SEACLEAR

USV SEACAT
THE TRANSPORTER

The **SeaCat** is the «mothership». It will also carry all the debris collected back to shore.

AERIAL DRONE
THE OVERWATCH

The drone detects areas of concentration from the air and ensures the navigation safety.

ROV GUARDIAN
THE MAPPER

The Mini-ROV **Guardian** scans the area, identifies and maps the sectors to be cleaned.

ROV TORTUGA
THE CLEANER

The **Tortuga** collects the debris on the seafloor and bring them back to the SeaCat.

SeaClear Project:
Search, Identification, and Collection of marine Litter with Autonomous Robots

Floating garbage islands, trash found in bird stomachs and traces of microplastics discovered in sea food have become shocking yet regular reports in the media. Their negative impacts are widely known and affect local flora and fauna as well as the human population everywhere.
In the fight against litter accumulation on the seafloor, the SeaClear project deals with the development of a holistic system for the search, identification, mapping, and collection of marine litter on the seafloor.

It is one of the first projects targeting trash on the bottom of the ocean rather than floating litter on the surface because that is where approximately 90% of the trash is located.

Fraunhofer CML works together with 7 European partners to develop a robotic solution with multiple autonomous robots to detect, classify, map and collect underwater waste and reduce potential risks for clean up divers.

Key Systems

The SeaClear system incorporates multiple robotic systems that cooperatively work together to detect litter, differentiate between trash and marine life, and finally remove and dispose of the litter properly.

The robotic system is composed of four unmanned vehicles:

1. The Unmanned Surface Vehicle
This vehicle acts as the main control hub, responsible of receiving and processing the majority of the data acquired by the underwater robotic systems, which is transferred via tether cables.

2. The Aerial Drone
The drone is launched in the air to oversee the activities below as well as scan for floating litter on and just below the water surface.

3. The Mapping ROV
This underwater ROV is responsible for detecting litter on the seafloor and the correct distinction between trash and marine life with the help of image processing and AI algorithms. It also creates a map of the identified litter, which can be used by the collection ROV.

4. The Collection ROV
This underwater ROV is equipped with a gripper and a suction tube to pick up the litter and deposit it into a collection basket during the mission.

Future Service

In the future, the SeaClear system will be monitored and commanded using a customized web user interface, where clients can order the service and view important states.
Thanks to the high level of autonomy of the SeaClear system, the unmanned surface vehicle carrying all of the other robotic systems can travel to and initiate the clean up mission without human intervention.

The information generated by the system are transmitted to shore, where the operator and client can observe the live video footage, review the data, plan the operation, and intervene in emergency situations.
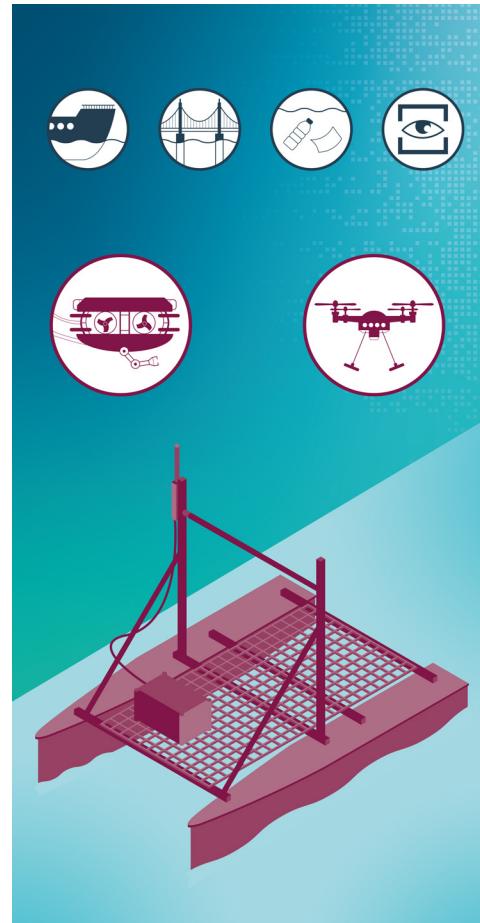
Your Benefit

The SeaClear system offers a unique robotic-aided solution for the removal of litter from the sea floor, thereby improving not only ecosystem health but also creates economic benefits through improved tourism attractiveness.

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