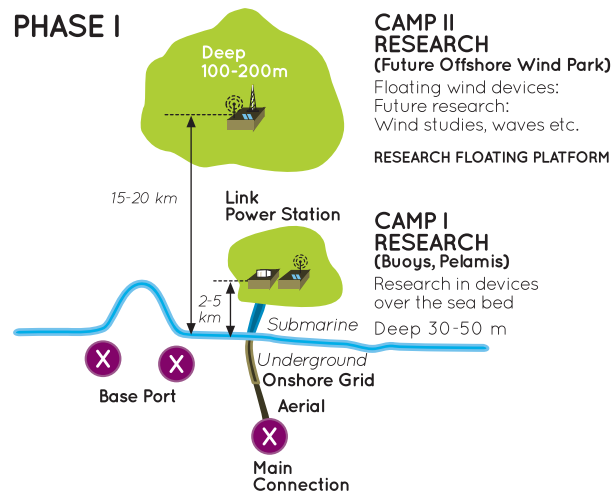


## The Offshore Energy Research Laboratory

(seAsturlab) is an initiative of the University of Oviedo (Spain) and its strategic aggregation as part of its Campus of International Excellence. It is an R&D facility designed to conduct marine research focusing on offshore energy generation devices (wind, wave and ocean currents) and promote the transfer to the industry. This unique laboratory aims to become a benchmark for the collaboration among the University, the administration and the business sector.

seAsturlab has been granted permission to carry out research projects, testing of prototypes and demonstrators in real operating conditions (scale of 1:1).

### PHASE I



The laboratory includes two research areas (Camp I and Camp II): one on them is placed in shallow water (30-50 m) where seabed and floating devices -such as buoys or pelamis- will be tested.

In addition, other type of studies and experiments will be carried out in the site: weather, aquaculture, material testing, oceanography, etc.

The research area provides power evacuation facilities (Link Power Station) and offers services for broadband communications (telephony, Internet, data transmission). The Campus of Gijon of the University of Oviedo is provided with a monitoring, control and data collection center that will promote the performance of experiments and will be in charge of the general maintenance of the facility.

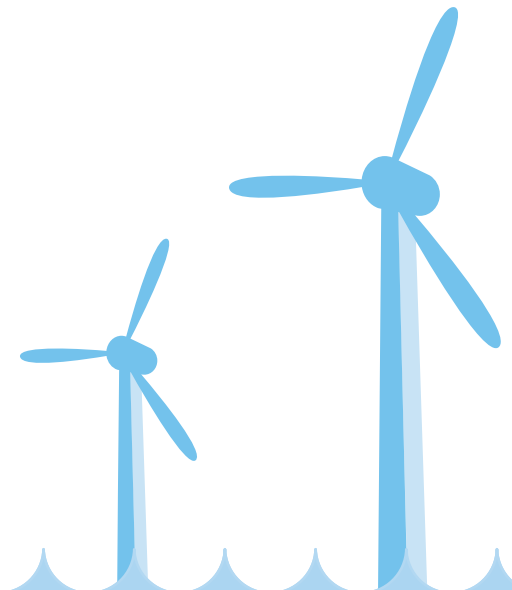
The first phase also includes a second site (in deep water, between 100 and 200 m) intended to carry out experiments and allow for the characterization of the area (weather, currents, waves, geology, etc.). At this stage, this area will not be connected to the grid but will be provided with communication services (telephony, Internet, data transmission) supplied from the Control Center of the Campus of Gijon of the University of Oviedo. In addition, it includes a floating research platform that provides the foundation and support needed to carry out all sort of tests related to offshore energy.

The research area will have all the permits and authorizations to perform the experiments. The University of Oviedo will be liable for the control and the coordination of all the tests being carried out.



