



Hellenic Research Fleet: Reconstruction & Modernazisation of the Research Vessel PHILIA

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Scientific Team

HCMR in collaboration with the School of Shipbuilding and Mechanical Engineering of the NTUA set the specifications of the competition. Supervision of the project:

HCMR in collaboration with NTUA

HCMR

- Dr. A. Machias
- Prof. S. Mavrakos
- As. Prof. Th. Mazarakos
- Dr. D. Sakellariou
- Dr. G. Rousakis
- Dr. S. Somarakis
- Dr. M. Tsapakis
- Dr. M. Giannoulaki
- Dr. S. Psarra
- Dr. N. Lampadariou
- Dr. K. Tsangarakis
- MSc Z. Kapelonis
- MSc M. Maniopoulou

NTUA

- Prof. M. Samouilidis
- Prof. G. Zarafonitis
- As. Prof. N. P. Ventikos
- Prof. G. Zambiras
- ΕΔΙΠ G. Katsaounis
- PhD candidates and external collaborators

MATCO LTD

Mr. N. Theodoropoulos

Supervising company of the
reconstruction of the R/V PHILIA

Identity of the project

- The project "Greek Research Fleet - Reconstruction of the Research Vessel PHILIA" (REPHIL) is funded by the Operational Program (OP) "Competitiveness Entrepreneurship and Innovation" (NSRF) Period 2014 - 2020, from the Regions of Crete, Attica and South Aegean co-financed by the European Regional Development Fund (ERDF)
- The project is completed in 30/06/22 and the total budget amounts to € 3,133,006.38

Actions of the project

1. Extension and modernization of the RV, capacity increase of research and operational spaces
2. Modernization of the shipping and the operational equipment R /V PHILIA
3. Greek research fleet: Modern scientific equipment for all research vessels (Philia, Aegeo, Alkyon)
4. Execute partners' research programs
5. Use of the modernized vessel by third parties
6. Infrastructure promotion actions

Identity of the project

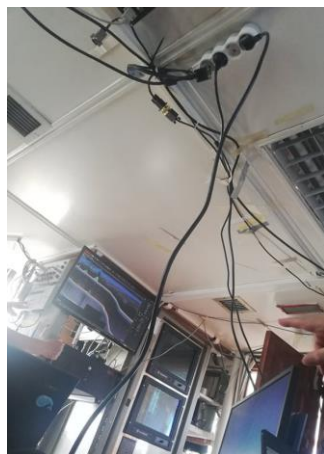


The R/V PHILIA

1. Extension and Modernization

- Extension of the vessel: increase of operational spaces, new cabins added - increase of scientific staff onboard
- Capacity increase of laboratory and electronic spaces
- Modernization and renovation of the infrastructure

