

NET4mPLASTIC PROJECT

WP4 – Act. 4.1 Monitoring plastic and microplastic wastes on coastal and marine environments

D 4.1.4

On Field Test Report

October, 2021 - Version 1.0

Project Acronym	NET4mPLASTIC
Project ID Number	10046722
Project Title	New Technologies for macro and Microplastic Detection and Analysis in the Adriatic Basin
Priority Axis	3
Specific objective	3.3
Work Package Number	3
Work Package Title	Preliminary activities and project implementation
Activity Number	4.1
Activity Title	Monitoring plastic and microplastic wastes on coastal and marine environments
Partner in Charge	PP3
Partners involved	LP, PP3, PP4
Status	Final
Distribution	Public

CONTRIBUTING PARTNERS	LP, PP3, PP4
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Data	Vers	Prep	Resp	Appr	Rev	Comment
31.10.2021	1.0	PP3	PP3	Nicola Fraticelli	Final	Approved

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Acronyms / Abbreviations

ACRONYM	DEFINITION
EWS	Early Warning System
MP	Microplastic
OBU	On board Unit
PP	Project Plan
PT	Project team
TC	Technical task coordinator
TGS-ML	Technical Subgroup on Marine litter, European Union expert group On marine litter
TM	Task Manager
UML	Unified Modelling Language
WP	Workpackage

1 Introduction

1.1 Background of the project

The main goal of the NET4mPLASTIC project is to achieve an efficient monitoring system for plastic and MP distribution along the Croatian and Italian coastal and marine areas in order to improve the environmental coastal and marine sea quality conditions.

According to doc R1, the WP4.1 Monitoring plastic and microplastic wastes on coastal and marine environments – have the goal to obtain physical, environmental, and plastic data for the 4 pilot sites identified in WP3, with the following activities:

- Topography and bathymetry monitoring with GPS, UAV based monitoring system and regional remote sensing (multispectral data reflecting information and land surface condition, ocean colour, phytoplankton, chemistry, atmospheric water vapour, temperature, etc.) (UNIFE, TIPH, UNISTFGAG)
- In-situ sampling activities, especially of the biota (IZSAM)
- Real-time recording of parameters relevant to MP: transparency, temperature, salinity, dissolved oxygen (% and mg/l), pH, pressure/depth, localization, flow, weather conditions (UNIST-FGAG)
- "on-fields" test procedure for all remote sources of data (maritime drone, instrumented package on board of ships, etc.) (HYDRA, PROSOFT)

The expected reports within WP4.1 are the following:

- D.4.1.1 - Sediments samplings, river and sea water samplings and biota sampling from the 4 macro-areas
- D.4.1.2 - Physical and remote sensing data and drone images
- D.4.1.3 - On Field Test Procedure
- D.4.1.4 - On Field Test Report

1.2 Purpose of the report

This document is the deliverable D.4.1.4 - On Field Test report detailing the results achieved from the filed tests in ITALY, relevant to Drone / OBU component, within the activity WP4 act.4.1 Monitoring plastic and microplastic wastes on coastal and marine environments of the **Net4mPlastic project - New Technologies for Macro and Microplastic Detection and Analysis in the Adriatic Basin.**

The purpose of this document is summarized as follows:

