

# NET4mPLASTIC PROJECT

## WP5 – Act. 5.3 EWS setting and calibration

### D 5.3.3

#### Data Centre Test Procedure and Report

June, 2022 - Version 2.1

<b>Project Acronym</b>	NET4mPLASTIC
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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	Work package
ACT	Activity
OBU	On-board unit
UAV	Unmanned aerial vehicle
DB	Database
DBMS	Database Management System
APP	Application
HW	Hardware
SW	Software
GIS	Geographic information system
ICT	Information and communications technology
WEB	World Wide Web
WebGIS	Geographic Information Systems available on web platforms
HMI	Human-machine interface

# 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 WP5 deals with the design implementation of the EWS - Early Warning System including:

- a control centre, based on system hardware and network (Prosoft), and a EWS application (Hydra Solutions) integrated with the transport model and external systems (such as the oceanographic model - (Marche Region);
- Integrated Marine Drone, for collection of MP - microplastic, and geolocalized water indicators on the route (Hydra Solutions);
- Integrated Marine OBU, a unit to be installed on board of ships for improved MP collection with geolocalized water indicators on the route (Hydra Solutions).

The design shall be carried out with the modern system engineering approach based on UML - Unified Modelling Language (Hydra Solutions). UNITS and RERA SD will provide data for the first set up of the platform related to MP. Based on this WP, the transport model will be developed in WP4. The development of the EWS platform integrated with the transport model will be done in WP5.

The activities planned for WP5 are the following:

- development of the EWS - Early Warning System data centre platform and integration with the transport model (WP4)
- development of the UAV/marine drone for real-time data acquisition
- testing and calibration
- business simulation for testing the solution with real users –
- final assessment of the solution, including a CBA–cost benefit analysis and the preparation of the business plan.

The main expected output will be:

- EWS integrated platform, implemented and tested
- Training for the required personnel and users - Assessment of the platform.

The required main software modules of the EWS platform will be:

- MP Transport model, providing data with distribution and concentration,
- MP WebGIS platform, for: a) Display MP data (historical, actual forecast, 24-72h forecast) b) Early warning provision, based on the transport model c) Data entry, recording & replay
- MP DB, the DB for collecting data
- A mobile APP, for starting/closing the field activities and for data reporting
- Firmware for marine remote units - Integration with external system, for meteorological/other data

The coordinator will be Hydra Solutions. The EWS SW platform will be developed by Hydra Solutions, with the support of Marche Region for the transport model, and Prosoft for localization, the ICT implementation, the integrated testing, training and support for maintenance activities. UNITS will coordinate the assessment of the platform. The other partners involved will give contribution for data entry, as target user, and for preparation of the required documentation. The user target group will be based on the main project partners, institution, regions and councils. They will be involved in the design stage for collecting the main needs, for testing and user training of the solution. The target group will be required to use the system during the business simulation, and provide feedback.

The expected reports within WP5 are the following:

- D 5.1.4 –Hardware and Network Integration Report (Report): this deliverable will provide a report with details on integration of the network and other hardware required for the system;
- D 5.1.5 –Test procedures and reporting (Report): this deliverable will provide the procedures for testing the data centre and the integrated solution in the test bed environment, and the reporting of the tests done to assure the quality of the solution provided;
- D 5.1.6 –Hardware & Network Maintenance Manual (Document); this deliverable will provide the manual for the maintenance of the hardware and the network of the system;
- D 5.1.7 –Software User and Maintenance Manual (Document); this deliverable will provide the manual for the maintenance of the software and the User manual for the operators
- D 5.2.4 – Marine OBU / Drone Test Procedure and Report (Document): this deliverable will provide the procedures for testing the drones and the OBU, and the reporting of the tests done to assure the quality of the solution provided;
- D 5.2.5 –Marine OBU / Drone Maintenance Manual (Document); this deliverable will provide the manual for the maintenance of the Drone and OBU;
- D 5.2.6 – Marine OBU / Drone User Manual (Document); this deliverable will provide the User manual for the operators;
- D 5.3.1 – Data Centre Hardware and Network Facility implemented (Hardware, report), in this deliverable is relevant to the implementation of the data centre for the integrated solution, hardware and the network facility, and the preparation of the AS BUILT document describing the data centre facility;
- D 5.3.2 – Remote Units and Data Centre Communication Test Procedure and Report (Document); this deliverable will provide the procedures for testing the communication integration between remote units and the data centre, and the relevant reporting of the tests done to assure the quality of the solution provided;
- D 5.3.3 – Data Centre Test Procedure and Report (Document): this deliverable will provide the procedures for testing the features of the solution provide in the data centre, and the relevant reporting of the tests done to assure the quality of the solution provided, that will be done in cooperation with the main stakeholders;
- D 5.3.4 – Integrated System Final Test Procedure and Report (Document): this deliverable will provide the procedures for the integrated test cases testing the integrated solution, and the relevant reporting of the tests done to assure the quality of the solution provided, that will be done in cooperation with the main stakeholders.