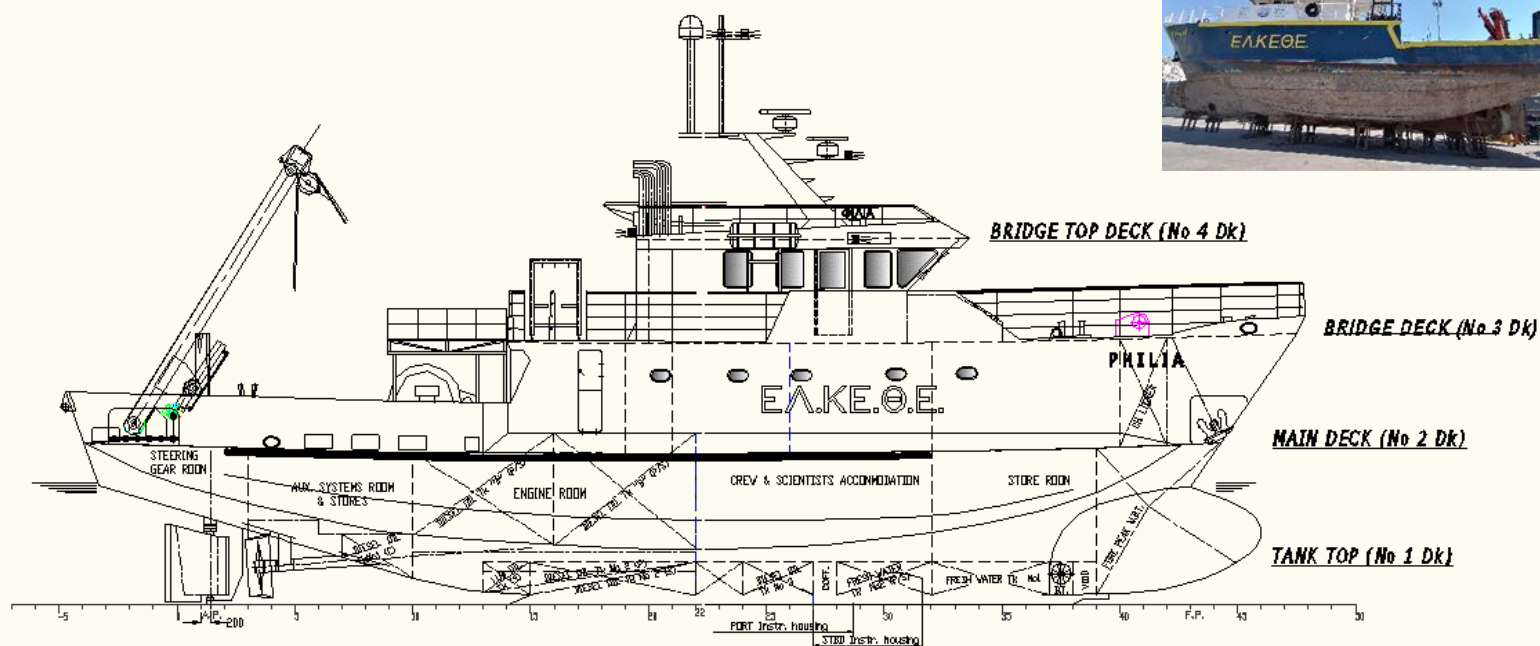
BEFORE



AFTER

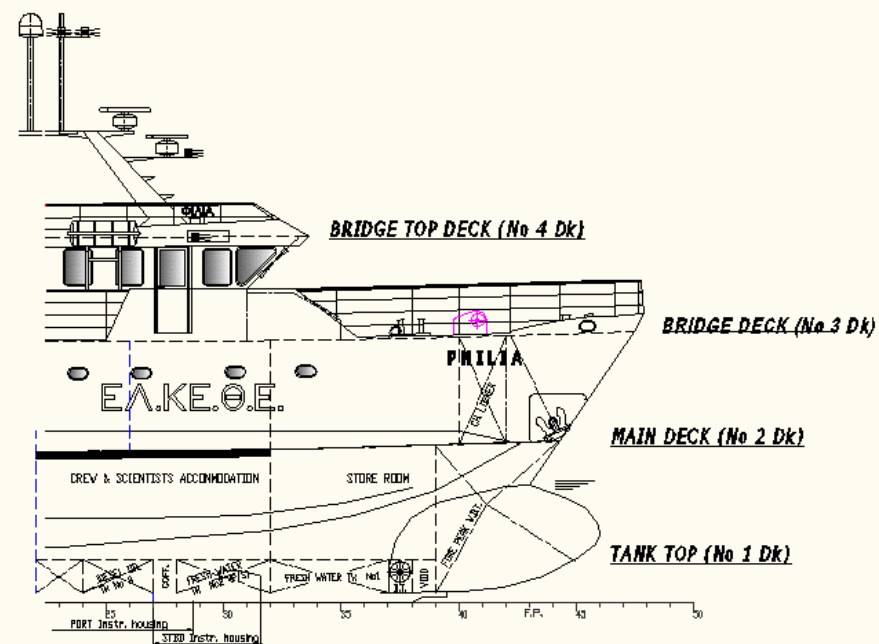
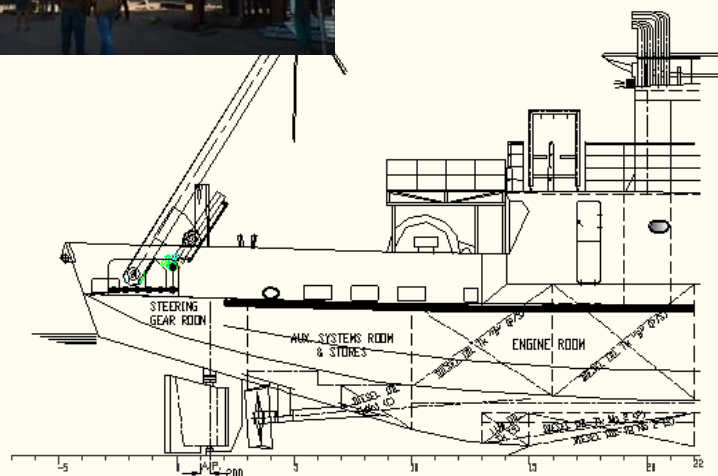


