready for coastal ecosystem monitoring.

Water-Sampler Filtering & Preservation Device (WASP)

- **Description:** WASP focuses on water sampling, filtration, and preservation, particularly for environmental DNA (eDNA). It is integrated with the FerryBox system for continuous sampling in coastal waters.
- **Main Features:**
 - Modified McLane Phytoplankton Particle Sampler for eDNA collection.
 - Refrigerated autosampler for bulk water sampling.



- Reagent-based and freezing sample preservation techniques for long-term storage.
- Bench Test Results: Bench tests confirmed that the WASP system meets accuracy and precision standards for volume filtration, DNA preservation, and sample recovery. The system is now prepared for deployment in field studies to collect critical coastal water samples.

Conclusion

The successful development and testing of the PSP, ACOBS, and WASP systems demonstrate their readiness for field deployment. These systems represent significant advancements in marine observation technologies and will contribute valuable insights into coastal and marine ecosystem processes. The upcoming field deployments will further validate the performance of these systems in real-world conditions, solidifying their role in the JERICO-S3 framework.

NB: Detailed reporting of the related activities will be available in JERICO-S3 related deliverables D7.4, D7.7 and D7.9 where all technological developments' owners, contributors and contributing institutes are cited.