- D 5.4.1 – Training documentation (document): this deliverable is relevant to the implementation of the required documentation for performing training to the personnel involved in the business simulation (as defined in the WP3.3 and the design of the solution);
- D 5.4.2 – Training assessment (report): this deliverable is relevant to the implementation of the training to be done for the personnel involved in the business simulation, with a reporting on evaluation of the training;
- D 5.4.4 – Questionnaire for platform assessment (report) this deliverable is relevant to the preparation of a questionnaire for evaluation of the platform from the user point of view involved in the business simulation;
- D 5.4.5 – Cost Benefits Analysis – CBA of the platform (Document); this deliverable will provide a final document with lessons learnt during the real use of the platform, an evaluation of the benefits of the platform, and costs for full exploitation of the solution, including the future recommendations on potential improvement, and including a business plan for a full implementation of the platform.

## 1.2 Purpose of the report

This document describe the **deliverable D.5.3.3 – Data Centre Test Procedure and Report**, following the implementation of the EWS, according to the activity 5.1 - Implementation of the platform (HW, SW) with field and laboratory data , and the activity 5.2, Development of the UAV/marine drone for real-time data acquisition, and will provide the procedures for testing the features of the solution provided in the data centre, and the relevant reporting of the tests done to assure the quality of the solution provided, to be done in cooperation with the main stakeholders.

This deliverable is within the activity 5.3 of the Net4mPlastic project - EWS setting and calibration, that is focused on the EWS setting and calibration. The main tasks planned in this activity are the following:

- Definition of integrated test cases including functional test, communication tests, performance tests of software applications and communication lines
- Tuning of the methods to collected data from sensors and/or laboratory equipment to choose/define optimal input method
- Implementation of the Data Centre in the final location; ICT operation and performance parameters will be monitored and adjusted accordingly
- Final integrated test will be performed in cooperation with the main stakeholders

The coordinator of this activity is PROSOFT, in cooperation with HYDRA, UNEWST-FGAG, UNIFE, UNITS, MARCHE

The purpose of this document is summarized as follows:

- Procedure for testing the functions available in the data centre,
- reporting of the tests done to assure the quality of the solution provided



## 1.1 Reference documentation

No	Title	Rif/Report N.	Published by
[R1]	<b>APPLICATION FORM - NET4mPLASTIC Project - New Technologies for macro and Microplastic Detection and Analysis in the Adriatic Basin</b>  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]	D 5.1.4 –Hardware and Network Integration Report		ACT5.1 – Net4Mplastic
[R3]	D 5.1.5 –Test procedures and reporting (Report)		ACT5.1 – Net4Mplastic
[R4]	D 5.1.6 –Hardware & Network Maintenance Manual		ACT5.1 – Net4Mplastic
[R5]	D 5.1.7 –Software User and Maintenance Manual		ACT5.1 – Net4Mplastic
[R6]	D 5.2.4 – Marine OBU / Drone Test Procedure and Report		ACT5.2 – Net4Mplastic
[R7]	D 5.2.5 –Marine OBU / Drone Maintenance Manual		ACT5.2 – Net4Mplastic
[R8]	D 5.2.6 – Marine OBU / Drone User Manual		ACT5.2 – Net4Mplastic
[R9]	D 3.3.1 – EWS Requirements definitions based on the stakeholders and users' needs, through questionnaires and specific meeting		ACT3.3 – Net4Mplastic
[R10]	D 3.3.2 – EWS Hardware Architecture and network design (central Data Centre Hardware Architecture Client/Server, Data network architecture and related communication segments)		ACT3.3 – Net4Mplastic
[R11]	D 3.3.3 – EWS Software Architecture design (data modelling software, GIS applications, early warning		ACT3.3 –

