

Airborne Marine Litter Detection

SkyfloX and partners start ESA validation project to detect marine plastics with flight campaign over Hamburg river delta



Esch/Belval, Luxembourg, 23 JULY 2020 – Luxembourg-based start-up SkyfloX and partners have entered a European Space Agency (ESA, Discovery Element contract no 40001311019/20/NL/GLC) contract to validate and assess plastic marine litter remote detection, paving the way for a consistent marine litter service using SkyfloX’s revolutionary constellation ORCA (Optical and Radio frequency Constellation on Aircraft).

Marine Litter is a global issue and can be found in all the seas from the equator to the poles, and in freshwater systems, such as rivers and lakes. The majority of marine litter is plastic. It is estimated that between 4.8 and 12.7 million tonnes of land originating plastic entered the oceans in 2010 alone (Jambeck et al 2015), and plastic production continues to increase.

Plastic marine litter dramatically affects marine life and ecosystems and has a great economic impact on coastal communities, tourism, and fisheries. It furthermore poses a concern for human health due to contamination of seafood with plastic particles and associated pollutants.

Urgent questions around marine plastic sources, sinks, trends and fates remain open, but cannot be answered satisfactorily using ground-based and model-based systems alone. The emerging field of remote sensing for plastic detection is showing promise for tackling unknowns around marine and monitoring, but reliable *in situ* validation data are required to improve and optimise algorithms and approaches.

The AIR-SOS (**AIR**borne & **S**atellite **O**bservation **S**trategies for marine litter monitoring) study aims to address the problem of limited validation data by collecting high quality and high resolution *in situ* data over the coastal waters outside of the Elbe River in central Europe. The main objective of this study is to evaluate the capability of sensors flown in demo flights to detect marine litter and validate algorithms used to process the acquired data. This will be performed alongside Sentinel-2A/B MSI data.

SkyfloX’s Irina Rammos, project manager for AIR-SOS, stated: “*I am grateful for the opportunity to evaluate another potential service of the ORCA monitoring system*”. The AIR-SOS project is a first step towards the use of the ORCA concept, using commercial airliners as a platform carrying small remote-sensing equipment, as a marine litter detection service by combining airborne and satellite data. This will likely prove essential in the prevention and remediation of the issue as well as developing and



enforcing legislation around marine litter (by introducing new measures and checking their effectiveness, by pinpointing the major sources of litter, by guiding potential cleaning missions etc.).

SkyfloX will be the prime contractor for this work with Plymouth Marine Laboratory (PML), experts in aquatic optics and hi-res image satellite processing, and Hoeltken Solutions, experienced in flight operations, approvals and compliance, to integrate the payload and coordinate the test campaign. PML's Dr Lauren Biermann, leading the remote sensing work, has expressed excitement at working on this project, as the data collected by seaplane will allow for enormous growth of current spectral libraries and machine learning capabilities for plastic detection and monitoring.

About SkyfloX

SkyfloX is a disruptive European Space Agency 'spin-off' developing ORCA (**O**ptical and **Rf** Constellations on **A**irplanes) a concept that plans to use commercial airliners as a platform carrying small remote-sensing equipment, which would image the ground as the planes travel on their regular routes. A constellation of such payloads, hitching a ride on the thousands of aircraft flights crossing the continents every day, would provide coverage and revisit frequencies impossible with satellite-based systems and at the fraction of the cost. The company's unique constellation will offer unprecedented cost/performance ratio to the high spatial and temporal resolution Earth observation and telecommunication markets, enabling a wide range of new applications.

About Plymouth Marine Laboratory (www.pml.ac.uk, @PlymouthMarine)

PML is an independent, impartial provider of scientific research and contract services relating to the marine environment. PML focuses on understanding how marine ecosystems function, their role in the Earth system and how we can protect this important environment for the prosperity of future generations. A truly interdisciplinary marine research centre, PML delivers highly innovative research and solutions for national and international marine and coastal programmes. PML's research is timely, highly relevant to UK and international societal needs and has at its core the mission to contribute to issues concerned with understanding global change and the health and sustainability of marine ecosystems.

About Höltken Solutions

Höltken Solutions (HS) was founded as an engineering and design office for environmental and aeronautical technologies. Among the environmental projects, the team improves methods for chemical free weed control and developed products in this market. The company has built experience in flight training, flight operations and aircraft maintenance management, as well as compliance management and digitalisation in aeronautical areas. HS operates a Seaplane LAKE LA-4-200, formerly used for oil spill surveillance in the northern sea as a flying camera platform, especially for offshore data collection.

ESA project link: [ESA- A step forward in detecting plastic marine litter](#)

For more information visit www.skyfloX.eu or contact us via info@skyfloX.eu