



EUROPEWAVE

MARMOK-Atlantic

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Mechanical engineer

**IDOM Consulting, Engineering and
Architecture**

IDOM



This project has received funding from the European Union's Horizon 2020 research and Innovation programme under grant agreement 883751.



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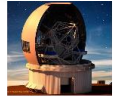
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Introduction

IDOM Consulting, Engineering and Architecture



Science



Transport



Energy



Environmental



Industry



Telecom



Building



Consulting

- Since 1957
- 4000+ employees
- 40 Offices in 125 countries (Headquarters in Bilbao, Spain)
- Employee owned, 700+ partners

MARMOK WEC Technology

- **13 years experience** in marine renewables. Started with the development of a **Spar type OWC** wave energy converter
- Technology with outstanding **simplicity, robustness and maintainability** (a single moving part, not submerged)
- **Viability** of the technology **demonstrated** offshore during 2.5+ years (**3 consecutive winters**)



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EW challenge

Advance towards commercial viability of the technology
by improving power performance while maintaining
reliability and survivability.



Phase 2 development

Expected operating conditions

Aim: Power performance improvement

Rotor:

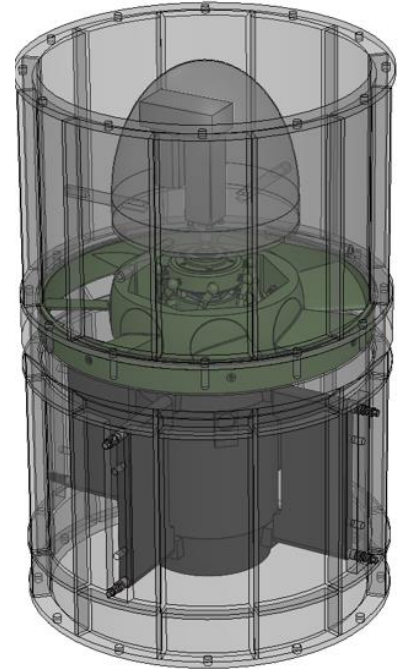
Conversion efficiency boost through **variable pitch** mechanism and performance improving features

Electric generator:

Ad hoc design with good efficiency and power peak endurance

Control system:

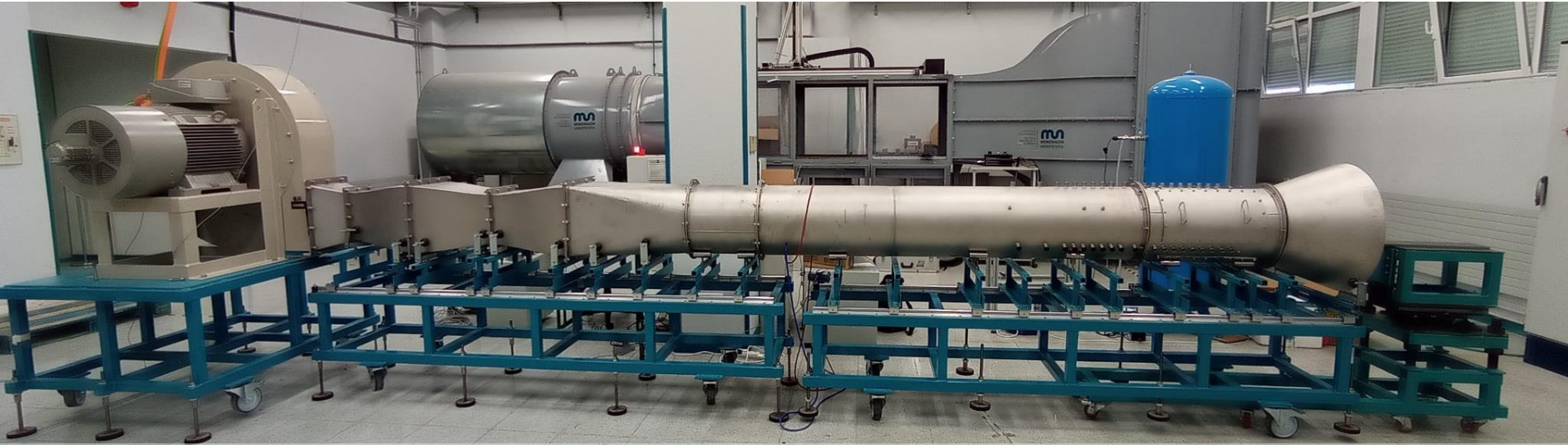
Machine learning based control strategy coupled with a reinforcement learning algorithm