]	detection software, etc.), the Relational Database to manage all collected data with related meta data, the communication Front-End for web remote access, the Data Centre Software Interfaces for users		Net4Mplastic
[R12 ]	D 3.3.4 – EWS Hardware and other software Components Specifications design (Integrated Marine Drone and Marine OBU, with details of required components (hardware and firmware), firmware and other software components (mobile apps for managing the drones and for remote mobile activities).		ACT3.3 – Net4Mplastic
[R13 ]	D 3.3.5 - Report and database provision with all the collected data		ACT3.3 – Net4Mplastic

## 2 Identification of Test Cases

The instrument used for testing the dynamic behaviour of the functionality (use cases) of the system is constituted by a table like the one attached here below, in which are identifiable 4 macro sections:

1. header,
2. general information,
3. scenarios (related to the main scenario, alternative scenarios or error should be developed in the design phase of the system),
4. conditions for success of the feature.

<b>TEST CASE:</b> <i>Use Case Code</i>	<i>Name of the use case</i>
<b>Description:</b>	<i>General description of the use case</i>
<b>Related functionalities:</b>	<i>Other features related to the one described</i>
<b>Primary Actor:</b>	<i>Name</i>
	<i>Interest in the execution of the use case</i>
<b>Secondary Actors:</b>	<i>Name</i>
	<i>Interest in the execution of the use case</i>
<b>Preconditions:</b>	<i>Description</i>
<b>Start:</b>	<i>Description</i>
<b>Main Scenario.</b>	
1.	<i>&lt;STEP 1&gt;</i>
2.	<i>&lt;STEP 2&gt;</i>
<b>Conditions of Success</b>	
1.	

**Table for the formalization of the functionality test**

The header shows a unique code, to be used to refer to the test case, and the name of the test case.

The description field provides a summary of the services offered by the case in question.

There is therefore a reference to any sub-features and related features.

Actors are entities, users, or subsets interested in the behaviour of the overall system and a set of features in particular. In respect of a use case can be divided into primary and secondary actors: for primary actors are the ones that provide the initial stimulus that initiates the use case.

The pre-conditions are the conditions that must be met in order to execute the use case.

The main scenario is that scenario of success providing the service requested by the plaintiff in the event that everything is working properly: input data valid, no error, etc.

The start field describes the event that triggers the commencement of functionality.

Finally, the conditions of success are the results of the function with the correct execution of the same.

In order to check whether the production environment of the NET4mPLASTIC platform is migrated and implemented in accordance with expectations and fully meets the set functional requirements, the data centre functionality uses the same testing procedure that was defined and carried out in the test environment and described/reported in D 5.1.5 Test Procedure and Reporting.

Here below are resumed the use cases to be tested:

Use Cases	Description of the functionality to be tested
NF-DB-001	Database instantiation
NF-DB-002	Automatic import procedure of the data in the Database
NF-DB-003	Database connection with the online WebGIS platform
F-DB-004	Database backup and rollback
NF-WG-001	WebGIS Platform online loading
NF-WG-002	WebGIS Platform visualization scripts (PHP) and map interpolation scripts (JavaScript) integration
F-WG-003	User Login/Logoff
F-WG-004	Photo gallery navigation
F-WG-005	Drone-OBU Mission navigation and data retrieving
F-WG-006	Data Model navigation and data retrieving
F-WG-007	Microplastic Concentration (Plastic Index) navigation and data retrieving
F-WG-008	Lab Data Analysis navigation and data retrieving
F-WG-009	Sea Sentinel navigation and data retrieving
F-WG-101	General Table mode data retrieving, data visualization and csv export
F-WG-102	General Plot mode data retrieving, data visualization
F-WG-103	General Map mode data retrieving, data visualization, rastering
F-WG-104	General Map mode Fullscreen mode, map/satellite mode, zoom in/out, navigation and waypoint detailed info.

### 3 Test Procedures

Here below are illustrated the adopted test procedures for the functionalities (use case) to be tested described in the previous chapter.