Extension & Modernization



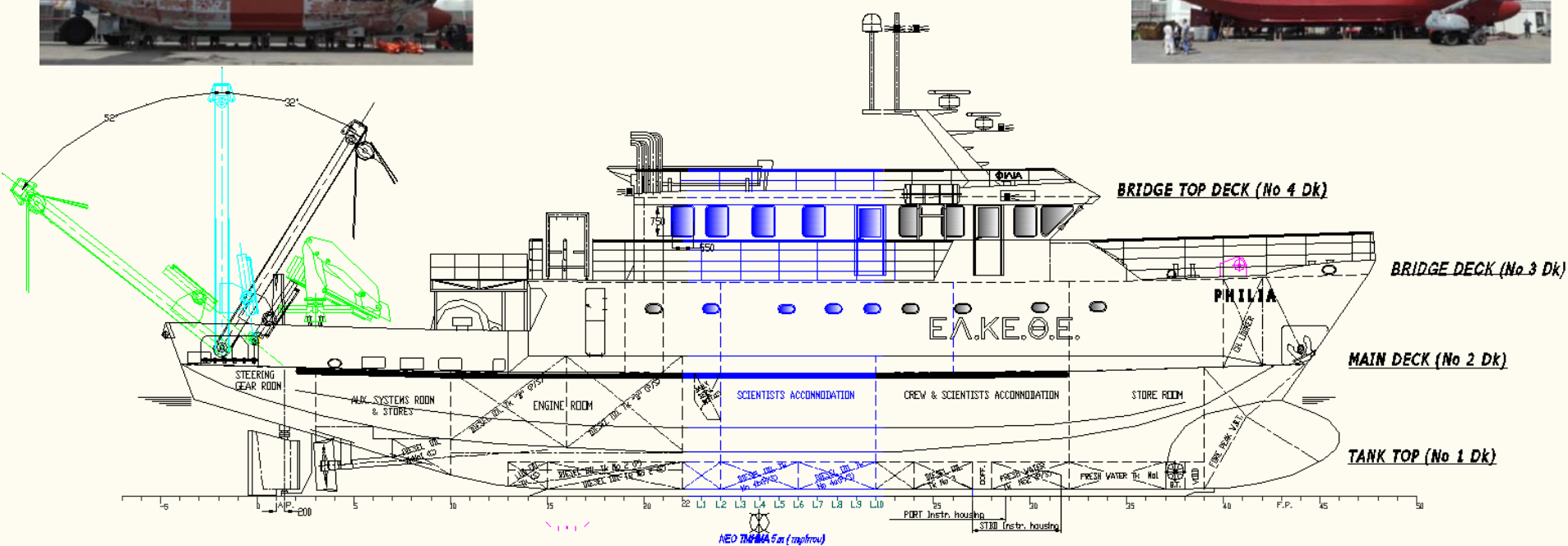
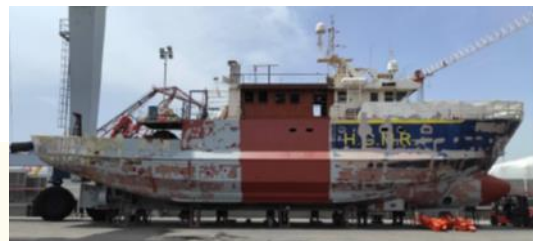
Previous Layout of the Research Vessel PHILIA

Extension & Modernization



Bifurcation of the R/V PHILIA

Extension & Modernization



Extension of the R/V PHILIA

Extension & Modernization (in a nutshell)

