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Danube Integrated System for MARking DISMAR

GOVERNMENT OF BULGARIA

EAEMDR Ruse

DISMAR PROJECT

STEERING COMMITTEE MEETING

LOCAȚIE: Comana, Giurgiu County

DATA: 17th July 2025

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WP 1NATIONAL PLANS FOR WATERWAY MANAGEMENT ACTIONS
D.1.3.1 – TESTING AND EVALUATION PLAN

Main scope of the Testing and Evaluation Plan:

- Assessment of the reliability and effectiveness of the integrated marking system
- Information about the number and time period for performance of the tests of the marking vessels, floating and coastal signs
- Methods for analysis of the test results

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1. FLOATING MARKING

- Buoys are designed to float on the surface of the water and provide important information to skippers.

- These floating signals are essentials for ensuring safe navigation.

- These are buoys intended for marking the edge of the fairway, technically configured for compact solar lamp mounting with built-in AIS transceiver.

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The buoys will be tested for:

- ✓ good radar visibility – to 1.6 - 1.8 km
- ✓ visual visibility – to 1.6 – 1.8 km binoculars
- ✓ vertical position at different depths – from 3 m to 10 m;
- ✓ good resistance to wind and waves;
- ✓ to be well anchored with a concrete anchor on the river bottom and a steel rope between them – in depth from 3 to 10 m.
- ✓ night visibility - navigation light will be tested from 3.5 km to be visible in good weather condition.

It should be possible to see the colour of the light at more than this distance.

All results will be recorded in a Report with an opinion and assessment.


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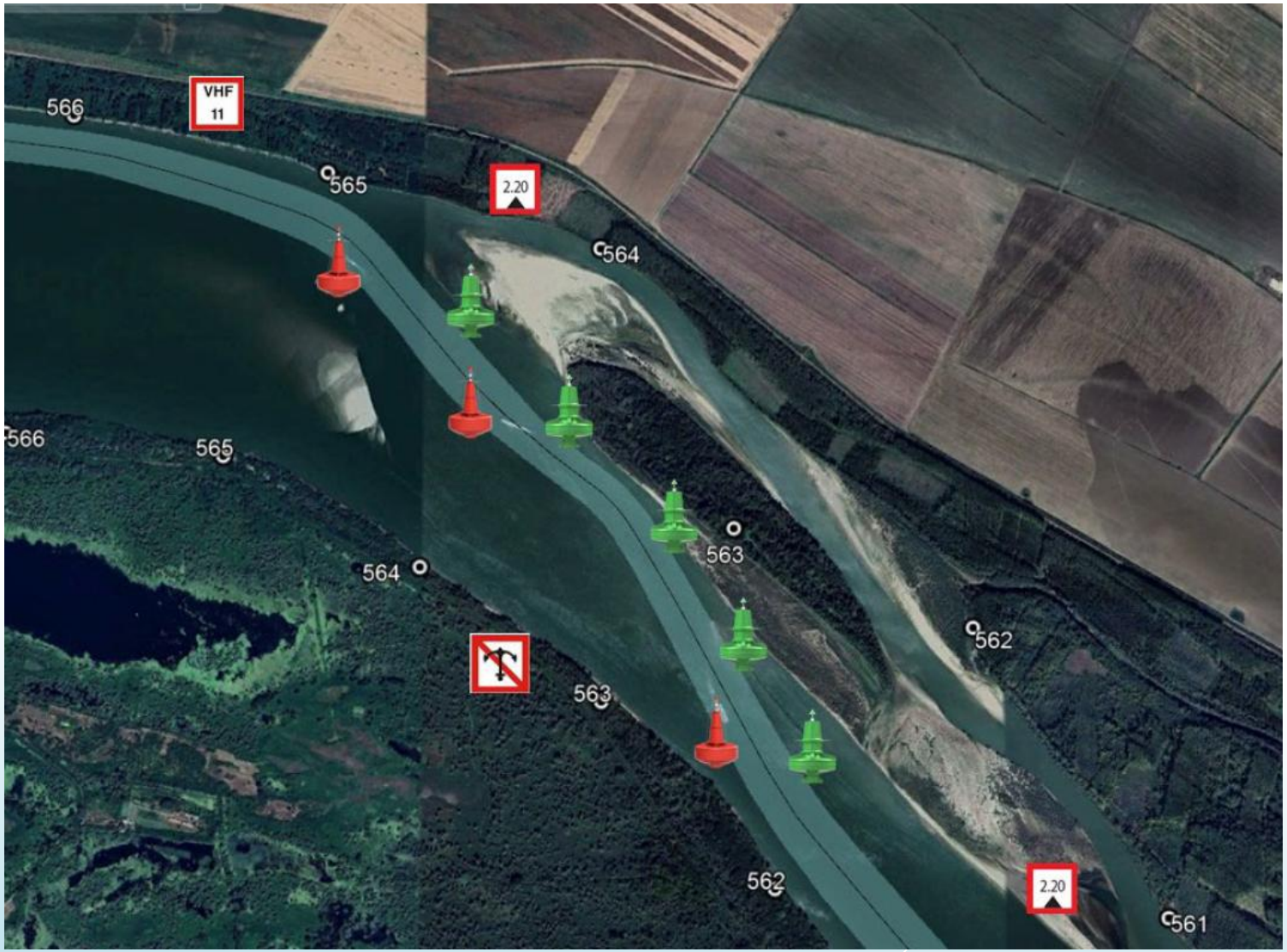
Marking the fairway