<b>TEST CASE:</b> T-NF-DB-001	<b>Database instantiation</b>
<b>Description:</b>	Database tables have been created and primary, secondary and foreign keys have been instanced
<b>Related Functionalities:</b>	<b>NF-DB-001</b>
<b>Related Sub-functionalities:</b>	--
<b>Primary Actor:</b>	SQL Management Interface Connect to the DB Schema to perform the necessary operations
<b>Secondary Actors:</b>	- -
<b>Prerequisites:</b>	DB has been instanced
<b>Start:</b>	Always active
<b>Main Scenario.</b>	
1.	- DB Is online and ready to accept connection - Connect SQL Management interface to DB - Perform a DB Integrity check
<b>Conditions of Success:</b>	
1.	The database after an integrity check doesn't report any failure and/or error and/or warning condition and the DB Schema is coherent

<b>TEST CASE:</b> T-NF-DB-002	<b>Automatic import procedure of the data in the Database</b>
<b>Description:</b>	The software module dedicated to import the data on the database extract the data from the formatted tables supplied by the partners and populate the database accordingly
<b>Related Functionalities:</b>	<b>NF-DB-002</b>
<b>Related</b>	NF-DB-001

<b>Sub-functionalities:</b>	
<b>Primary Actor:</b>	DB
	Handles the data received and store it in the DB table set
<b>Secondary Actors:</b>	DB Import Software module
	Parse the dataset tables provided and commit data to the DB formatting it accordingly to the specification
<b>Prerequisites:</b>	DB has been instanced and running Import software module is running Dataset tables are in the required directory
<b>Start:</b>	At user input, when data is available to be imported
<b>Main Scenario.</b>	
1.	- Connect SQL - Connect SQL Management interface to DB - Start data import and wait for end message
<b>Conditions of Success:</b>	
1.	The database has correctly imported all the data, with no duplicates and it can be checked directly on the DB table set with SQL Management interface

<b>TEST CASE:</b> T-NF-DB-003	<b>Database connection with the online WebGIS platform</b>
<b>Description:</b>	Database is online and connecting with the WebGIS platform with the connection strings implemented in JavaScript
<b>Related Functionalities:</b>	NF-DB-003
<b>Related Sub-functionalities:</b>	NF-DB-001, NF-WG-001
<b>Primary Actor:</b>	DB / Server Side
	Waiting to receive the connection
<b>Secondary Actors:</b>	WebGIS Platform
	Prompt the connection to the DB
<b>Prerequisites:</b>	DB online and running DB populated of data WebGIS platform is set online
<b>Start:</b>	Automatically at the start-up of the WebGIS platform
<b>Main Scenario.</b>	
1.	- Connect to <a href="http://www.net4mplastic.net">www.net4mplastic.net</a>

	<ul style="list-style-type: none"> <li>- Issue a JavaScript test code that communicate with the DB</li> <li>- DB respond with the requested data/string to the WebGIS script</li> </ul>
<b>Conditions of Success:</b>	
1.	Communication is instantiated and the DB is correctly connecting to the WebGIS, replying with a test data to the WebGIS script request

<b>TEST CASE: T-F-DB-004</b>	<b>Database backup and rollback</b>
<b>Description:</b>	Database perform a backup on manual request Database perform a rollback from a backup on manual request
<b>Related Functionalities:</b>	T-F-DB-004
<b>Related Sub-functionalities:</b>	NF-DB-001
<b>Primary Actor:</b>	SQL Management interface Connect to the DB Schema to perform the necessary operations
<b>Secondary Actors:</b>	--
<b>Prerequisites:</b>	DB online and running DB populated of data
<b>Start:</b>	On user input
<b>Main Scenario.</b>	
1.	<ul style="list-style-type: none"> <li>- User decide to perform the backup of the database using the backup functionality on SQL Management interface</li> <li>- The backup is executed and stored</li> <li>- DB data is manually altered by the user to simulate a fault</li> <li>- The backup is rolled back on the database</li> </ul>
<b>Conditions of Success:</b>	
1.	Database is in the same initial condition, without data loss and/or loss of integrity

<b>TEST CASE: T-NF-WG-001</b>	<b>WebGIS Platform online loading</b>
<b>Description:</b>	Platform is loading while connecting at <a href="http://www.net4mplastic.net">www.net4mplastic.net</a>
<b>Related Functionalities:</b>	NF-WG-001

<b>Related Sub-functionalities:</b>	NF-DB-001, NF-DB-002, NF-DB-003
<b>Primary Actor:</b>	WebGIS HMI Interface Connects to the internal WebGIS Platform scripting system that perform the necessary action to show the data and interact with the user
<b>Secondary Actors:</b>	DB Connects to the WebGIS platform scripting system and provide data in bidirectional way
<b>Prerequisites:</b>	DB online and running WebGIS Platform running
<b>Start:</b>	On user connection at <a href="http://www.net4mplastic.net">www.net4mplastic.net</a>
<b>Main Scenario.</b>	
1.	- User load the indicated website on a web browser
<b>Conditions of Success:</b>	
1.	The WebGIS main page is showing properly