	BEFORE	AFTER
Date of (re) construction	1986	2021
Length	26.10 m	31.00 m
Breadth moulded	7.25 m	7.25 m
Max draught	3.20 m	3.20 m
Draught	2.57 m	2.60 m
GRT	143 grt	186 grt
DWT	45.70 M/T	67.7 M/T
Cabins	7 (13 pers.)	10 (19 pers)
3 Labs	32m2	54m2

2. Modernization of shipping equipment

- Radar
- Auto pilot
- Satellite broadband connection
- Sounders
- Electronic maps
- Compasses (magnetic - gyroscopic)
- Electronic machine control systems
- A - Frame
- Generators
- Navigation controls
- Immersion and drag controls
- Polyconic system for mapping and catch detection



Before



After



3. Greek Research Fleet: Research Equipment

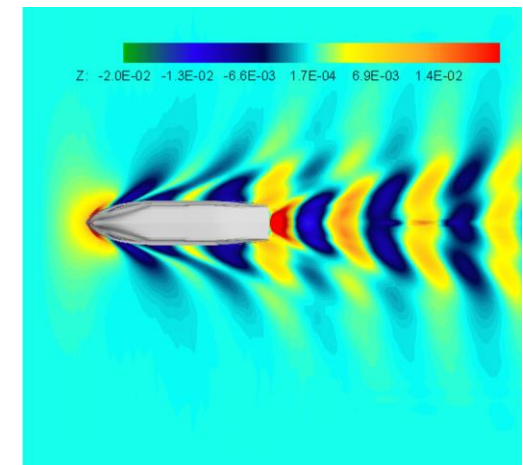
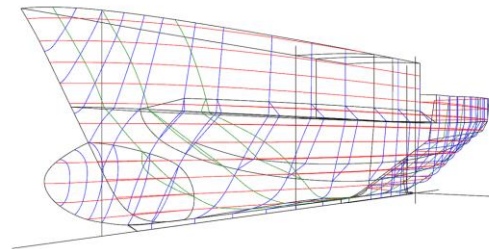
- **Multi beam:** installation of the R/V Aegeo
 - Improving geological research, carbohydrates, mapping
- **Rossette:** For use by all 3 R/V (Philia, Aegeo, Alkyon)
 - Improving ecological and biological research, plankton sampling and abiotic parameters
- **CTD:** Use from the 3 R/V (Philia, Aegeo, Alkyon)
 - Permitting measurements of abiotic parameters in the water column over greater depths



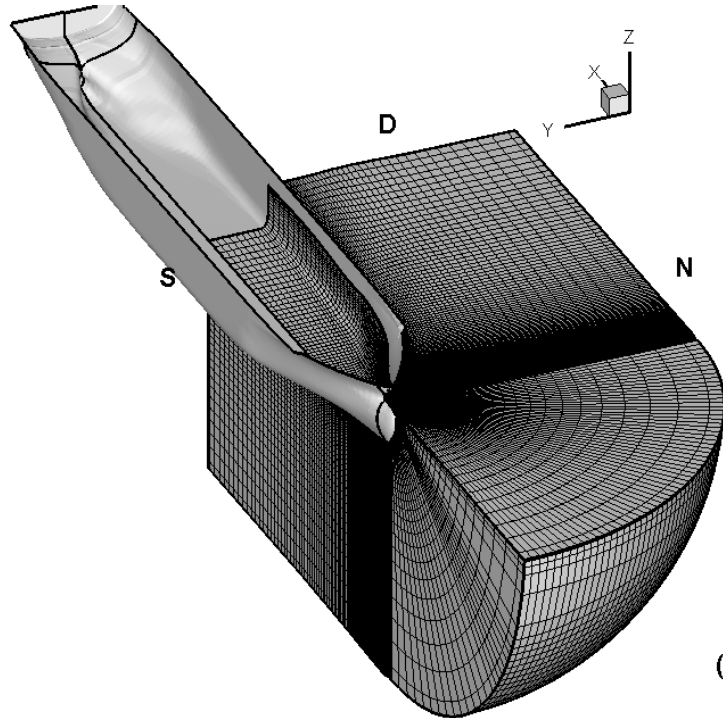
4. Partners' Research Actions

Within the framework of the project, partners (HCMR & NTUA) will use the modernized vessel and its equipment for the conduction of:

