

MARBLE - Joint Master on Maritime Robotics in Blue Economy

Project main achievements

**10th IPA ADRION MONITORING COMMITTEE MEETING
13th May 2024, Sibenik**

Interreg

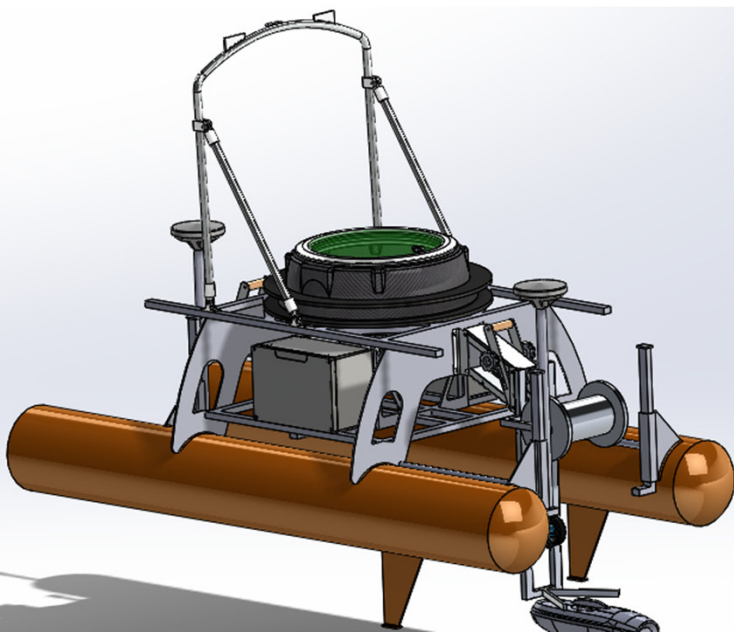
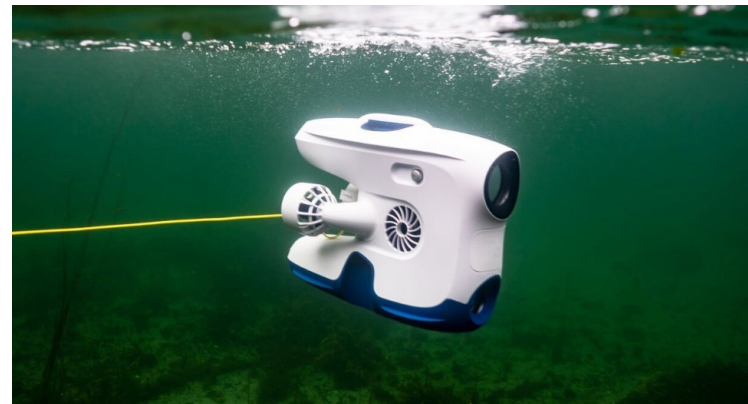
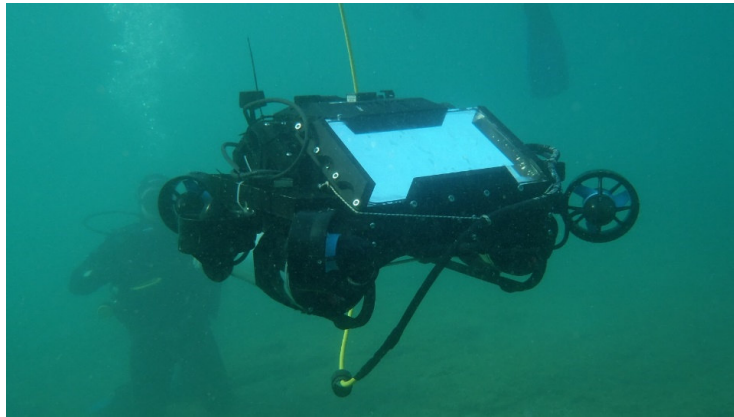
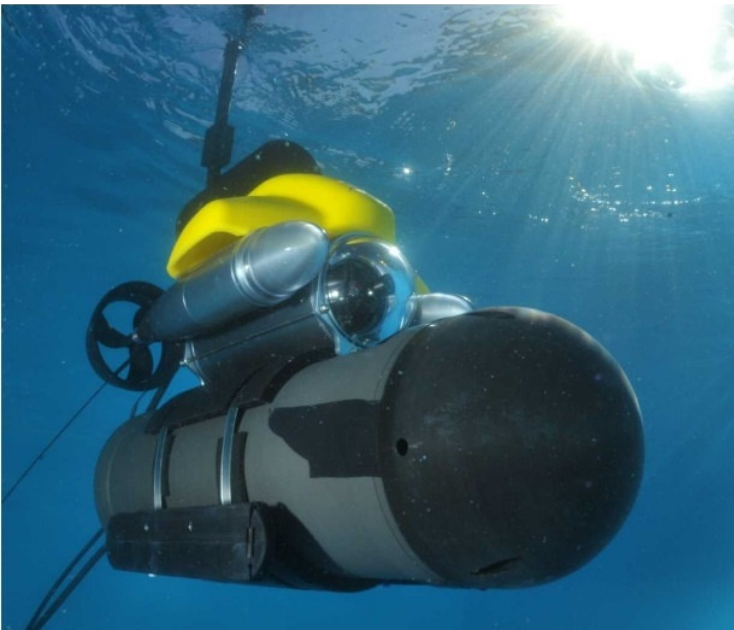