<b>TEST CASE: T-NF-WG-002</b>	<b>WebGIS Platform visualization scripts (PHP), map interpolation scripts (JavaScript) and DB script (SQL) integration</b>
<b>Description:</b>	Platform is loading the test scripts while connecting at <a href="http://www.net4mplastic.net">www.net4mplastic.net</a> ,
<b>Related Functionalities:</b>	NF-WG-002
<b>Related Sub-functionalities:</b>	NF-DB-001, NF-DB-002, NF-DB-003, NF-WG-001
<b>Primary Actor:</b>	WebGIS HMI Interface Connects to the internal WebGIS Platform scripting system that perform the necessary action to show the data and interact with the user
<b>Secondary Actors:</b>	DB Connects to the WebGIS platform scripting system and provide data in bidirectional way
<b>Prerequisites:</b>	DB online and running WebGIS Platform running Test Script ready to be executed
<b>Start:</b>	On user connection at <a href="http://www.net4mplastic.net">www.net4mplastic.net</a> and launch of the test script
<b>Main Scenario.</b>	
1.	- User load the indicated website on a web browser



	<ul style="list-style-type: none"> <li>- User launch the PHP test script</li> <li>- User launch the JavaScript map test script</li> <li>- User launch the SQL test script</li> </ul>
<b>Conditions of Success:</b>	
1.	<p>The WebGIS main page is showing properly</p> <p>PHP script is outputting properly</p> <p>JavaScript script interact with the map and the map is outputting properly</p> <p>SQL script interact with the DB and it is outputting properly</p>

<b>TEST CASE:</b> T-F-WG-003	<b>User Login/Logoff</b>
<b>Description:</b>	The user is able to login in the WebGIS Platform and then logoff
<b>Related Functionalities:</b>	F-WG-003
<b>Related Sub-functionalities:</b>	NF-DB-001, NF-DB-002, NF-DB-003, NF-WG-001
<b>Primary Actor:</b>	<p>WebGIS HMI Interface</p> <p>Connects to the internal WebGIS Platform scripting system that perform the necessary action to show the data and interact with the user</p>
<b>Secondary Actors:</b>	<p>DB</p> <p>Connects to the WebGIS platform scripting system and provide data in bidirectional way</p>
<b>Prerequisites:</b>	<p>DB online and running</p> <p>WebGIS Platform running</p>
<b>Start:</b>	On user connection at <a href="http://www.net4mplastic.net">www.net4mplastic.net</a>
<b>Main Scenario.</b>	
1.	<ul style="list-style-type: none"> <li>- User load the indicated website on a web browser</li> <li>- User execute login with the credential</li> <li>- User execute logoff with logoff button</li> </ul>
<b>Conditions of Success:</b>	
1.	<p>The WebGIS main page is showing properly</p> <p>User is able to enter after the login screen in the WebGIS Platform</p> <p>User is redirected to the main login page after the logoff</p>

<b>TEST CASE:</b> T-F-WG-004	<b>Photo gallery navigation</b>
<b>Description:</b>	The user is able to navigate in the photo gallery section
<b>Related Functionalities:</b>	F-WG-004
<b>Related Sub-functionalities:</b>	NF-DB-001, NF-DB-002, NF-DB-003, NF-WG-001
<b>Primary Actor:</b>	WebGIS HMI Interface Connects to the internal WebGIS Platform scripting system that perform the necessary action to show the data and interact with the user
<b>Secondary Actors:</b>	DB Connects to the WebGIS platform scripting system and provide data in bidirectional way
<b>Prerequisites:</b>	DB online and running WebGIS Platform running User logged in the WebGIS Platform
<b>Start:</b>	Click on Photo gallery section
<b>Main Scenario.</b>	
1.	- User click on the photo gallery section of the WebGIS Platform - User scroll between the pictures
<b>Conditions of Success:</b>	
1.	User is able to properly visualize the chosen pictures without errors, bugs or glitches

<b>TEST CASE:</b> T-F-WG-005	<b>Drone-OBU Mission navigation and data retrieving</b>
<b>Description:</b>	The user is able to navigate in the drone-OBU mission section
<b>Related Functionalities:</b>	F-WG-005
<b>Related Sub-functionalities:</b>	NF-DB-001, NF-DB-002, NF-DB-003, NF-WG-001
<b>Primary Actor:</b>	WebGIS HMI Interface Connects to the internal WebGIS Platform scripting system that perform the necessary action to show the data and interact with the user
<b>Secondary Actors:</b>	DB Connects to the WebGIS platform scripting system and provide data in bidirectional way

