



Port Waters Environmental Monitoring – TREASURE WP3

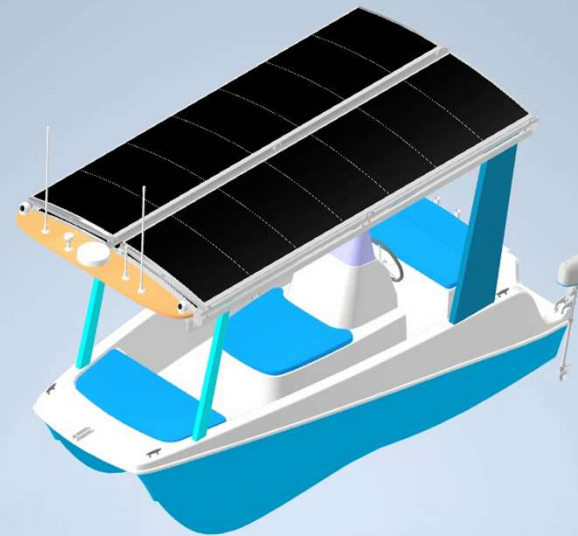


First operations



ASV Autonomous Surface Vehicle and TOWFISH

AUTONOMOUS
BOAT
AND UNDERWATER
VEHICLES IN TWIN
COORDINATED
NAVIGATION



WHAT WE HAVE REACHED?

1

AUV multiple
functionality
and sizes.
Sensor and
measurement
own design



2
ASV

autonomous
Surface vehicle
Non stop
operation
capabilities

3

AUV ASV in
Twin operation

4

Expandable to
new features
and port
demands



Standard PORT WATER MONITORING Main problems



Single point measuring

- Fixed moorings
- Navigation obstacle
- No control of all area of the port water conditions

Intensive port traffic

- Avoid permanent operation of water sampling
- Difficult online coordination

Manual survey costly and inefficient

- Manual sampling. Costly and non effective

No real time

- No real time results
- Poor reaction capabilities
- Direct human intervention, Costly and inefficient

FOUR STEPS FOR A QUICK REACTION



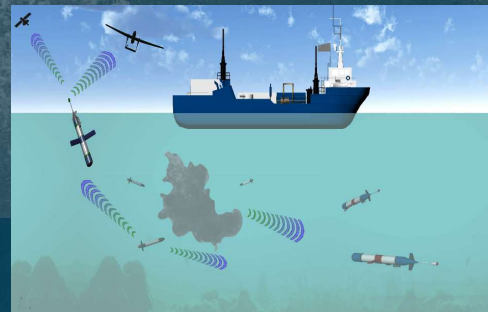
EARLY DETECTION

- Multiple vehicle operation
- Multisensor
- Self harvesting energy
- Flexible and reactive



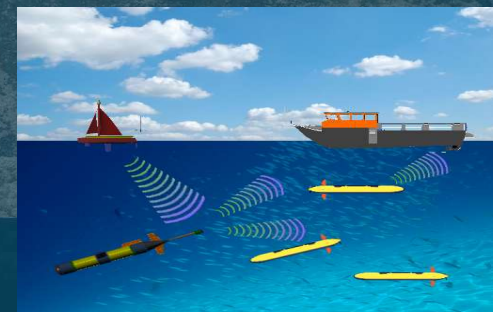
PROBLEM EXTENSION IDENTIFICATION

- Triple layer for safe navigation control.
- Obstacle avoidance based on IA.
- Connected to port traffic control



WARNING SIGNAL AND COORDINATION

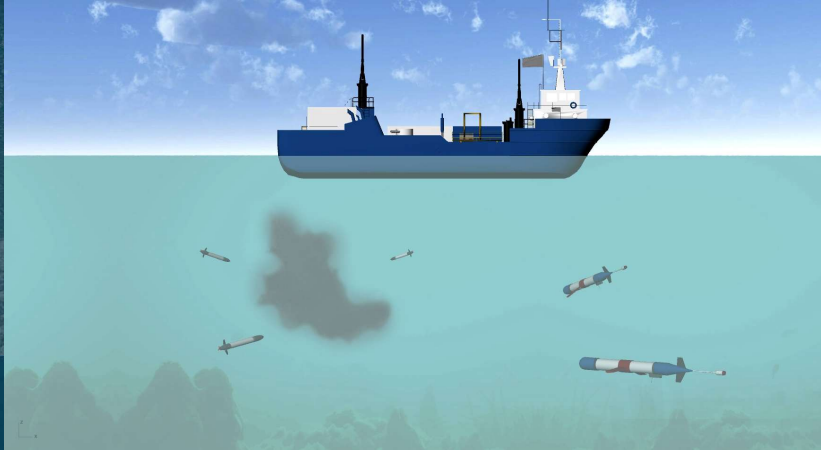
- Autonomous navigation
- WIFI, 5G satellite encrypted secure link.
- Shore station control