- Test results in ITALY

1.3 Reference documentation

No	Title	Rif/Report N.	Published by
[R1]	APPLICATION FORM - NET4mPLASTIC Project - New Technologies for macro and Microplastic Detection and Analysis in the Adriatic Basin 2014 - 2020 Interreg V-A Italy - Croatia CBC Programme Call for proposal 2017 Standard - NET4mPLASTIC Priority Axis:Environment and cultural heritage	Application ID: 10046722, dated 30/06/2017	Lead applicant: UNIVERSITY OF FERRARA
[R2]	EWS requirements definition	HYD001-SPE-001.0	ACT3.3 – Net4Mplastic
[R3]	D 3.3.2 – EWS Hardware Architecture and network design	HYD002-SPE-001.0	ACT3.3 – Net4Mplastic
[R4]	D 3.3.3 – EWS Software Architecture design	HYD003-SPE-001.0	ACT3.3 – Net4Mplastic
[R5]	D 3.3.4 – EWS Hardware and other software Components	HYD004-SPE-001.0	ACT3.3 – Net4Mplastic
[R6]	D 3.3.5 - Report and database provision	HYD005-SPE-001.0	ACT3.3 – Net4Mplastic
[R7]	D.5.2.4 - Net4mPlastic project - Marine OBU _Drone test procedure and report	HYD006-SPE-001.0	ACT5.2 – Net4Mplastic
[R8]	D.4.1.3 - Net4mPlastic project - Marine OBU _Drone on field test procedure	HYD007-SPE-001.0	ACT4.1 – Net4Mplastic

2 Test Mission Description

The test mission was carried out the 20th October 2021 in the Volano beach to test the drone capability to transport the HOLO2 and to pull the mini-manta.

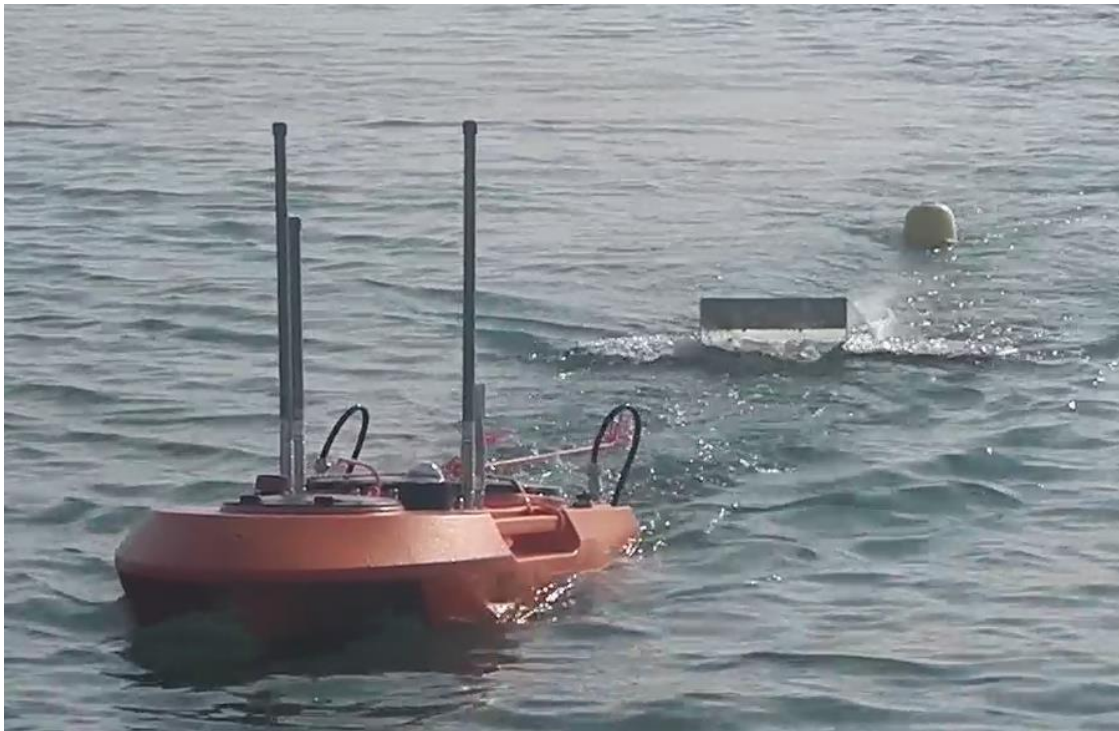
The HOLO2 was fixed under the drone hull and with a small rope the mini-manta was fixed at the stern of the drone. See pictures below