<b>Prerequisites:</b>	DB online and running WebGIS Platform running User logged in the WebGIS Platform
<b>Start:</b>	Click on Drone-OBU mission section
<b>Main Scenario.</b>	
1.	- User click on the Drone-OBU mission section of the WebGIS Platform - User can check the map and the data of the chosen section
<b>Conditions of Success:</b>	
1.	User is able to properly visualize the chosen section, including maps, tables and xy graphs

<b>TEST CASE: T-F-WG-006</b>	<b>Data Model navigation and data retrieving</b>
<b>Description:</b>	The user is able to navigate in the Data Model section
<b>Related Functionalities:</b>	F-WG-006
<b>Related Sub-functionalities:</b>	NF-DB-001, NF-DB-002, NF-DB-003, NF-WG-001
<b>Primary Actor:</b>	WebGIS HMI Interface Connects to the internal WebGIS Platform scripting system that perform the necessary action to show the data and interact with the user
<b>Secondary Actors:</b>	DB Connects to the WebGIS platform scripting system and provide data in bidirectional way
<b>Prerequisites:</b>	DB online and running WebGIS Platform running User logged in the WebGIS Platform
<b>Start:</b>	Click on Data Model section
<b>Main Scenario.</b>	
1.	- User click on the Data Model section of the WebGIS Platform - User can check the map and the data of the chosen section
<b>Conditions of Success:</b>	
1.	User is able to properly visualize the chosen section, including maps, tables and xy graphs

<b>TEST CASE:</b> T-F-WG-007	<b>Microplastic concentration navigation and data retrieving</b>
<b>Description:</b>	The user is able to navigate in the microplastic concentration section
<b>Related Functionalities:</b>	F-WG-007
<b>Related Sub-functionalities:</b>	NF-DB-001, NF-DB-002, NF-DB-003, NF-WG-001
<b>Primary Actor:</b>	WebGIS HMI Interface Connects to the internal WebGIS Platform scripting system that perform the necessary action to show the data and interact with the user
<b>Secondary Actors:</b>	DB Connects to the WebGIS platform scripting system and provide data in bidirectional way
<b>Prerequisites:</b>	DB online and running WebGIS Platform running User logged in the WebGIS Platform
<b>Start:</b>	Click on Microplastic concentration section
<b>Main Scenario.</b>	
1.	- User click on the Microplastic concentration section (Plastic Index) of the WebGIS Platform - User can check the map of the sources and concentrations and the data of the chosen section
<b>Conditions of Success:</b>	
1.	User is able to properly visualize the chosen section, including maps, tables and xy graphs

<b>TEST CASE:</b> T-F-WG-008	<b>Lab Data Analysis navigation and data retrieving</b>
<b>Description:</b>	The user is able to navigate in the lab data analysis section
<b>Related Functionalities:</b>	F-WG-008
<b>Related Sub-functionalities:</b>	NF-DB-001, NF-DB-002, NF-DB-003, NF-WG-001
<b>Primary Actor:</b>	WebGIS HMI Interface Connects to the internal WebGIS Platform scripting system that perform the necessary action to show the data and interact with the user
<b>Secondary Actors:</b>	DB Connects to the WebGIS platform scripting system and provide data in bidirectional way
<b>Prerequisites:</b>	DB online and running WebGIS Platform running User logged in the WebGIS Platform
<b>Start:</b>	Click on Lab Data Analysis section
<b>Main Scenario.</b>	
1.	- User click on the Lab Data Analysis section of the WebGIS Platform - User can check the data in a dynamic table format of the chosen archived laboratory analysis on the left-side menu
<b>Conditions of Success:</b>	
1.	User is able to properly visualize the chosen section data