REMEDICATION AND COOPERATION

- Triple source of energy, Sustainable sources
- Total remote control and monitoring

PORT WATER MONITORING Proposal solution



Multiple point 3D measuring

- Multiple vehicle operation
- Multisensor
- Self harvesting energy
- Flexible and reactive

Adaptative to port traffic schedule

- Triple layer for safe navigation control.
- Obstacle avoidance based on IA.
- Connected to port traffic control

Autonomous and safe self reactive survey system

- Autonomous navigation
- WIFI, 5G satelikte encrypted secure link.

Real time data 24/7 availability

- Triple source of energy, Sustainable sources
- Total remote control and monitoring

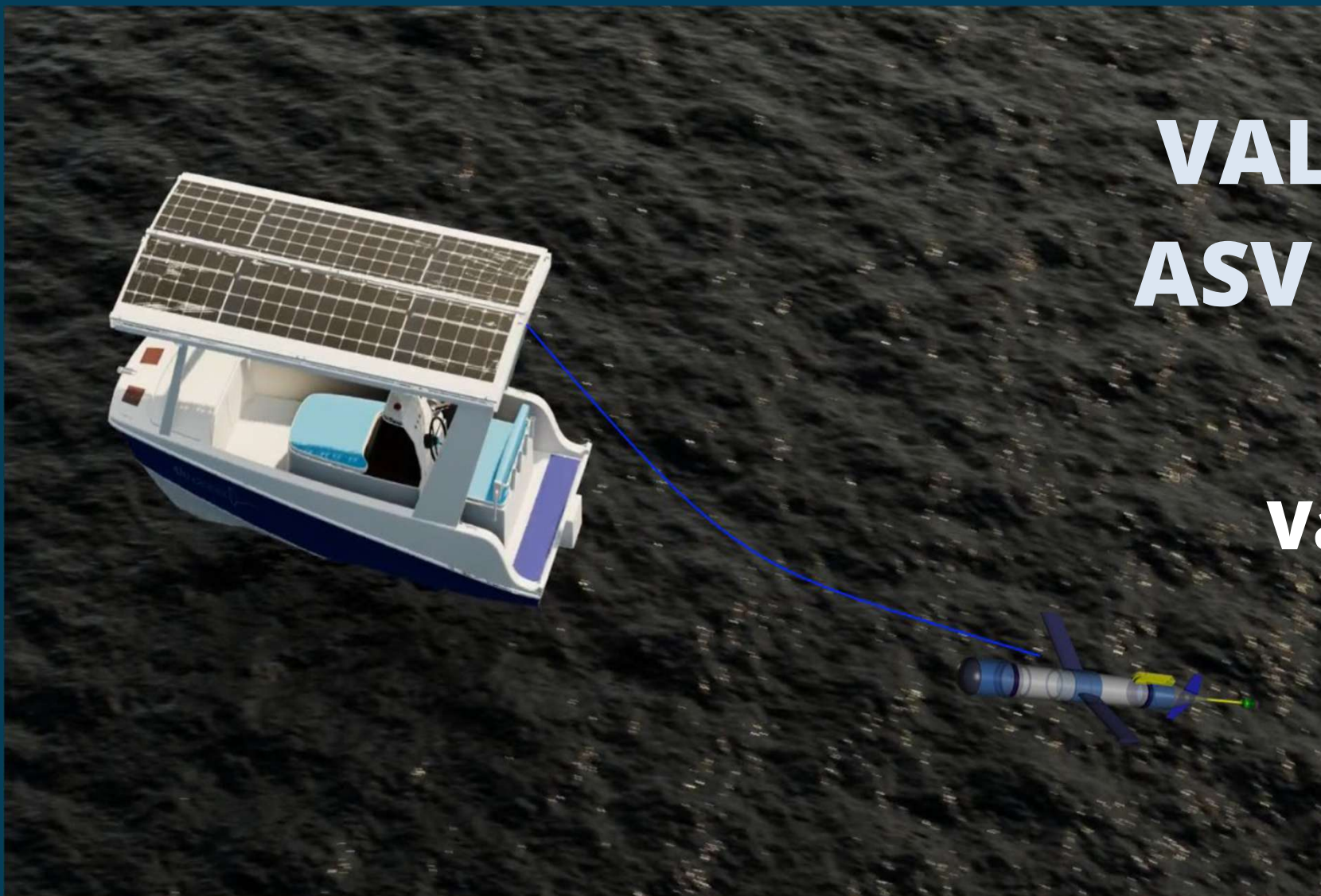


VALIDATION ASV and AUV