2. COASTAL MARKING

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The new coastal signs will be made with an aluminum composite panel (etalbond) plate, reinforced with a steel frame, the dimensions of the frame are in accordance with the dimensions of the etalbond plate.

A self-adhesive film will be placed on the plate, on which the figure of the respective sign is written.

Tests will be carried out to determine good visibility during the dark part of the day by illuminating it with the ship's searchlight.

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The self-adhesive film should meet the following characteristics:

- made of reflective material that ensures good visibility from all angles, at night or in low light;
- resistant to water, UV and other extreme weather conditions to ensure its long-term durability and effectiveness;
- resistant to scratching and abrasion to maintain its bright and visible appearance for a long period of time;
- visible and bright color to ensure effective and safe signaling.

The results and the assessment will be recorded in a Report.

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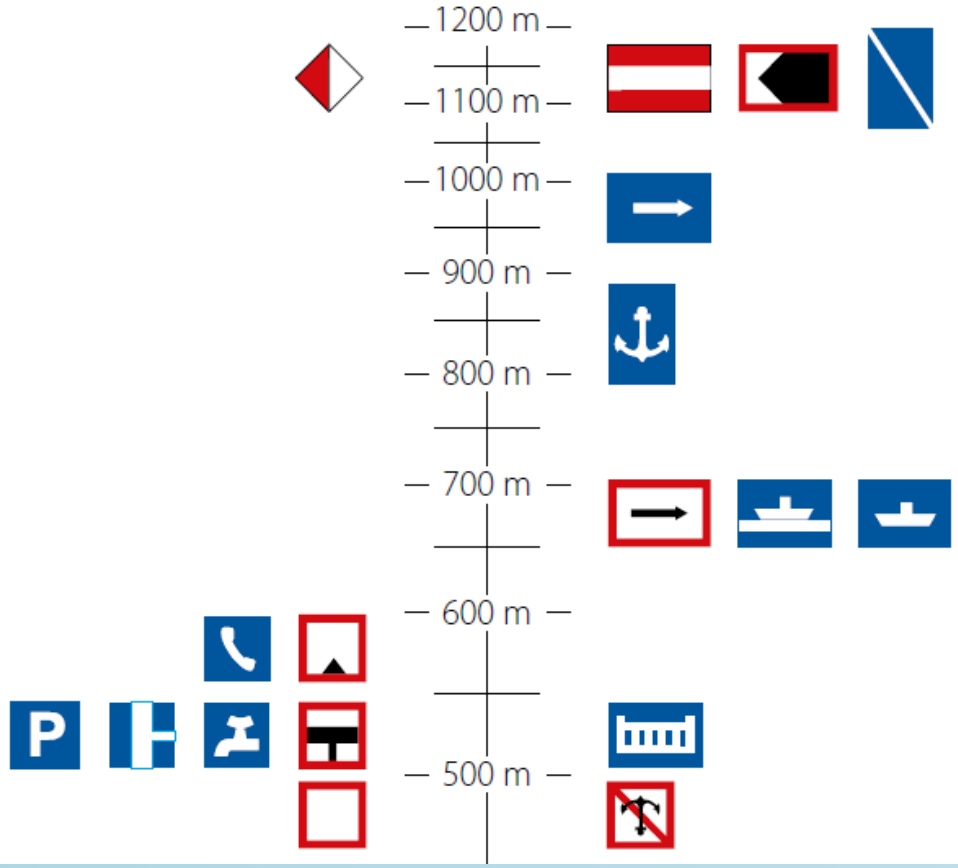
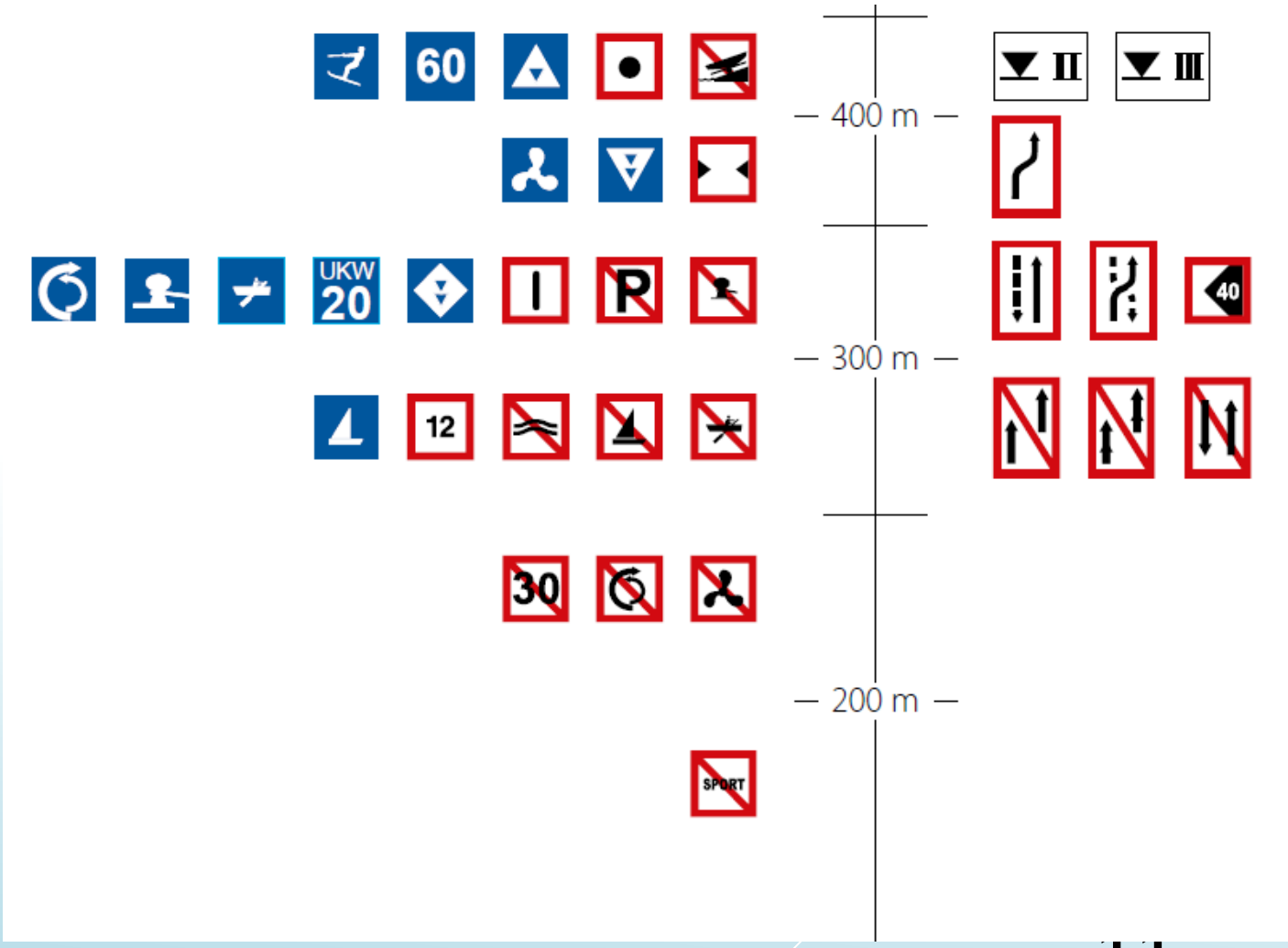
Visibility of signs, according to SIGNI