<b>TEST CASE:</b> T-F-WG-009	<b>Sea Sentinel navigation and data retrieving</b>
<b>Description:</b>	The user is able to navigate in the sea sentinel section
<b>Related Functionalities:</b>	F-WG-009
<b>Related Sub-functionalities:</b>	NF-DB-001, NF-DB-002, NF-DB-003, NF-WG-001
<b>Primary Actor:</b>	WebGIS HMI Interface Connects to the internal WebGIS Platform scripting system that perform the necessary action to show the data and interact with the user
<b>Secondary Actors:</b>	DB Connects to the WebGIS platform scripting system and provide data in bidirectional way
<b>Prerequisites:</b>	DB online and running WebGIS Platform running User logged in the WebGIS Platform
<b>Start:</b>	Click on Sea Sentinel section
<b>Main Scenario.</b>	
1.	<ul style="list-style-type: none"> <li>- User click on the chosen date range on the top left corner of the map and select the “filter” option</li> <li>- User can visualize on the map various waypoint, indicating the presence of a macro plastic picture on the pointed coordinates</li> <li>- User can press on the desired waypoint to collect additional information such as pictures, coordinates, etc.</li> </ul>
<b>Conditions of Success:</b>	
1.	User is able to properly choose a date range
2.	User is able to visualize the waypoints corresponding to macroplastic pictures
3.	User is able to click on a waypoint and visualize extra information

<b>TEST CASE:</b> T-F-WG-101	<b>General Table mode data retrieving, data visualization and csv export</b>
<b>Description:</b>	Tables are correctly populated accordingly to the expected data, correctly visualized and the csv export data button perform its functionality
<b>Related Functionalities:</b>	F-WG-101
<b>Related</b>	NF-DB-001, NF-DB-002, NF-DB-003, NF-WG-001

<b>Sub-functionalities:</b>	<i>F-WG-005, F-WG-006, F-WG-007, F-WG-008, F-WG-009</i>
<b>Primary Actor:</b>	WebGIS HMI Interface
	Connects to the internal WebGIS Platform scripting system that perform the necessary action to show the data and interact with the user
<b>Secondary Actors:</b>	DB
	Connects to the WebGIS platform scripting system and provide data in bidirectional way
<b>Prerequisites:</b>	DB online and running WebGIS Platform running User logged in the WebGIS Platform
<b>Start:</b>	Check every table mode in every section, by selecting search criteria and let the platform load the data
<b>Main Scenario.</b>	
1.	<ul style="list-style-type: none"> <li>- For every functionality <i>F-WG-005, F-WG-006, F-WG-007, F-WG-008, F-WG-009</i> user input a search criterion</li> <li>- Tables are populated</li> <li>- User press export CSV data</li> </ul>
<b>Conditions of Success:</b>	
1.	<p>User is able to visualize without errors, bugs or glitches the data in the table</p> <p>Data shown in the table are coherent with the reference tables that have been imported in the DB</p> <p>CSV file has been correctly exported and shown the same data outputted in the WebGIS platform table view</p>

<b>TEST CASE:</b> <b>T-F-WG-102</b>	<b>General Plot mode data retrieving, data visualization and csv export</b>
<b>Description:</b>	XY Plots are correctly populated accordingly to the expected data and correctly visualized
<b>Related Functionalities:</b>	F-WG-102
<b>Related Sub-functionalities:</b>	NF-DB-001, NF-DB-002, NF-DB-003, NF-WG-001 <i>F-WG-005, F-WG-006, F-WG-007, F-WG-008</i>
<b>Primary Actor:</b>	WebGIS HMI Interface
	Connects to the internal WebGIS Platform scripting system that perform the necessary action to show the data and interact with the user
<b>Secondary Actors:</b>	DB

	Connects to the WebGIS platform scripting system and provide data in bidirectional way
<b>Prerequisites:</b>	DB online and running WebGIS Platform running User logged in the WebGIS Platform
<b>Start:</b>	Check every XY Plot mode in every section, by selecting search criteria and let the platform load the data
<b>Main Scenario.</b>	
1.	<ul style="list-style-type: none"> <li>- For every functionality F-WG-005, F-WG-006, F-WG-007, F-WG-008 user input a search criterion</li> <li>- User select a point in the map that require the XY Plot</li> <li>- Plots are populated</li> </ul>
<b>Conditions of Success:</b>	
1.	User is able to visualize without errors, bugs or glitches the data in the XY Plot Data shown in the table are coherent with the reference tables that have been imported in the DB