Phase 2 development

Wind tunnel testing

- Facility built specifically for the campaign
- Aerodynamic performance improvement confirmed





Phase 2 development

Aim: Cost reduction when scaling up the technology

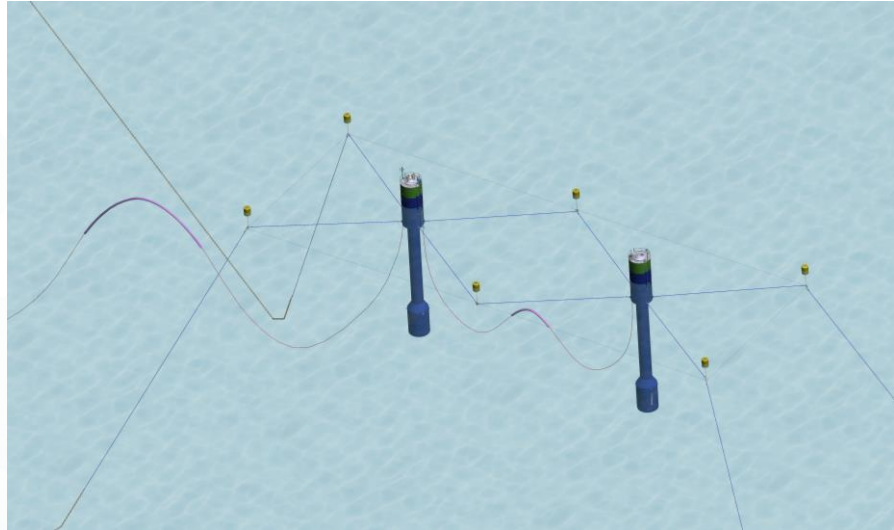
Detailed mooring & umbilical cable routing design developed (following DNV-OS-E301) for BiMEP & EMEC

Shared mooring:

Mooring cost reduction per device due to elements sharing

Array configuration:

Peak loads not increased due to “not in phase” movement



Phase 2 development

Aim: Marine ops. Optimization

Installation:

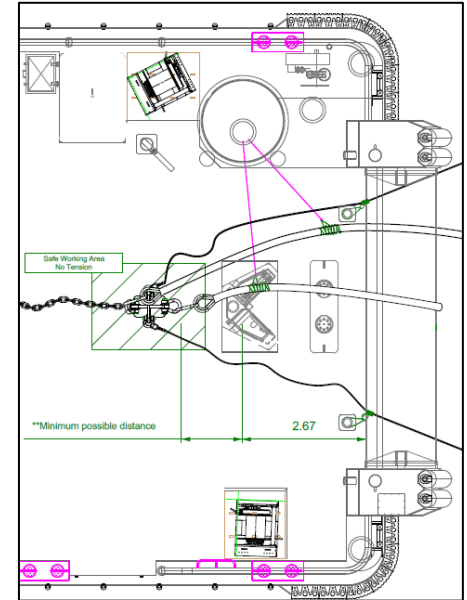
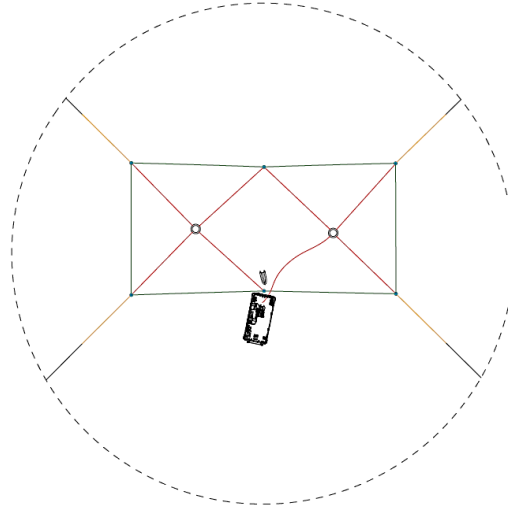
Array configuration installation process details developed

Divers:

Involvement limited to simple and not risky operations

Marine operations:

Common operations compatible with common means



Phase 3

MARMOK-A-5 deployment at BiMEP with an improved PTO and control system

Main objectives:

- Installability
- Power performance
- Operational experience
- Survivability
- Reliability & availability

Phase 3

Testing scheme



Phase 3

Team (same in Phase 2)





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