- **Study for the evaluation of the conversion efficiency,** measurements in real sea conditions, study of vibrations (NTUA)
- **Hydrodynamic studies:** Speed, power and motion tests in real sea states. 3D Geometric Modification Models (NTUA)

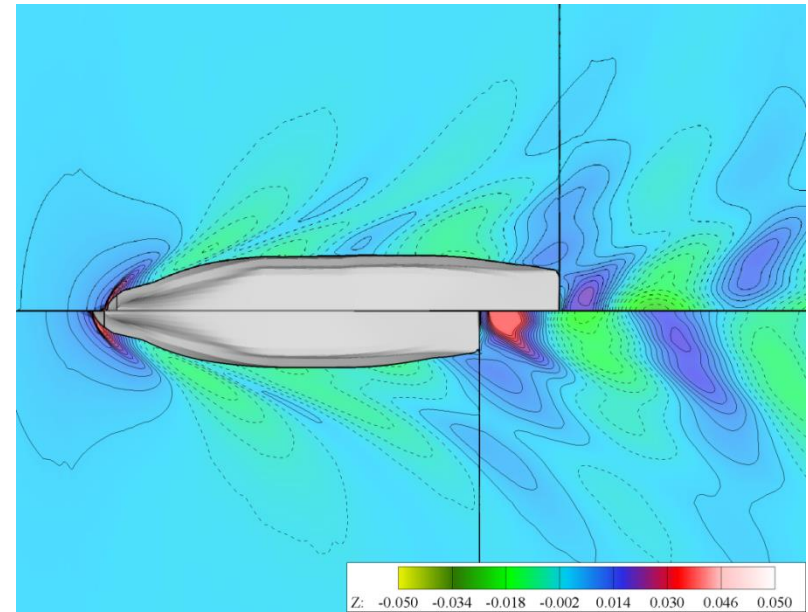


- **Numerical (CFD) towing power studies** and comparisons with existing experimental data from tests at the LSMH tank (NTUA)



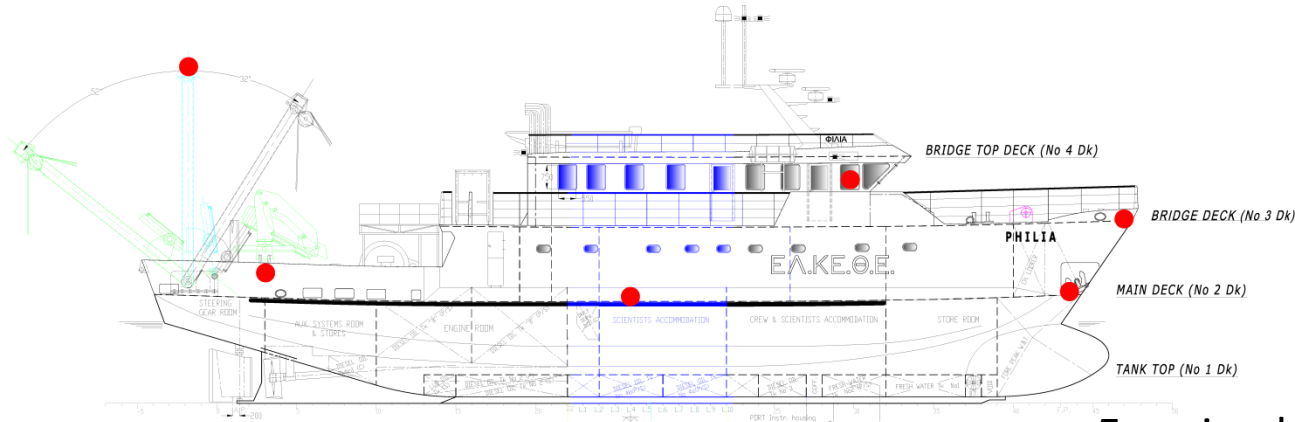
(I)