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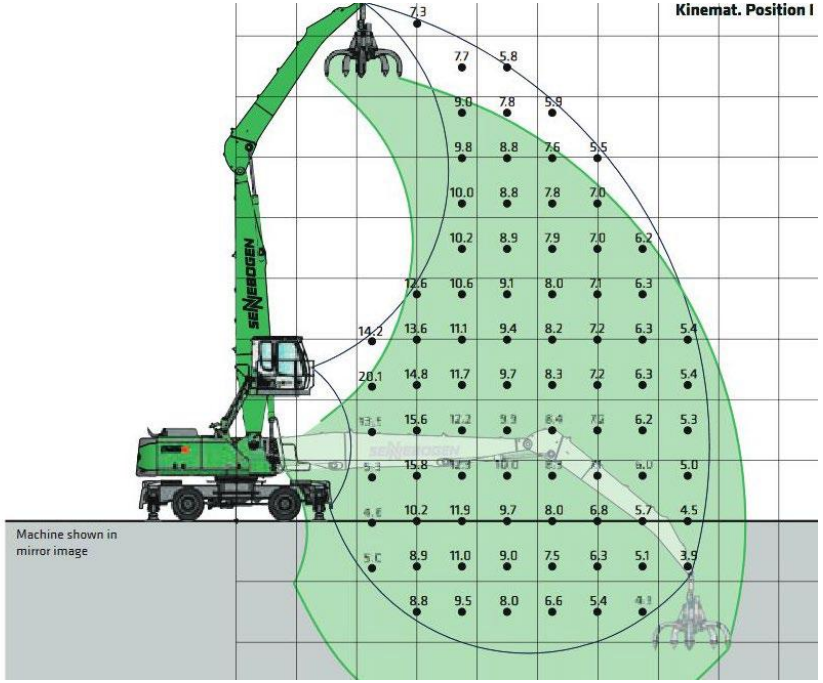
3. MARKING VESSELS



The ship will be subjected to navigation tests to verify **stability, noise and navigation parameters.**

The tests will consist of:

- Verification of ship performance: buoyancy, fixed point stability
- Checking the operation of the manipulator's hydraulic group and related installations (e.g. cooling, fuel, electrical, etc.);
- Checking the operation of the hydraulic system, hydraulic unit, distribution and winches;
- Checking the level of pollutants and noise at different points on the ship;
- Checking the functionality of all equipment on board the ship

- The stability test will be carried out with the ship fully equipped;
- Noise and navigation tests;
- Coastal signalization mounting test consisting of: preparatory work for mounting coastal signals (e.g.: clearing vegetation, etc.); drilling in natural shore; excavation; vibrating signal posts; preparing and pouring concrete in the post pit; pulling out posts, etc.)
- Leakage test of covers, metal doors, etc.

Report will be drawn up and an assessment will be made of the vessel's functionality to perform the activity.

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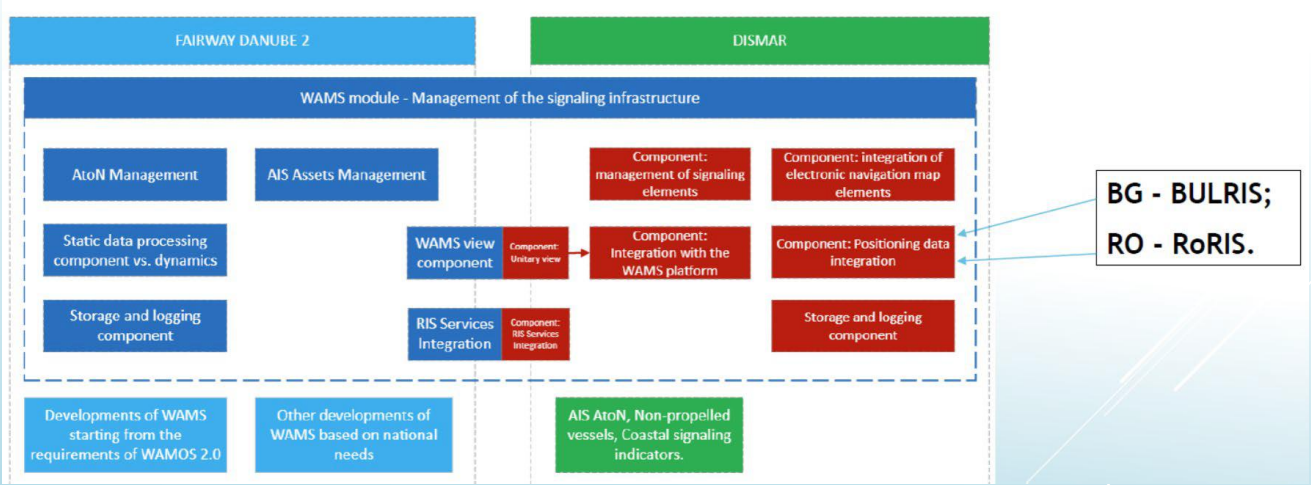
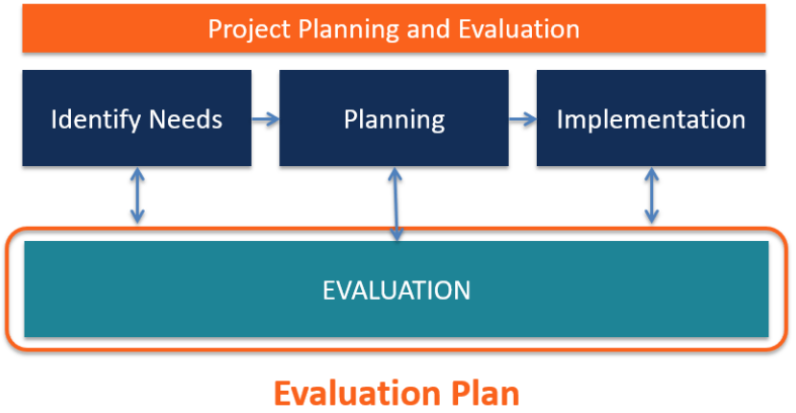
4. IT PLATFORM