Drone and mini-manta at sea and on land. Drone remote console



Holo2 sensor mechanically fixed under the drone hull



Drone and mini-manta at sea

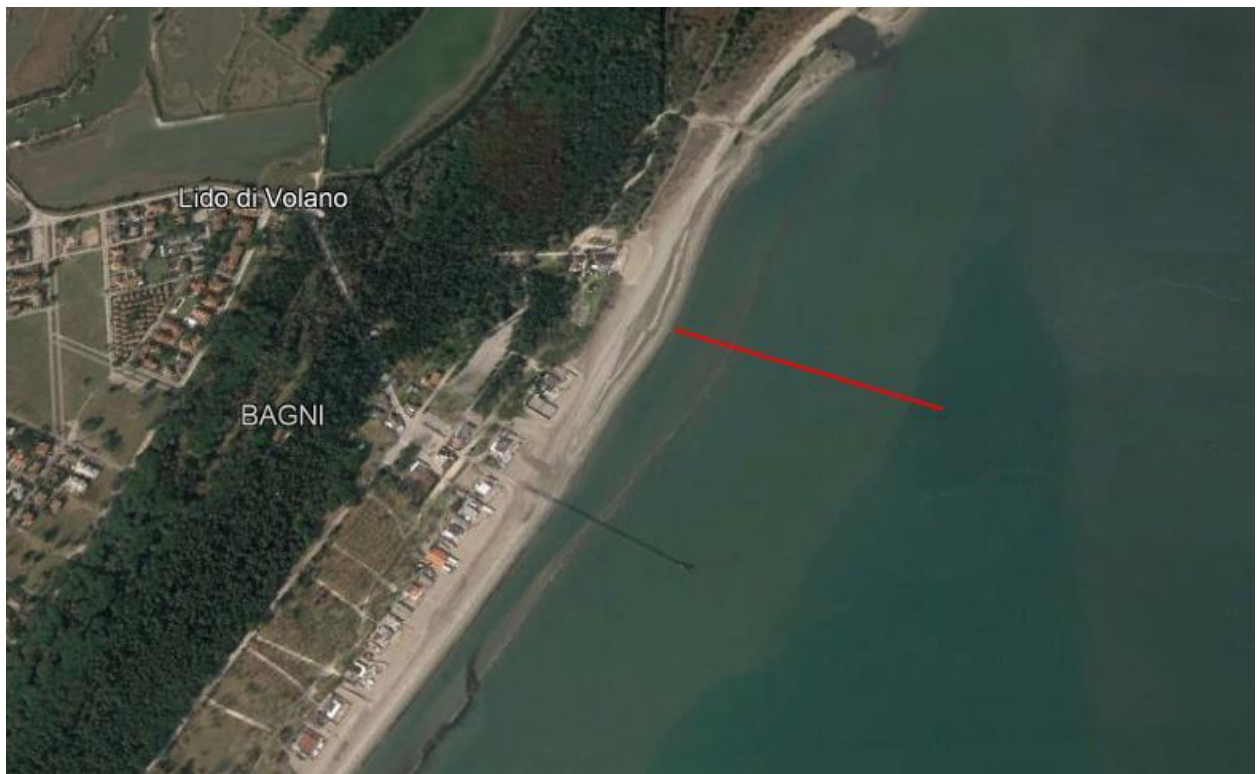
2.1 Test site

The test site was the Volano beach indicated in the following pictures



Volano beach

A transect of about 350m indicated in the picture below was carried out forth and back controlling the drone from the beach.



