SeaML:UXV

Enabling Maritime Assistance Robotics As A Service

An Interconnected Unmanned Robotic Vessel Fleet

Fraunhofer CML's surface, aerial, underwater and crawling vessels (UXVs) are a combination of in-house developments and commercials products that form an interconnected unmanned robotic vessel fleet. The robots are modular in design enabling the incorporation of survey-specific measurement equipment to perform unmanned services for near-shore and ports operations.

Each vessel can execute a user-specific task, while information is relayed and saved within the cloud and is displayed to the user in real time and stored for post-survey data analysis. An operator is supervising the vessel continuously in the background to keep the human in the loop and ensuring all safety requirements for safe dispatch and recover of the robotic vessel at the targeted area of interest. This holistic modular setup allows researching, demonstrating and validating of novel on-demand Robot As-a-Service concepts.

The Fleet
SeaML:SeaLion
SeaLion is an in-house developed Autonomous Surface Vehicle (ASV) that acts as the 'mothership' to carry and deploy measurement equipment and unmanned vehicles to remote locations. It is equipped with a Launch And Recovery System (LARS) for ROVs (Remotely Operated Vehicle) and a landing platform for UAVs (Unmanned Aerial Vehicles).

SeaML:BlueROV
Blue (Bluerobotics BlueROV2) is a ROV additionally equipped with a 4K camera, DVL positioning system and thickness sensor to allow for profiling and scanning tasks. Besides visual inspection of submerged structures, it can be equipped with grippers for manipulating tasks or sensors / lasers for bathymetry analysis, seafloor mapping or water analysis


SeaML:Magic
Magic is a MAGnetic Inspection Crawler (Deep trekker DT640) which can operate on land and under water down to 50m. Being additionally equipped with thickness sensor and capable of traversing even sharp corners, it is ideal for ship or quay wall inspections.

SeaML:EyeML
EyeML (DJI Matrice 300 RTK) is an unmanned aerial vehicle (UAV) additionally equipped with an in-house developed autonomous start and landing software. The integrated Zenmuse Z30 enables 30x optical magnification.
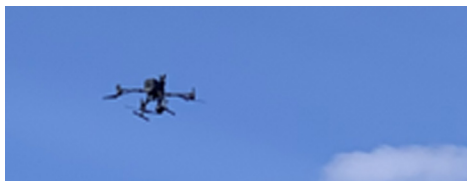

A sensor box for measuring air quality and a hot-swap battery system is under development to increase range while operating from the SeaLion to perform time intensive inspections.

Your Benefit
We offer a set of already validated maritime assistance services, such as bathymetry inquiries or underwater quay wall or ship hull inspections as demonstrated in the RoboVaaS Project.

We further design, develop and deploy the robotic solutions and services that fit your specific needs and enable your staff to monitor the tasks' completion. Regardless if you already have an established infrastructure for your operations or none at all, we can design and deploy the solution appropriate for your environment. To save costs and time we can simulate the aspired solution in controlled environments, designed to match the envisioned deployment sites and with sensors that virtually emulate data before we implement the solution in reality.

SeaML: Robotic Assistance Services.
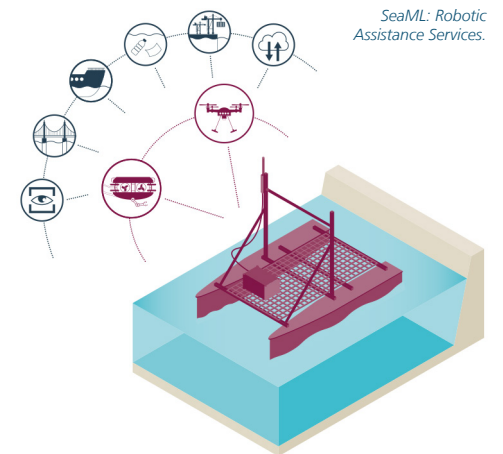
SeaML:Robotic Assistance Services
Our on-demand Robotic Assistance Services for the maritime sector are enabled through SeaML:SeaLion, SeaML:UXV and SeaML:WebUI. To learn more, see:

Linked project sheets:
• *WebUI*
SeaLion •