The **test and evaluation plan** for the **integrated marking system**, includes **AIS-equipped marking buoys** and a **dedicated IT software platform**.

The purpose of this plan is to verify that all system components work, as expected, and meet both **functional** and **integration** requirements:

- Functionality (1), (2);
- Integration;
- Audit and Permission;
- Performance;
- External System Validation (AIS / ECDIS) (Buoys Perspective).

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Functional Testing (1)

Module	Functionality	Test Objective / Expected Outcome
Table View Markings	View details, Go-to map, Export, Add/Edit/Delete, Filter	Data is correctly displayed, filtered, and manipulated
Map View Markings	View on map, Geometry edit, Add/Edit/Delete, Filter	Geometric elements behave as expected and are saved correctly
Marking Management	Add, Edit, Remove marking elements	Markings are created, modified, and deleted successfully
Reports (Alarms)	List view, Add/Edit/Delete, Correlate with markings/damages	Reports can be created and linked to relevant elements

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Functional Testing (2)

Module	Functionality	Test Objective / Expected Outcome
Damage Management	List and link to reports or repairs	Damage reports reflect real-time correlation and visibility
Repair Management	Add/Edit/Delete, Link to damages/markings	Repair logs are properly recorded and associated
AIS AtoN Monitoring	Display and monitor MMSI data from Message 21	AIS data (type, position, ID) is received, parsed, and visualized
Lists Management	Manage static data (Signs, Standards, Ports, Sections, etc.)	List values are editable and consistent across modules

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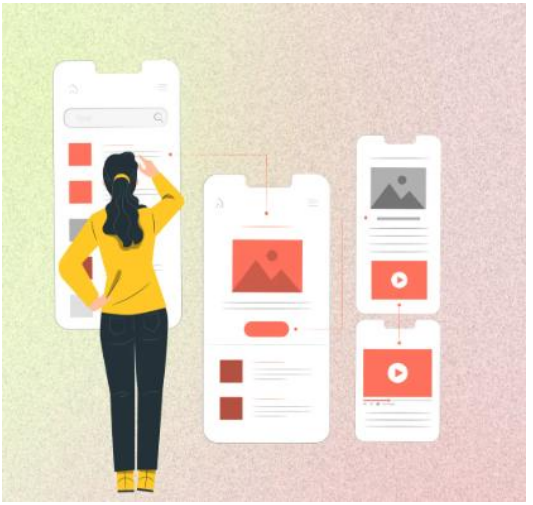
Integration

- Module Interactions: Ensure that linked elements across modules (e.g., markings with reports, reports with repairs) function seamlessly;
- Database Integration: Validate data flow between UI and backend storage (create, update, delete);
- Map and Geometry Handling: Verify that spatial components sync between table and map views;
- Export/Import: Test the Excel export/import consistency (where applicable).