CFD grid of calculations in the
forehead and around the bulb

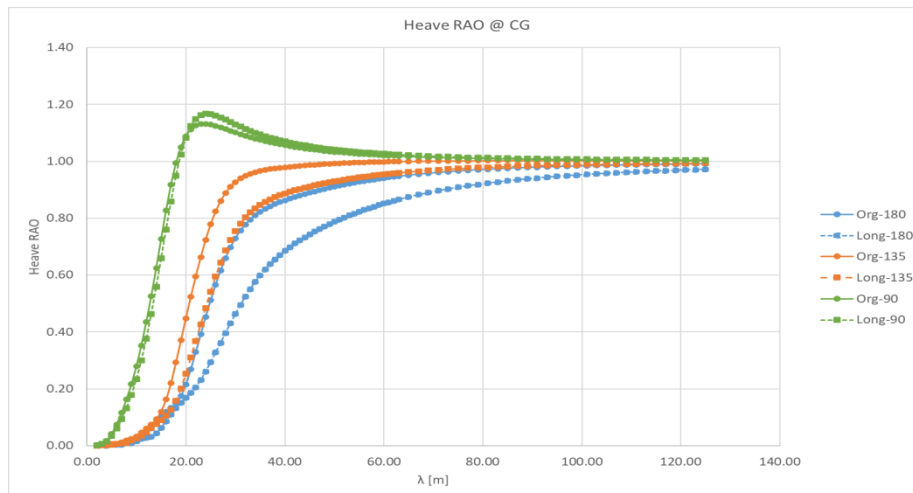


Wave elevation contour for the
original and the elongated ship, $V = 8.2 \text{ kn}$

- Studies of the vessel dynamic behavior in waves



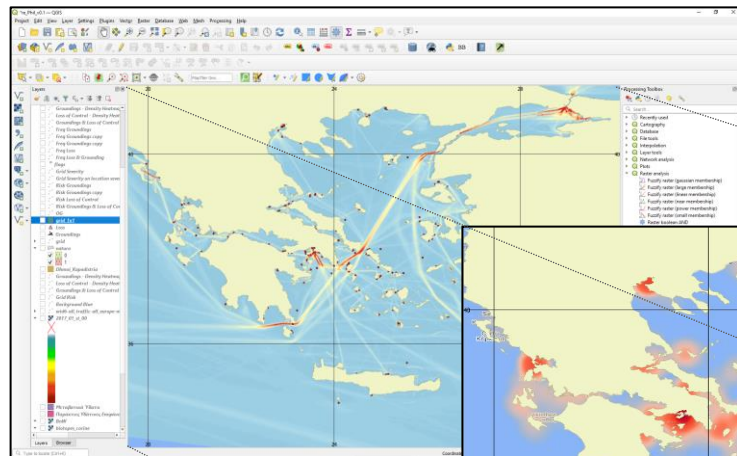
Examined points, representative of the dynamic movements of the vessel



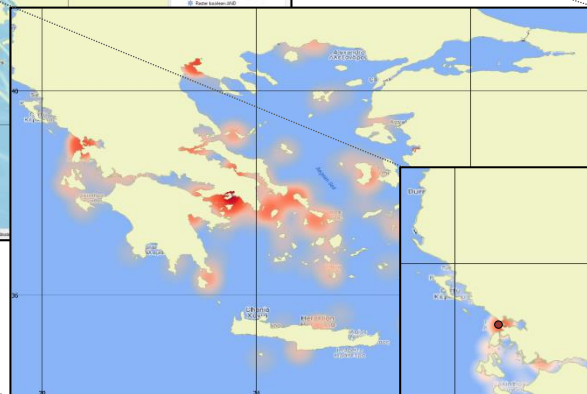
Vertical Motion RAO's- Comparisons between pre- and post-elongation states