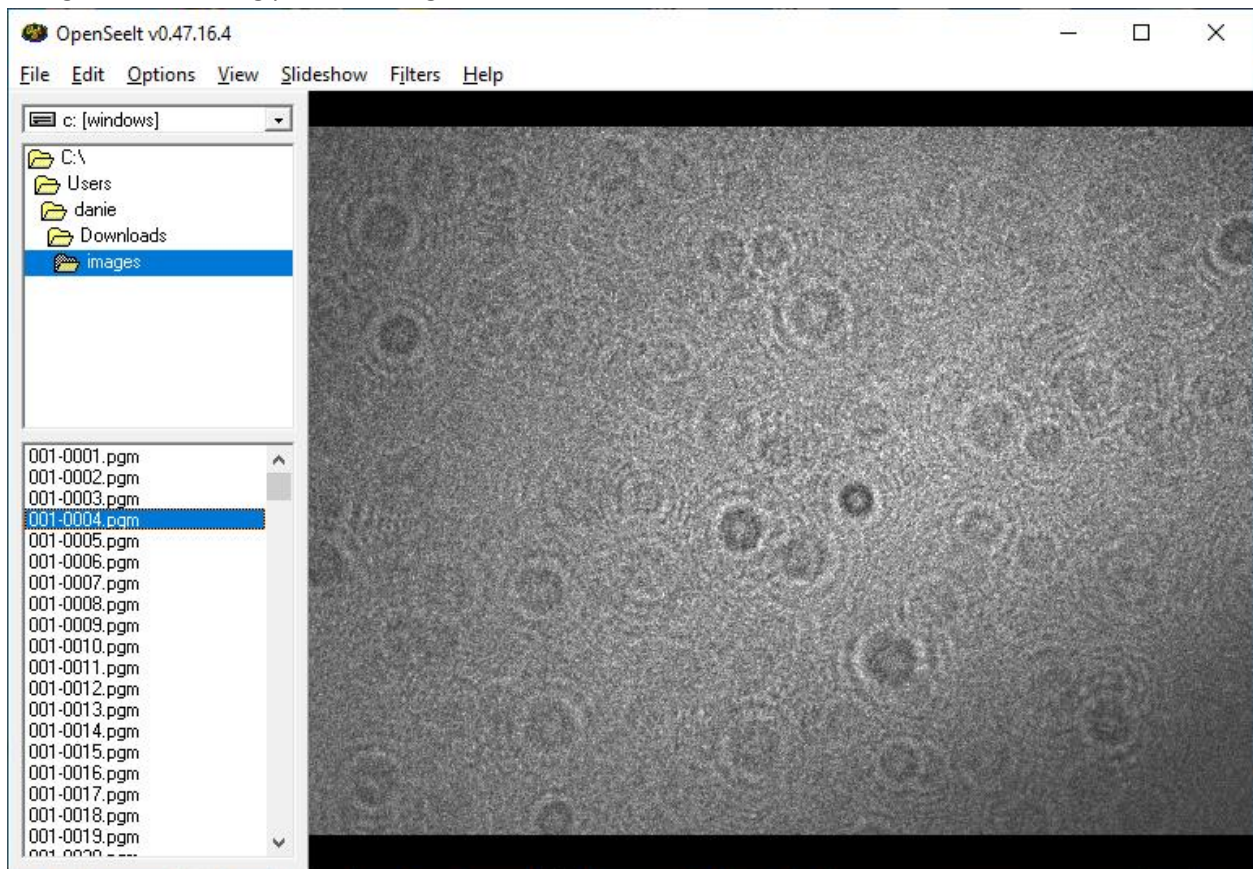
Test transept (about 350m)