## Datasheet

### Offshore Renewable Energy Research Laboratory

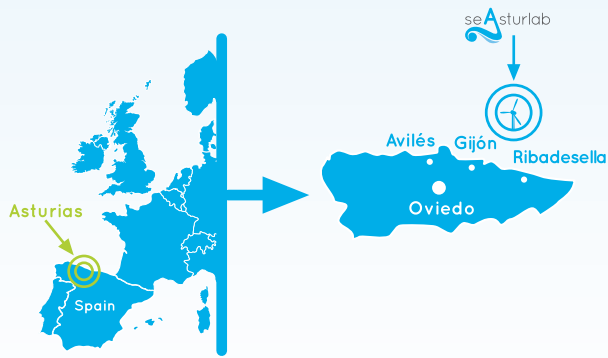


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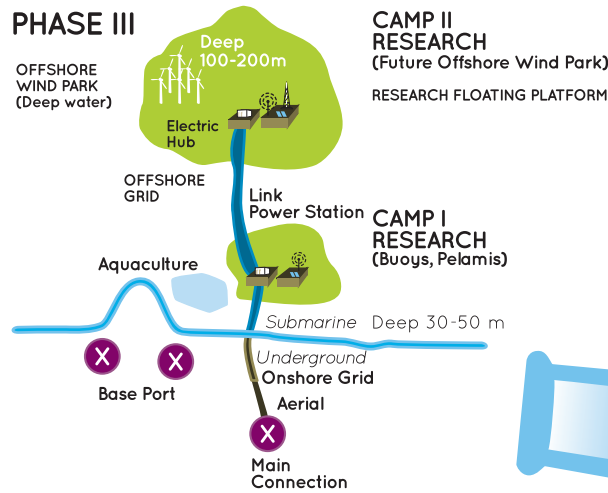
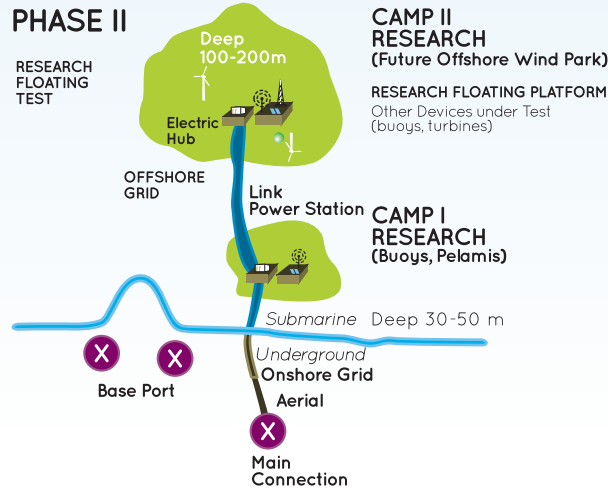


The second phase of the project will allow for the connection of power generation devices to the Power Line through a binding underwater line and an Electric Hub. This phase will include real tests with floating wind turbine structures and enable the enlargement of the testing area for buoys, turbines, pelamis, etc. to the second research area

The broadband communication services of the area (telephony, Internet, data transmission) will enable the maintenance and monitoring of such devices from the University Campus.

The second research area includes the development of an Offshore Wind Farm based on semi-submerged or floating devices.

Both the electric line and the communications system ensure the compatibility of the transport of energy from an Offshore Wind Farm -intended for commercial purposes- with the activities of a research laboratory.



## TECHNICAL DATA

### Shallow water area (CAMP I)

1 nautical mile x 1 nautical mile - 3.43 km<sup>2</sup>  
 Distance from the coast 2 km  
 Maximum depth 50 m

### Deep water area (CAMP II)

2 miles x 2 nautical mile nautical - 13.72km<sup>2</sup>  
 Distance from the coast 20 km  
 Maximum depth 200 m

### Electrical specifications

Offshore grid voltage: 132 kV  
 HUB connection voltage: 20 kV  
 Total peak power: 200 MVA  
 Maximum power for each device: 5 MVA

### Other facilities

Data, mobile and internet coverage  
 Work areas with electrical, water and electronic instrumentation laboratories.  
 Shuttle service and maintenance from home ports of Gijon and Aviles.  
 Monitoring and control center in the Campus of Gijon - Asturias - Spain