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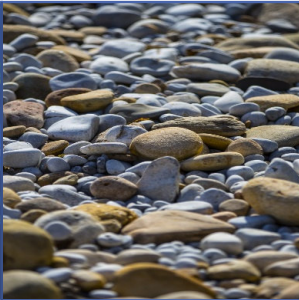
- *Use the font «Georgia»*
- *Max 7 slides*
- *The presentation must not last more than 15 minutes (sharp!)*
- *The presentation must cover all topics reported in the next slide*
- *Presentation to be delivered in advance to the IPA ADRION Joint secretariat by **30 April 2024.***

- *Partnership overview & project budget allocated and spent*
- *Achieved and not fulfilled targets (in full or partial)*
- *Number of mobilised students*
- *Content of the future Master's degree:*
 - *Type of courses; topics; combination of theoretical technical knowledge and hands-on experience etc*
 - *University path and mobility scheme for students*
 - *Degree issued at the end of the educational path*
 - *Number of students expected to be involved*
 - *Master potential in the labour market*
 - *Master duration*
- *Accreditation process of the Master degree – state of the art and earliest possible start (academic year)*
- *Budget necessary for the implementation of the Master degree.*





MARINE LIVING RESOURCES



MARINE NON-LIVING RESOURCES



MARINE RENEWABLE ENERGY (OFFSHORE WIND)



PORT ACTIVITIES



SHIPBUILDING AND REPAIR



MARITIME TRANSPORT



COASTAL TOURISM



OCEAN ENERGY



BLUE BIOTECHNOLOGY



DESALINATION



MARITIME DEFENCE, SECURITY AND SURVEILLANCE



RESEARCH AND INNOVATION



INFRASTRUCTURE

Partnership overview & project budget

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| | Country | Allocated | Spent |
|--|---------|------------|---------------|
| University of Zagreb Faculty of Electrical Engineering and Computing | CROATIA | 220913.00 | 94.8 % |
| Digital innovation hub (DIH) Agrifood Croatia | CROATIA | 117 458.00 | 94.1 % |
| Maritime Technology Cluster FVG S.c.a.rl. | ITALY | 100 826.00 | 100 % |
| National Institute of Oceanography and Applied Geophysics | ITALY | 110 502.00 | 80.8 % |
| National Technical University of Athens | GREECE | 130 386.00 | 88.2 % |
| University of Montenegro | MNE | 138 093.00 | 95.4 % |
| University of Sarajevo, Faculty of Electrical Engineering | BIH | 141 590.00 | 91.0 % |
| University of Trieste | ITALY | 139 652.00 | 96.5 % |