2.2 Data collected and transfer

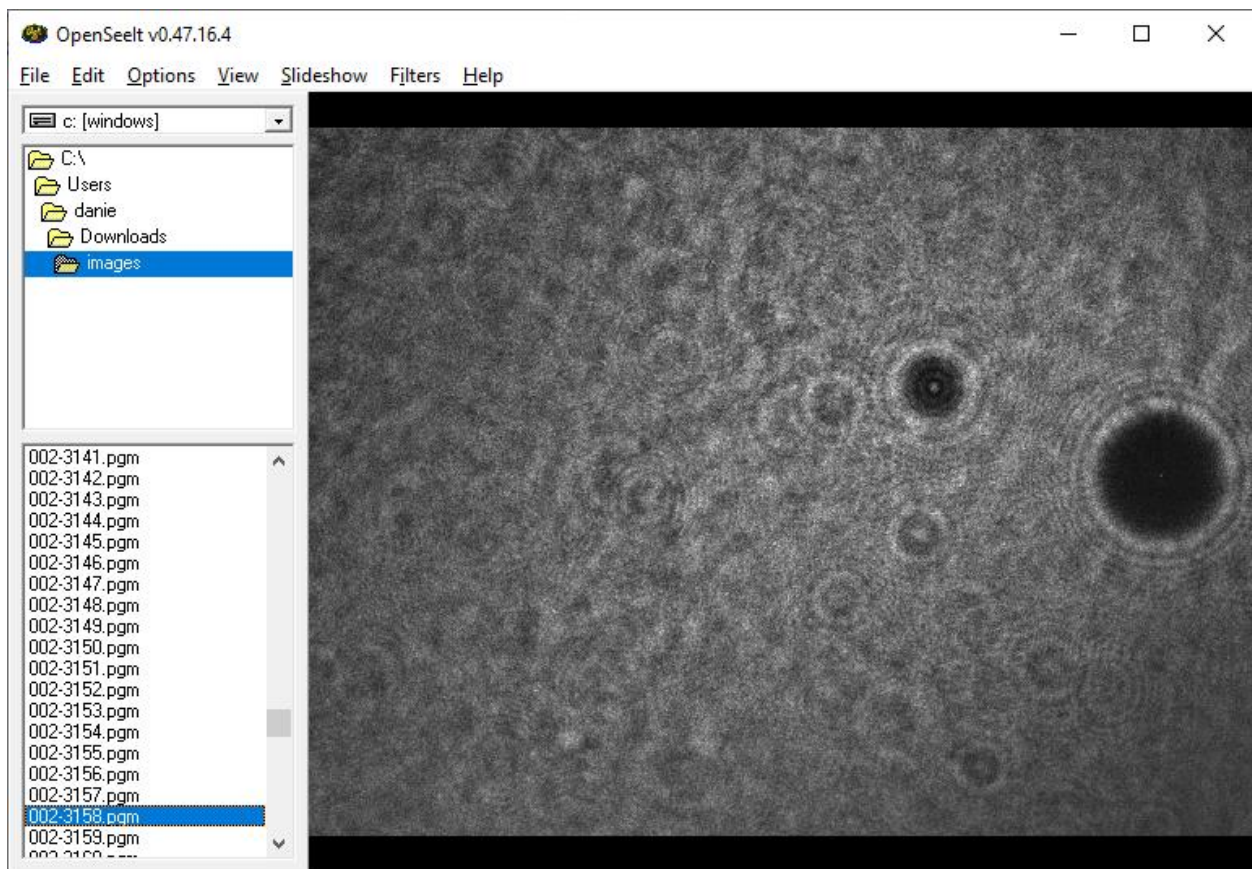
In about 15min (900 secs) with an acquisition rate of 20 holograms per second an amount of 18000 holograms was collected for a total memory size of about 34Gbyte.
All data were transferred from the HOLO2 to a notbook PC in about 45mins.

2.3 Post Processing

With the application OpenSeelt (see picture below) all holograms were verified extracting only 151 holograms containing particles images.



The picture above does not contain particles whereas the picture below show a clear particle