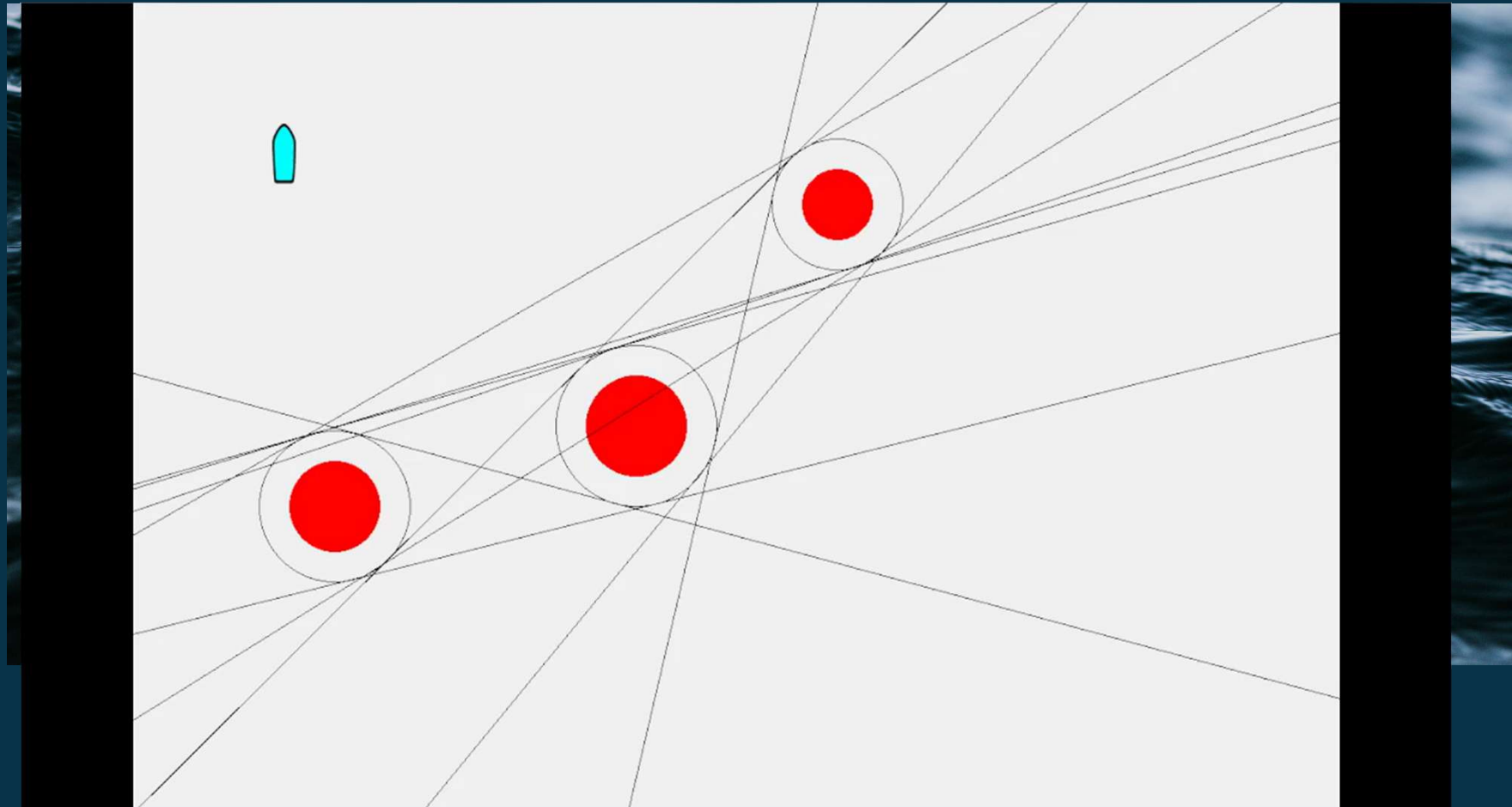
Real tests

Valencia Port

DEC-25

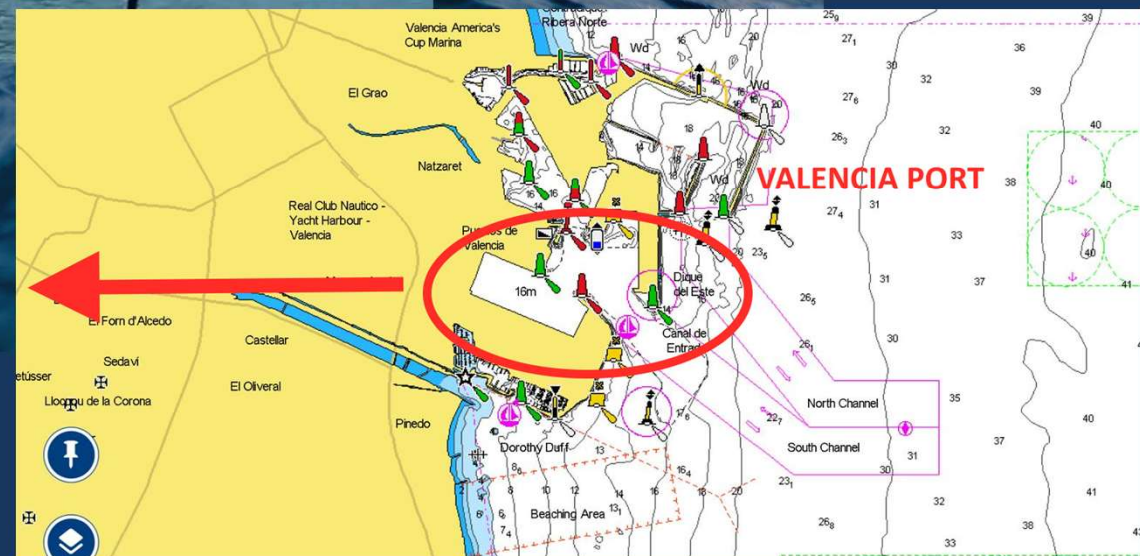


ACO real time multi sensor based obstacle avoidance protocol





FIRST TEST
1/12/2025
Equipment,
navigation and Port
control coordination
validation test.



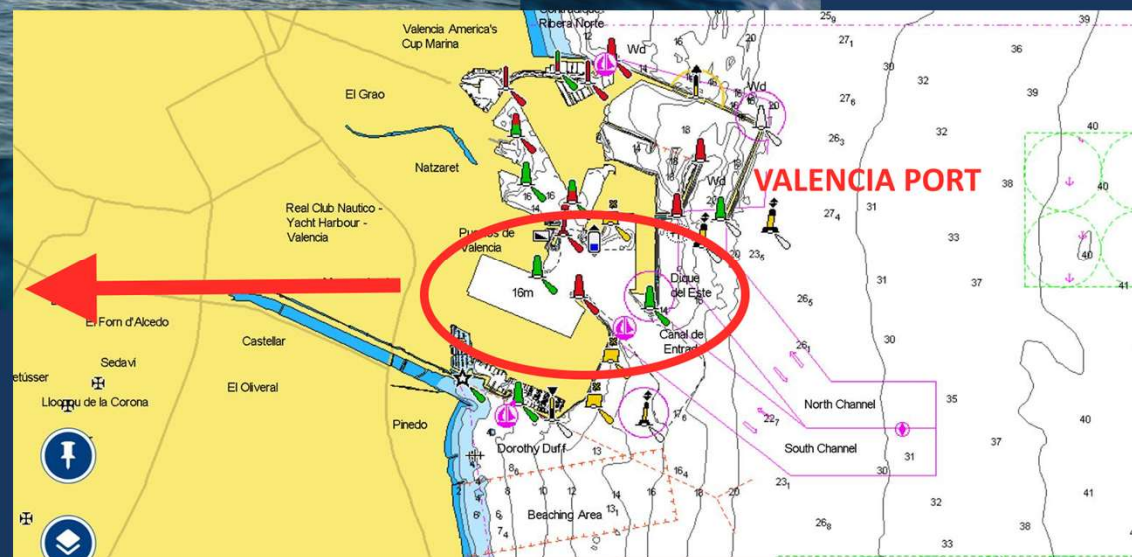
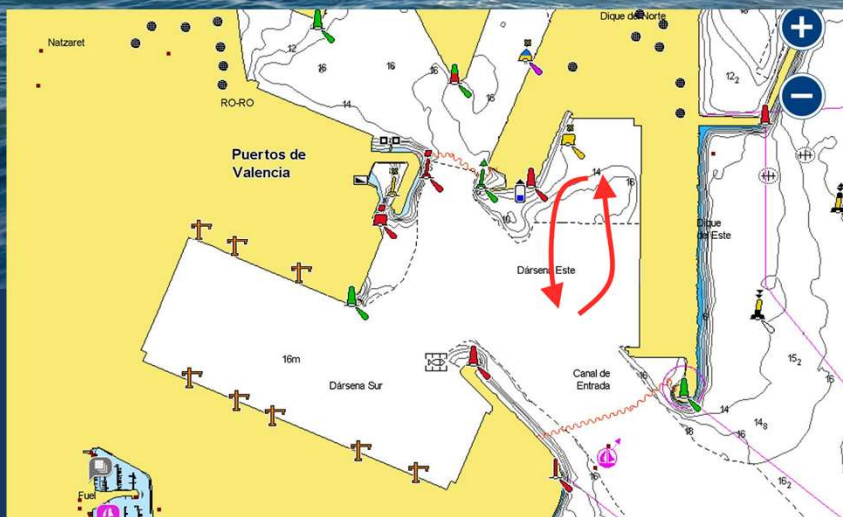