Achieved targets & mobilized students

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| Target groups | Target value | Target Groups Reached | Percentage |
|-------------------------------|--------------|-----------------------|--------------|
| Higher education and research | 300 | 300 | 100 % |
| Local Public Authority | 10 | 10 | 100 % |
| Regional Public Authority | 10 | 10 | 100 % |
| Enterprise, excluding SME | 25 | 25 | 100 % |
| SME | 25 | 25 | 100 % |

- ~ 200 mobilized students

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How did MARBLE tackle the challenge of developing the intersectoral and technological skills required in maritime robotics?

Forming the network

Involving
students

Interdisciplinary
curriculum

Network

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1. Barska Plovidba
2. Crnogorska Plovidba
3. Invar Ivošević
4. Montenegro marine surveys
5. Uprava pomorske sigurnosti i upravljanja
6. Hemosan
7. Eurodry
8. Euroseas
9. STRATEGIS
10. Prime Tanker Management
11. Niriis Shipping
12. Stamco
13. Optimum
14. ACI
15. Cromaris
16. Iskra shipyard
17. NCP
18. Marinetek
19. AdSPMAC
20. AdSPMAO
21. AITRONIK
22. CNR
23. GORIZIANE
24. MDM TEAM
25. NOVACAVI
26. prirodoslovni fax
27. SRSBiH
28. Veterinary faculty
29. Authority Partners

