
Deployment of an innovative microplastic sensor in PLOCAN offshore ocean platform.

Gonzalo García-Valle*^{†1}, F. Javier Campoy¹, Rubén Marrero^{‡2}, Joel Moreno¹, Tania Montoto-Martínez², Ferrán Martín¹, Adriana García-Mendoza², and María Díaz²

¹LEITAT (LEITAT) – Carrer Innovació, 2, Terrassa, Barcelona, Spain

²Plataforma Oceánica de Canarias (PLOCAN) – Carretera de Taliarte, Telde, Las Palmas, Spain

Abstract

The presence of microplastics (MPs) in water is a significant source of contamination in seas and oceans and poses a serious threat to the health of marine ecosystems. Methods and protocols to detect and remove MPs are essential to improve the water quality and ensure the preservation of the marine environment. LEITAT has developed an optical MP sensor to detect and quantify these particles, distinguishing them from other elements naturally present in the water (sand, algae, etc.). The sensor uses a pump to circulate the water through an optical system that detects the passage of particles in the continuous water stream. A successful detection triggers a camera to capture consecutive magnified frames of the element, which are processed using artificial intelligence (AI) to determine whether they are MPs or other elements. The entire system is housed in an IP67 suitcase to facilitate portability, protect all the components from hazardous environmental phenomena, and ensure long-term unattended operation. Validation was conducted in the laboratory prior to the deployment in real environments, achieving a detection efficiency of 85% using two types of samples: artificial ones and collected in the Mediterranean Sea. The next step is to install the sensor in the PLOCAN Offshore Ocean Platform facility within the scope of the ILIAD H2020 Project (Grant Agreement: 101037643), which aims to integrate several data sources, AI processes, big data, etc. to develop digital twins of the ocean and facilitate the adoption of effective measures against the degradation of marine environments. The installation includes a water/MPs collection system to get oceanic water to circulate through the sensor and determine the efficacy in a real environment and the necessary improvements in future versions by sampling in the eastern boundary of the North Atlantic subtropical gyre, which can accumulate large quantities of pollutants and MPs particularly.

Keywords: Sensor, ocean platform, microplastic, artificial intelligence

*Speaker

[†]Corresponding author: gogarcia@leitat.org

[‡]Corresponding author: ruben.marrero@plocan.eu