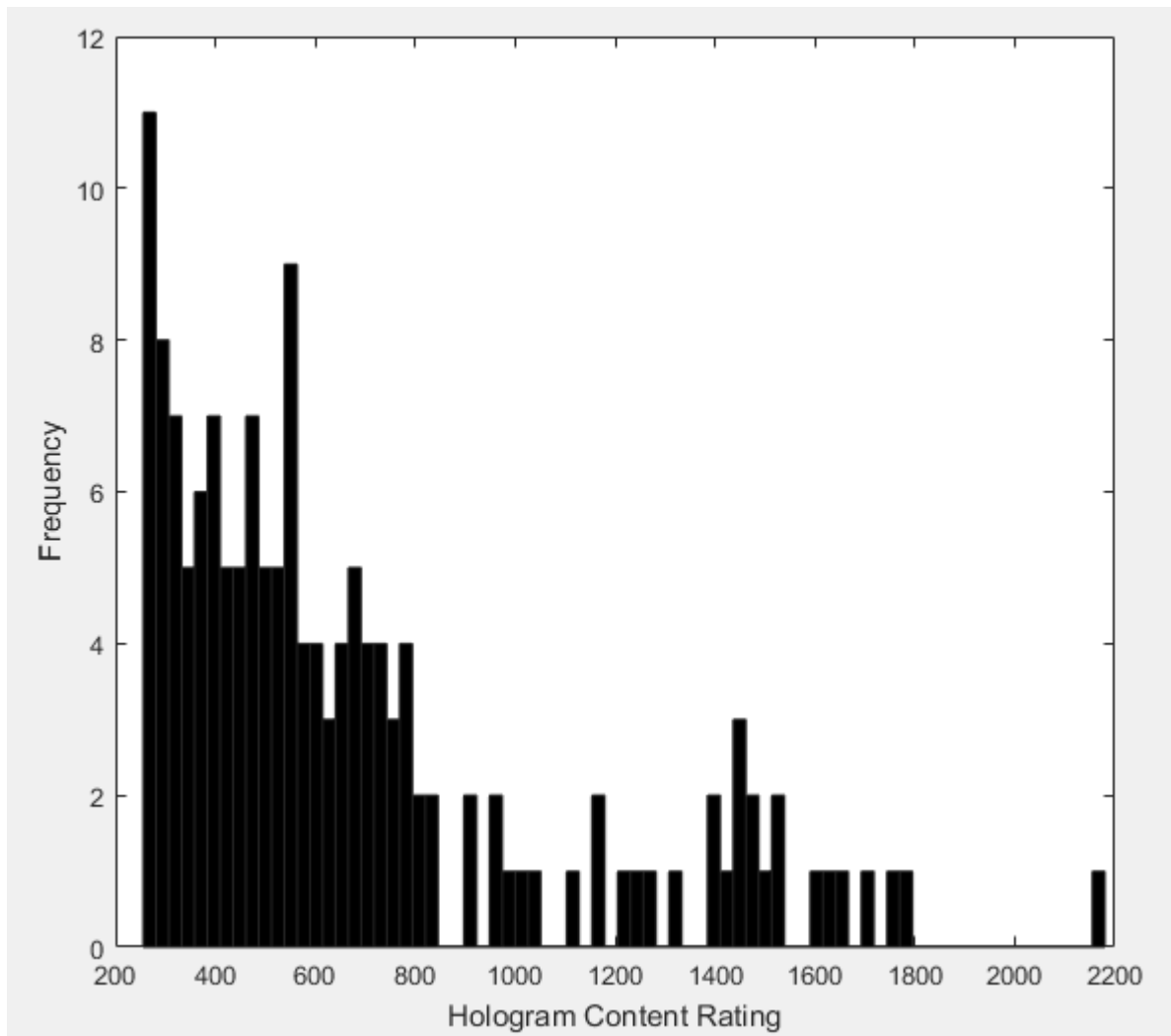


The 151 selected holograms were processed with a dedicated Matlab application to get the number of particles collected in 15mins with a size of at least 250um.

It is possible to set the minimum size to 15um but the processing time increase dramatically from 1 hour to many hours (6-8 hours). In this test we are interested only to get the particle bigger than 250um of diameter to be compared with the material collected with the mini-manta nets with holes of 300um.

Collection depth was 25cm from the sea surface with a sea water temperature of 17.3°C.

The number of particles extracted with size in the range 250-2200um is 57 with an average concentration of about 18uL/L and with the size distribution shown in the picture below



Frequency of particle vs. size in um

Sample of particle images extracted by the holograms are reported hereinafter
 All images extracted are compressed in a dedicated file.