SECOND TEST FIRST SURVEY

9/12/2025

Sampling for offline
análisis pending of lab
validation.

Hybrid ships no
emissions



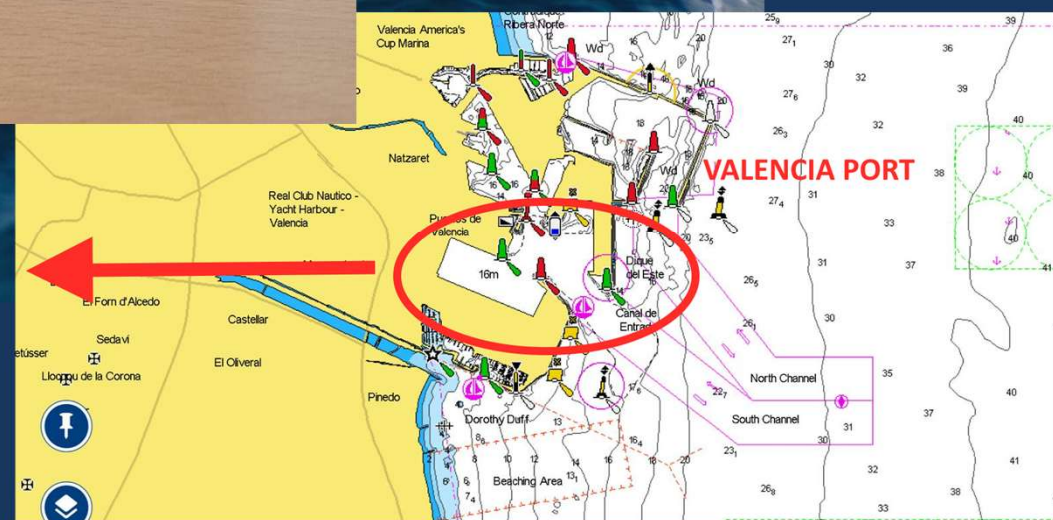
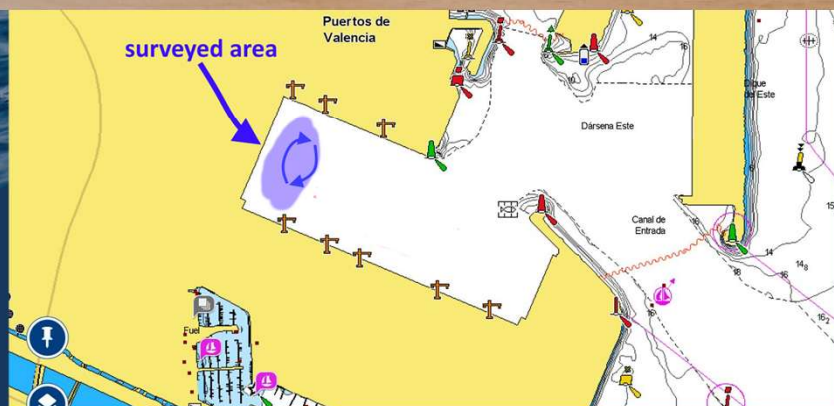
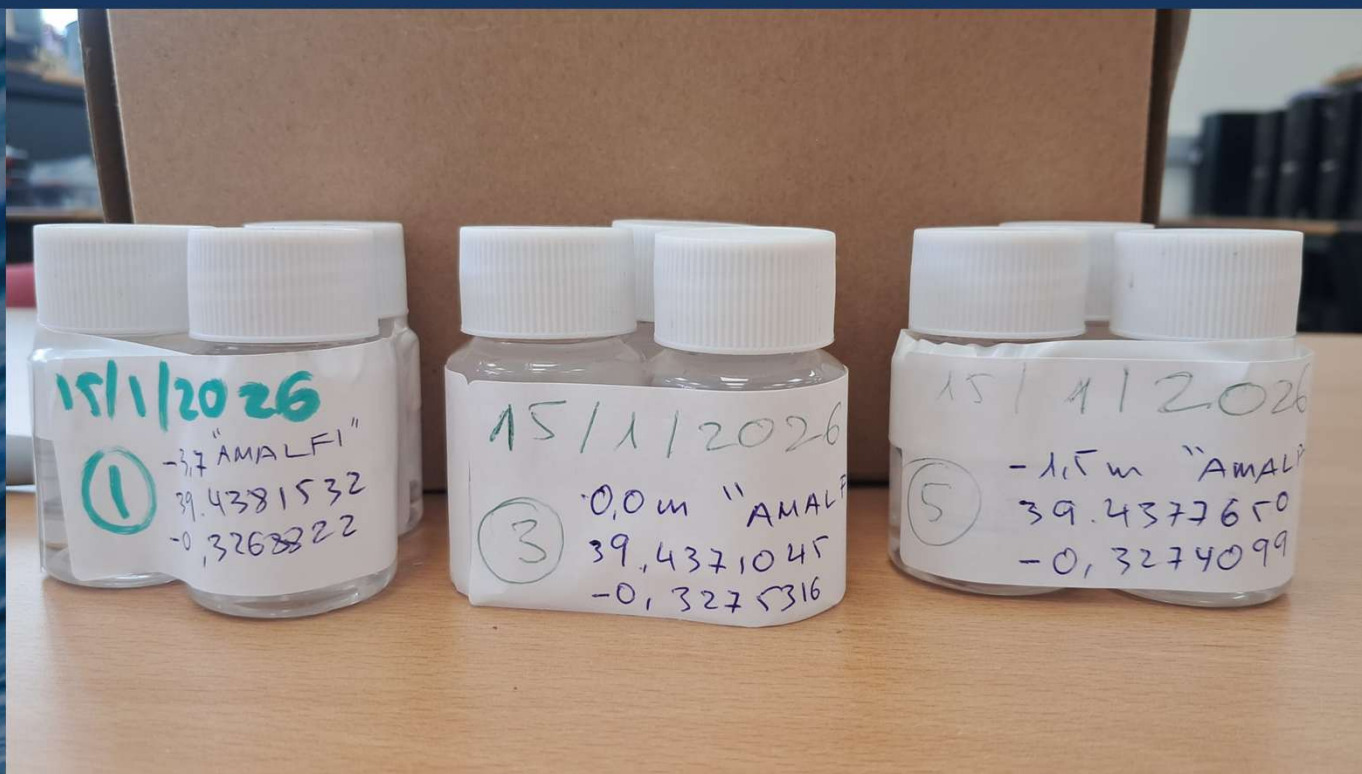


THIRD TEST SURVEY AND SAMPLING 15/1/2026

Night navigation in the port area
for validation during low ship
traffic periods



Effective sampling
Validation of night operation
Real measurement and Water
sampling. Pending of lab results





THIRD TEST SURVEY AND SAMPLING 15/1/2026

Ph and tem on line, rest pof
parameters laboratory offline
analysis

PH: FROM 7,40 TO 7,70

TEMP FROM 14,1° TO 14,4°

External wáter temp (port entrance 13,7 °, Waters coming from
outside port)