<b>TEST CASE:</b> T-F-WG-103	<b>General Map mode data retrieving, data visualization, rastering</b>
<b>Description:</b>	General GIS maps are correctly populated accordingly to the expected data and correctly visualized, in terms of geographical referenced points with related values by clicking on them. Points are rasterized and coloured with a standard GIS gradient from green to yellows
<b>Related Functionalities:</b>	F-WG-103
<b>Related Sub-functionalities:</b>	NF-DB-001, NF-DB-002, NF-DB-003, NF-WG-001 <i>F-WG-005, F-WG-006, F-WG-007, F-WG-009</i>
<b>Primary Actor:</b>	WebGIS HMI Interface Connects to the internal WebGIS Platform scripting system that perform the necessary action to show the data and interact with the user
<b>Secondary Actors:</b>	DB Connects to the WebGIS platform scripting system and provide data in bidirectional way
<b>Prerequisites:</b>	DB online and running WebGIS Platform running User logged in the WebGIS Platform
<b>Start:</b>	Check every Map mode in every section, by selecting search criteria and let the platform load the data
<b>Main Scenario.</b>	
1.	- For every functionality F-WG-005, F-WG-006, F-WG-007, F-WG-009 user input a search criterion - Maps are populated - User can navigate inside the map and visualize the rasterized data
<b>Conditions of Success:</b>	
1.	Map is populated accordingly to the data Georeferenced points show different colours in base of the selected value Click on a point give info related to the point itself

<b>TEST CASE:</b> T-F-WG-104	<b>General Map mode full screen mode, map/satellite mode, zoom in/out, navigation and waypoint detailed info</b>
<b>Description:</b>	Normal operation such as full screen mode, map/satellite mode, zoom in/out, map navigation and waypoint detailed info are responsive
<b>Related Functionalities:</b>	F-WG-104

<b>Related Sub-functionalities:</b>	NF-DB-001, NF-DB-002, NF-DB-003, NF-WG-001 <i>F-WG-005, F-WG-006, F-WG-007, F-WG-009</i>
<b>Primary Actor:</b>	WebGIS HMI Interface Connects to the internal WebGIS Platform scripting system that perform the necessary action to show the data and interact with the user
<b>Secondary Actors:</b>	DB Connects to the WebGIS platform scripting system and provide data in bidirectional way
<b>Prerequisites:</b>	DB online and running WebGIS Platform running User logged in the WebGIS Platform
<b>Start:</b>	Populate a map in one of the sections
<b>Main Scenario.</b>	
1.	<ul style="list-style-type: none"> <li>- Toggle the Fullscreen mode</li> <li>- Check the zoom in/zoom out</li> <li>- Toggle the satellite/map mode</li> <li>- Check the waypoint detailed info</li> </ul>
<b>Conditions of Success:</b>	
1.	<ul style="list-style-type: none"> <li>Map goes Fullscreen then get back to windowed</li> <li>Map goes zoom in and zoom out accordingly</li> <li>Map goes satellite then get back to windowed</li> <li>Waypoint popup appear providing point of interest info</li> </ul>

## 4 Test Report

Here below is reported the report table of the performed test-cases, with its related result.

Test Cases	Description of the functionality to be tested	Result
<b>T-NF-DB-001</b>	Database instantiation	Passed
<b>T-NF-DB-002</b>	Automatic import procedure of the data in the Database	Passed
<b>T-NF-DB-003</b>	Database connection with the online WebGIS platform	Passed
<b>T-F-DB-004</b>	Database backup and rollback	Passed
<b>T-NF-WG-001</b>	WebGIS Platform online loading	Passed
<b>T-NF-WG-002</b>	WebGIS Platform visualization scripts (PHP) and map interpolation scripts (JavaScript) integration	Passed
<b>T-F-WG-003</b>	User Login/Logoff	Passed
<b>T-F-WG-004</b>	Photo gallery navigation	Passed
<b>T-F-WG-005</b>	Drone-OBU Mission navigation and data retrieving	Passed
<b>T-F-WG-006</b>	Data Model navigation and data retrieving	Passed
<b>T-F-WG-007</b>	Microplastic Concentration navigation and data retrieving	Passed
<b>T-F-WG-008</b>	Lab Data Analysis navigation and data retrieving	Passed
<b>T-F-WG-009</b>	Sea Sentinel navigation and data retrieving	Passed
<b>T-F-WG-101</b>	General Table mode data retrieving, data visualization and csv export	Passed
<b>T-F-WG-102</b>	General Plot mode data retrieving, data visualization	Passed
<b>T-F-WG-103</b>	General Map mode data retrieving, data visualization, rastering	Passed
<b>T-F-WG-104</b>	General Map mode Fullscreen mode, map/satellite mode, zoom in/out, navigation and waypoint detailed info.	Passed