4. Ερευνητικές Δράσεις Εταίρων

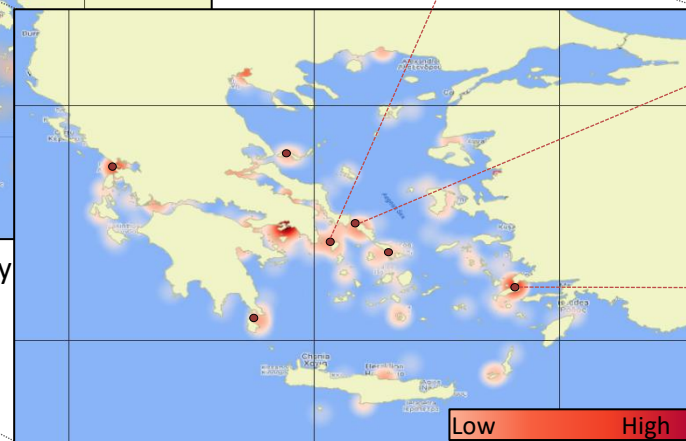
- Holistic **ecological study** using the entire infrastructure and all its equipment, applying conversion performance tests (HCMR-NTUA)
- **Mapping** of the (wider) seabed in high risk areas of avoiding grounding/stranding incidents of ships (NTUA-HCMR)



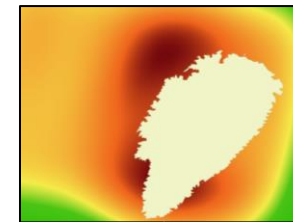
System environment QGIS



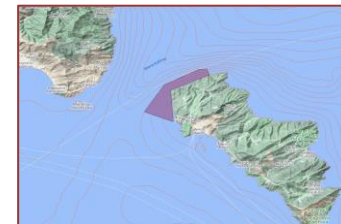
Grounding Incidents Density
(Density Heatmap)



Grounding Incidents Risk ((Density Heatmap)



Strait of Kea



Strait of Kafirea



NW of Kos

5. Use of the modernized vessel by third parties

- Within the framework of the program, the renovated vessels will be available for use by third parties (other than HCMR). The equipment and know-how of the HCMR scientific staff will be available and the costs will be covered by the project.



Following an open call for expressions of interest for the use of the vessel, 15 proposals were submitted and 12 were selected by a committee to be implemented, more precisely :

Research proposals (8 submitted / 8 will be implemented)

Productive bodies (4 submitted / 2 will be implemented)

Educational proposals (3 submitted / 2 will be implemented)

6. Infrastructure Promotion Actions

Aim:

Inform the institutions and the public about the activities of the infrastructure as well as the possibilities that arise with its renovation and modernization, in order to attract more users

Communication means:

- **Website & Social Media** (www.rephil.eu, FB, Instagram, YouTube)
- **Flyer, Banner**
- **Promotional video** (in progress)
- **Press Releases:** 3 (by Feb2022)
- **Press articles :** 48 (by Feb2022)
- **Inauguration & Events** (2022) : Open day in Heraklion Crete (Feb2022)
- **Promotional material**
- Radio, TV, presentations in conferences/events

Contribution to Social & Economic Development

R/V PHILIA is a multi-purpose platform for:

- ✓ conducting combined surveys (fishery, oceanographic, biological, chemical, physical and geological surveys, hydroacoustic surveys) & supporting submarines in coastal and deeper waters

The boat and its equipment will be available for training, research and cooperation with:

- ✓ Academic institutions, participation of scientists from other countries, especially in the Eastern Mediterranean, fishermen associations of and industry executives with an emphasis on manufacturing

Results

- ✓ **Doubling the number of scientists** who can participate in a research expedition, allowing
- ✓ **Interdisciplinary research** aimed at the management and protection of the aquatic environment, climate change, ecosystem approach to sustainable development, optimization of fishery production
- ✓ **Hosting NGOs** for parallel actions
- ✓ Use of PILIA by **productive bodies** (fishermen associations, fish farming, tourism, archeology, etc.)
- ✓ Contribution to the **exploitation of mineral wealth** through the research for underwater energy deposits e.g. with the use of modern hydroacoustic equipment (Multi beam "Aegean Railway")
- ✓ **Estimation of fish stocks** using hydroacoustic equipment

Access policies, contribution to address brain drain, brain waste

Access Policy:

Based on standard and established protocols applied in European countries as well as on the European platform EUROFLEETS (www.eurofleets.eu)