MARITIME ROBOTICS IN BLUE ECONOMY



TRAINING COURSE

15-19 MAY 2023



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MARBLE Curriculum

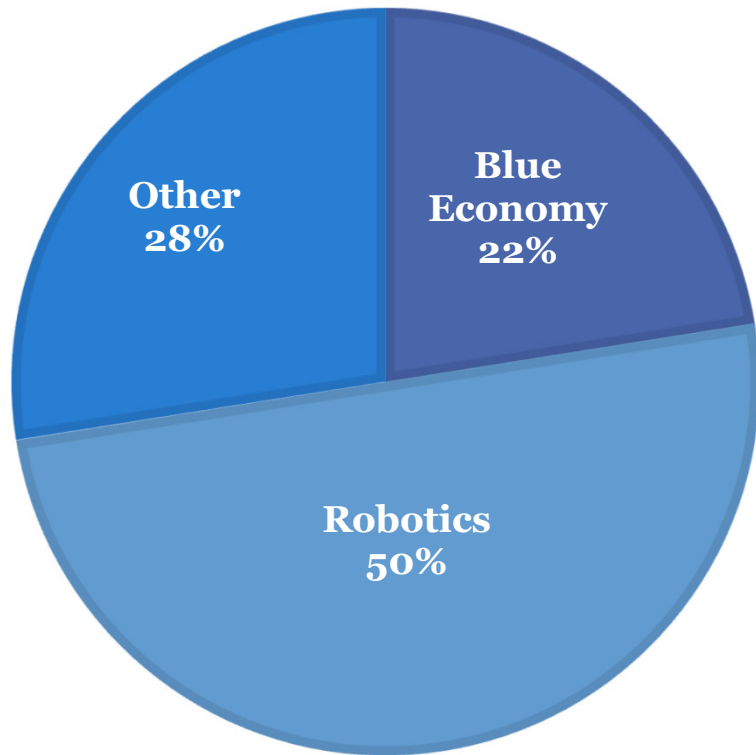
University path / Mobility scheme

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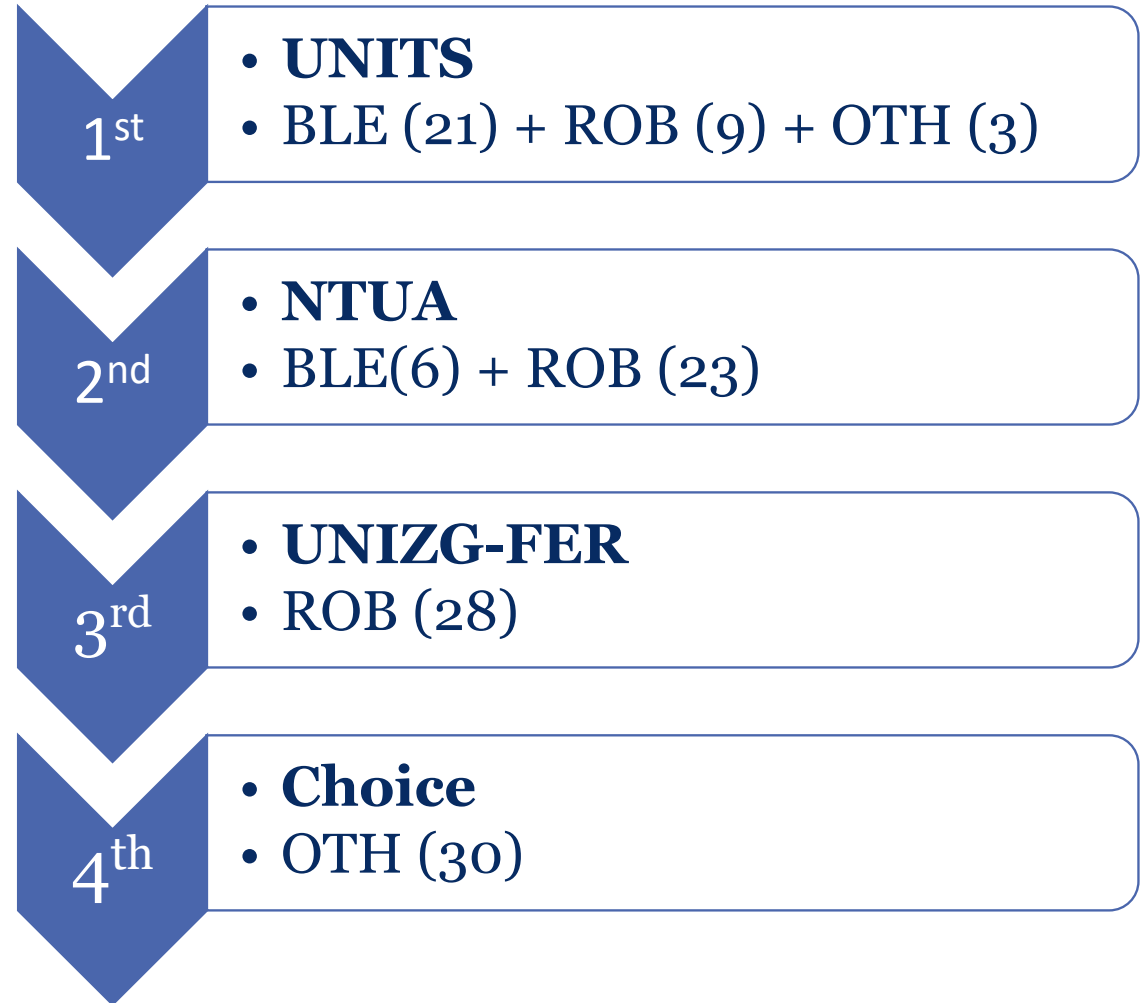


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2 years / 120ECTS
20-30 students/year



MARBLE Curriculum Courses

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| Overview of courses in semesters | | | | | | | |
|----------------------------------|---|------------------------|---|--------------------------------|---|-----------------------------|-----------------------------|
| 1. Sem UNITS | Marine Technologies & Economics 6 ECTS | Oceanography 6 ECTS | Microgrids for sustainable energy 9 ECTS | | Fundamentals of electrical drives and systems 9 ECTS | | Transvers. Cours. 3 ECTS |
| 2. Sem NTUA | Robotics Control Systems 10 ECTS | | Mechatronic Systems 5 ECTS | Elective course ROB1 5 ECTS | Elective course BE 6 ECTS | | ROS 3 ECTS |
| 3. Sem UNITS | Marine and aerial robotics 10 ECTS | | Advanced Robotics 10 ECTS | | Elective course ROB2 5 ECTS | Sel. Top. in Rob. 3 ECTS | |
| 4. Sem Choice | Internship 15 ECTS | | | Master Thesis 15 ECTS | | | |
| ECTS | 5 | 10 | 15 | 20 | 25 | 30 | 33 |