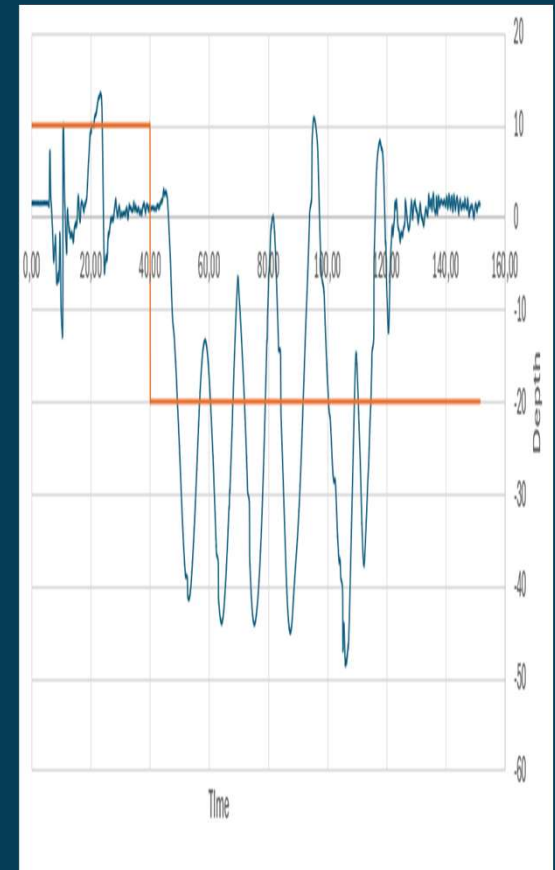
PENDING OF LAB ANALYSIS:

Polycyclic Aromatic Hydrocarbons (PHA – PAHphe)

Nitrates (NO₃-)

Sulphate Compounds (Na₂SO₄, CaSO₄, HCl, H₂SO₄)

AUV Dive control test for simultaneous tow-fish and autonomous sampling



Bidding confirmation Sept 17th, 2025



TREASURE

Interreg
Euro-MED



Co-funded by
the European Union

**TREASURE - Testing novel environmental quality
measures in ports**

Port Waters Environmental Monitoring – TREASURE WP3

EMPRESA ADJUDICATARIA

MARINE SYSTEMS AND ROBOTICS SLNE

DELIVERABLE D1

Parameters to measure

Parameters		
pH	<u>Hig</u> rate	En <u>tiempo</u> real *
Temperature	<u>Hig</u> rate	En <u>tiempo</u> real *
Turbidity	<u>Hig</u> rate	En <u>tiempo</u> real *
<u>Polycyclic Aromatic Hydrocarbons (PHA – PAHphe)</u>	Lapse/programmed triggered Sample	De <u>muestra</u> . <u>Off line</u>
Sulphate Compounds (Na_2SO_4 , <u>CaSO_4</u> , HCl, H_2SO_4)	Lapse/programmed triggered Sample	De <u>muestra</u> . <u>Off line</u>