Audit and Permission



Role-Based Access: Confirm that different user roles have appropriate access to each feature;

Audit Trail: Verify that key actions are logged correctly.

Performance testing

Table Load Time: Test loading behavior with real life records;

Map Interaction Speed: Measure latency when zooming, selecting, or editing geometry;

Filtering and Search Speed: Confirm responsive behavior for filters and search combinations.

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External System Validation (AIS / ECDIS) (Buoys Perspective)

Test Objective	Expected Outcome
AIS Transmission	Confirmation that the buoy correctly transmits via AIS (Message 21)
Visibility	The buoy appears on an external ECDIS system (tested on a vessel or shore-system)
Transmitted Data	Validation of position, MMSI number, AtoN type, etc.
Accuracy	Confirmation that the transmitted position matches the one in the platform(installation position)
AIS updates frequency test	ECDIS refreshes and updates buoy position in near real-time (according to the frequency of AtoN messages)

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CONCLUSION

Testing and evaluation Plan for Integrated Marking System:

- Would like to evaluate the improvement of navigations conditions by new **Integrated Marking System**;
  - The improvement of works inside of **DISMAR projects** (**AFDJ and EAEMDR**);
  - VTS systems from **Romania (RoRIS)** and **Bulgaria (BulRIS),** improvements;
  - **Stakeholders, point of view**, about new Integrated Marking Systems;

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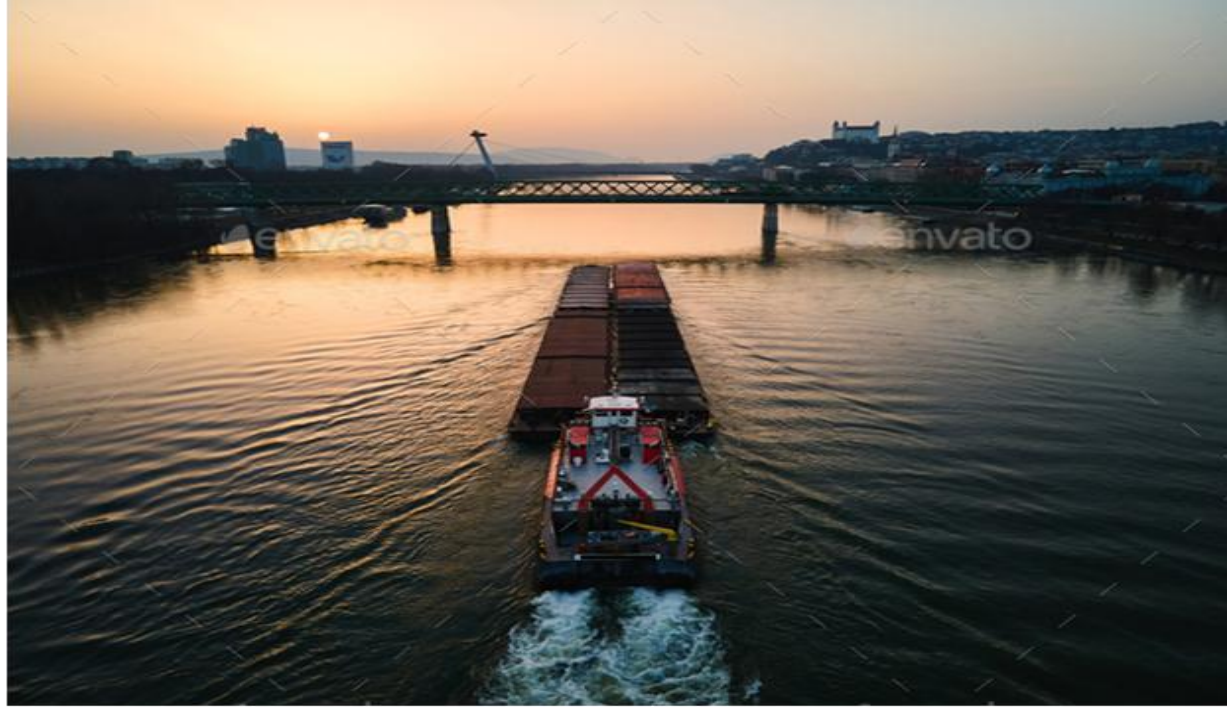
THANK YOU FOR YOUR ATTENTION!



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AFDJ Galati Team

IAPPD Ruse Team

EAEMDR Ruse