MARBLE Degree & Accreditation

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Upon finalizing the study the students would receive a **Double Degree**:

1. Joint master degree in Robotics for Blue Economy by:

- University of Zagreb FER (Croatia)
- National Technical University of Athens (Greece),
- University of Sarajevo
- University of Montenegro

2. Master degree in Electrical Energy and Systems Engineering (LM-28) by:

- University of Trieste

- Joint Master will be accredited in Greece (HAHE) and accepted in Croatia, Bosnia and Herzegovina and Montenegro (documents fully prepared)
- Master in Italy is an existing master.

Timeline: Accreditation in Greece/Croatia within 2024./25.; **Earliest possible start:** 2025./26.

MARBLE Budget Estimate

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| PREPARATION PHASE | |
|---|--------------|
| Staff costs | € 48.000,00 |
| <i>Personnel</i> | € 48.000,00 |
| Office and administration | € 7.200,00 |
| Equipment/consumables | |
| Travel and accomodation | € 20.000,00 |
| <i>Travel - Selection committee meeting</i> | € 20.000,00 |
| External expertise and services | € 35.000,00 |
| <i>accreditation in Greece</i> | € 15.000,00 |
| <i>accreditation in Italy</i> | € 10.000,00 |
| <i>Dissemination</i> | € 10.000,00 |
| TOTAL - preparation | € 110.200,00 |

| Year 1 - October 2025; 1 generation of students | |
|--|--------------|
| Staff costs | € 204.000,00 |
| <i>Staff cost - academic</i> | € 132.000,00 |
| <i>Staff cost - technical</i> | € 72.000,00 |
| Office and administration | € 30.600,00 |
| Travel and accomodation | € 32.750,00 |
| <i>Travel - teaching</i> | € 14.000,00 |
| <i>Travel - induction week and networking</i> | € 18.750,00 |
| External expertise and services | € 515.000,00 |
| <i>External experts (incl. travel and accommodation)</i> | € 50.000,00 |
| <i>Consumables (materials for lab exercises, etc.)</i> | € 60.000,00 |
| <i>Dissemination and organization services</i> | € 20.000,00 |
| <i>Students - transportation</i> | € 25.000,00 |
| <i>Students - accommodation and food</i> | € 360.000,00 |
| TOTAL - year 1 | € 782.350,00 |

TOTAL € 1.674.900,00

- All classes are held in person, students spend 1st semester in Trieste, 2nd semester in Athens, 3rd semester in Zagreb
- The budget includes 1 generation of students – we believe that at least 2 generations should be educated
- The budget is aligned with similar Joint Masters funded by Erasmus and Horizon programmes

| Year 2 - October 2026; 1 generation of students | |
|--|--------------|
| Staff costs | € 204.000,00 |
| <i>Staff cost - academic</i> | € 132.000,00 |
| <i>Staff cost - technical</i> | € 72.000,00 |
| Office and administration | € 30.600,00 |
| Travel and accomodation | € 32.750,00 |
| <i>Travel - teaching</i> | € 14.000,00 |
| <i>Travel - induction week and networking</i> | € 18.750,00 |
| External expertise and services | € 515.000,00 |
| <i>External experts (incl. travel and accommodation)</i> | € 50.000,00 |
| <i>Consumables (materials for lab exercises, etc.)</i> | € 60.000,00 |
| <i>Dissemination and organization services</i> | € 20.000,00 |
| <i>Students - transportation</i> | € 25.000,00 |
| <i>Students - accommodation and food</i> | € 360.000,00 |
| TOTAL - year 2 | € 782.350,00 |