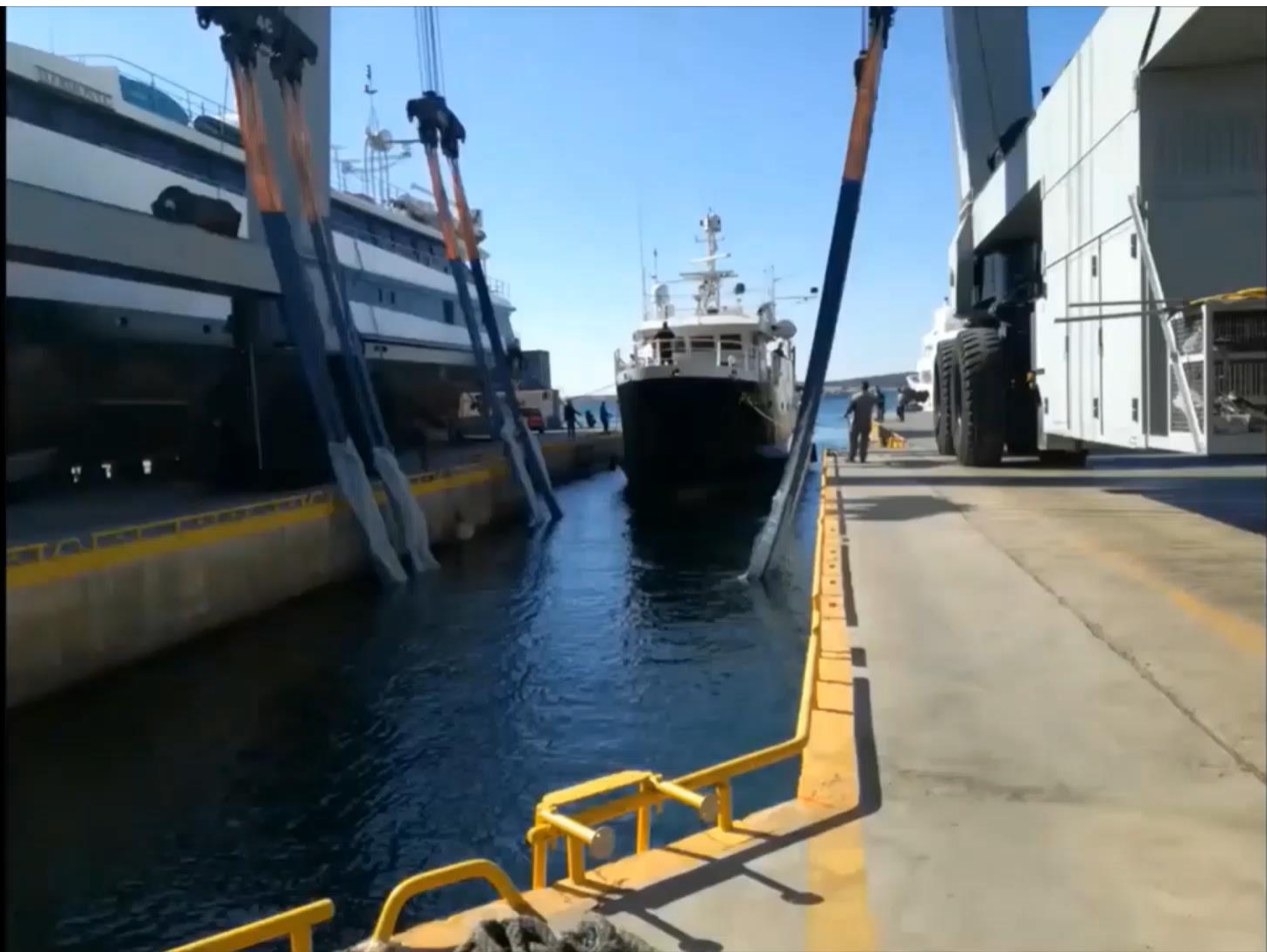
Brain Drain:

- ✓ Possibility for multiple projects ensuring quality jobs for young scientists and researchers
- ✓ Enhancing competitiveness in international programs, training and use by productive bodies

Access policies, contribution to address brain drain, brain waste

Brain Waste:

- ✓ The policy of using PHILIA by third parties, attracted mass interest of young scientists. It is an action that should be generalized regarding the infrastructure of the Research Centers
- ✓ Suggestion to become permanent as a "tool":
 - connecting with universities and academic institutions,
 - and especially at this time as a "tool" to address the brain drain, as it enables young scientists to access infrastructures





Thank you for your time

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Website of the Rephil project:

<https://www.rephil.eu>