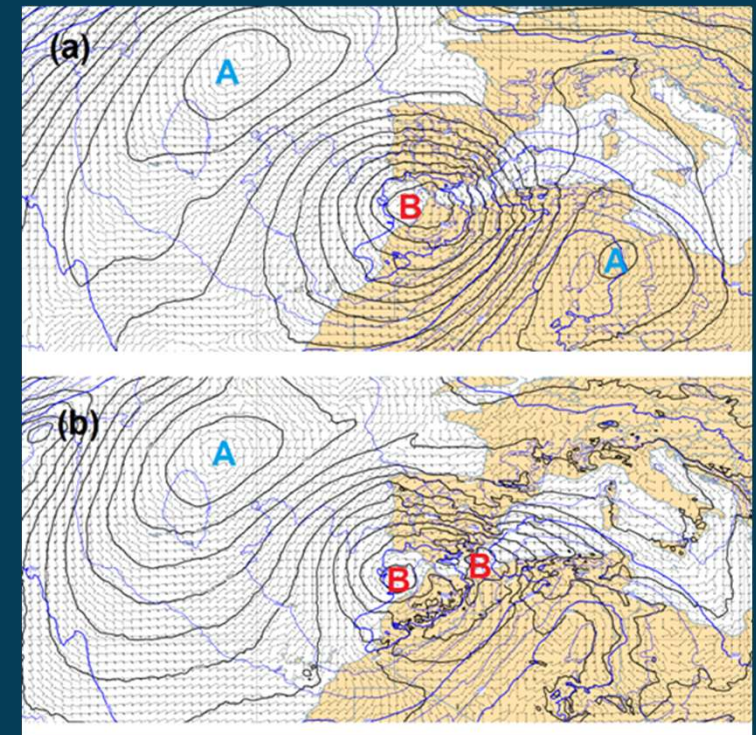
Initial previsional plan

Month	Deliverables	Activity
Sept/Oct 2025	- M1: Campaign 1,	Sampling Campaign 1
Oct 2025	M2-M5: Campaigns 2-5	Sampling Campaign 2
Nov 2025	M2-M5: Campaigns 2-5	Sampling Campaign 3
Dec 2025	M2-M5: Campaigns 2-5	Sampling Campaign 4
Ene 2026	M2-M5: Campaigns 2-5	Sampling Campaign 5
Feb 2026	M6: campaign 6	Sampling Campaign 6
Mar 2026	M7-M10: Campaigns 7-10	Sampling Campaign 7
Abril 2026	M7-M10: Campaigns 7-10	Sampling Campaign 8
May 2026	M7-M10: Campaigns 7-10	Sampling Campaign 9
Jun 2026	M7-M10: Campaigns 7-10	Sampling Campaign 10
Jul 2026	M11: Final campaign 1	Extended availability period for delays/incidents
Ago 2026	M12: RESERVE Final campaign 2	Extended availability period for delays/incidents

A total of 17 DANA and severe storms in the Valencia area in the 2025-26 season, and counting



Nombre	Tipo	Fecha de nombramiento	Servicio Met. que puso el nombre	Estudio del episodio
Alice	Dana	7 octubre 2025	AEMET	Dana Alice
Benjamin	Borrasca	22 octubre 2025	MÉTÉO-FRANCE	Borrasca Benjamin
Claudia	Borrasca	10 noviembre 2025	AEMET	Borrasca Claudia
Davide	Borrasca	5 diciembre 2025	MÉTÉO-FRANCE	Borrasca Davide
Emilia	Borrasca	11 diciembre 2025	AEMET	Borrasca Emilia
Francis	Borrasca	29 diciembre 2025	IPMA	Borrasca Francis
Goretti	Borrasca	6 enero 2026	MÉTÉO-FRANCE	Borrasca Goretti
Harry	Borrasca	16 enero 2026	AEMET	Borrasca Harry
Ingrid	Borrasca	20 enero 2026	IPMA	Borrasca Ingrid
Joseph	Borrasca	25 enero 2026	IPMA	Borrasca Joseph
Kristin	Borrasca	27 enero 2026	IPMA	Borrasca Kristin
Leonardo	Borrasca	2 febrero 2026	IPMA	Borrasca Leonardo
Marta	Borrasca	5 febrero 2026	IPMA	Borrasca Marta
Nils	Borrasca	10 febrero 2026	MÉTÉO-FRANCE	Borrasca Nils
Oriana	Borrasca	11 febrero 2026	AEMET	Borrasca Oriana
Pedro	Borrasca	17 febrero 2026	MÉTÉO-FRANCE	Borrasca Pedro
Regina	Borrasca	1 marzo 2026	IPMA	Borrasca Regina
Samuel	Borrasca	15 marzo 2026	SERVEI METEOROLÒGIC NACIONAL	
Therese	Borrasca	16 marzo 2026	IPMA	
Vitor				
Wilma				



New plan, based in tempests effect

Month	Deliverables	Activity	
Sept/Oct 2025	- M1: Campaign 1,	Sampling Campaign 1	Done Pending of lab results
Oct 2025	M2-M5: Campaigns 2-5	Sampling Campaign 2	
Nov 2025	M2-M5: Campaigns 2-5	Sampling Campaign 3	
Dec 2025	M2-M5: Campaigns 2-5	Sampling Campaign 4	In progress
Ene 2026	M2-M5: Campaigns 2-5	Sampling Campaign 5	
Feb 2026	M6: campaign 6	Sampling Campaign 6	
Mar 2026	M7-M10: Campaigns 7-10	Sampling Campaign 7	
Abril 2026	M7-M10: Campaigns 7-10	Sampling Campaign 8	
May 2026	M7-M10: Campaigns 7-10	Sampling Campaign 9	
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Port of Valencia, sedimentary intrusion after tempest event



CONCLUSIONS

- 1. Totally atypical fall and winter seasons 2025-26 in Valencia has been extremely difficult for sailing and sampling.**
- 2. Port situation very close of the Turia River mouth, requires some days of latency for allowing sediments, inland pollutants and inland fresh water to dissipate after each tempest event**
- 3. Some samples (three campaigns) has been conducted until now wich has validated the system**
- 4. POSITIVE, the demonstrated capability of sampling even AT A DAILY RATE, guarantees the conclusion of the original timetable plan on time**

**Thank you very much for
your attention!**



Questions ?

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