

Unprecedented experimentation at the lighthouse of the Jument

France Energies Marines is coordinating a collaborative project to better understand sea states in the event of storms, in order to optimize the design of renewable energy recovery systems. Originality of this project: use the lighthouse of the Jument located near the island of Ushant as an experimental device on a scale of 1:1. The measurement campaign carried out during the winter of 2017-2018 after the deployment of state-of-the-art equipment will be repeated in the coming weeks.



Left: Lighthouse of the Jument from the sky (© Mickael Accensi, IFREMER) - Right: Installation of the radar on the lighthouse gallery (© France Energies Marines)

A collaborative R&D project

France Energies Marines, the national reference institute for research on renewable marine energies, is currently coordinating a collaborative R&D project aimed at improving knowledge of sea states in the event of storms in order to optimize the design of renewable energy recovery systems such as floating wind turbines. Indeed, such machines are exposed to extreme waves can endanger their mechanical structure. If these extreme waves are brought to break, the danger for the machines is even greater. It is therefore essential to better understand and characterize these phenomena.

An experimental system on a scale of 1:1

The project, called DIME, includes a groundbreaking operation that began in December 2017 near the Ile d'Ouessant, with the support of Cerema, Ifremer, Shom and Helmholtz-Zentrum Geesthacht (HZG), a German materials and coastal research centre. The principle? Use the lighthouse of the Jument as an experimental device on a scale of 1:1. A current profiler located at the foot of the building and a wet swell buoy 2 km to the west provide in situ information on the waves and surrounding currents. State-of-the-art equipment has also been installed at the top of the lighthouse: a camera system allows the waves to be reconstructed in three dimensions, and a radar is used to map the wave field on a larger scale. Accelerometers quantify the building's movements under the influence of waves. Three pressure sensors will soon be installed on the front of the lighthouse to determine wave forces.

Winter campaigns

The measurement campaign carried out during the winter of 2017-2018 will be repeated over the next three winters. After exploitation and analysis, the latter will improve the predictability of extreme and breaking waves, an essential element for optimizing renewable energy recovery systems and thus their cost competitiveness. The knowledge gained will also be very useful in the current context of intensifying storms and exposing populations to the risk of increased marine flooding. The Mare's

lighthouse will not be forgotten because the data will be used to refine the estimate of its lifespan and to recommend consolidation measures to extend it.

Partners with complementary contributions

The DIME project is funded by France Energies Marines and the State managed by the Agence Nationale de la Recherche under the programme Investissements d'Avenir (ANR-10-IEED-0006-14). The experiment on the lighthouse of the Jument was also supported by the Filière Mer of the Crédit agricole. Coordinated and scientifically managed by France Energies Marines, the project brings together a consortium of 17 academic and private partners with complementary skills and contributions, guaranteeing quality scientific work.

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Main information about DIME project

Subject: modelling and observations of extreme sea states for marine renewable energies

Duration: 3 years (2017-2020)

Financial support: this project receives financial support from the State, managed by the National Research Agency (ANR) as part of the Big Investment Plan (ANR-10-IEED-0006-14), and from France Energies Marines. The experiment on the lighthouse of the Jument was specifically supported by the Filière Mer du Crédit agricole.

Coordinator: France Energies Marines

Scientific pilot: France Energies Marines

Consortium partners:



France Energies Marines in short



Identity: National reference institute for research on marine renewable energies

Labelling: Institute for Energy Transition (ITE) co-financed by the Big Investment Plan (IA), 26 projects accredited by the Bretagne Atlantique and Méditerranée competitiveness clusters

4 scientific and technical programmes:

- Tools and methods for site characterization
- Technology design tools for MRE applications
- Environmental and socio-economic impacts
- Farm architecture and network integration

Number of employees: 30 employees (25 FTEs)

Annual budget: €2 million

Date of creation: 15 March 2012

Location: Bâtiment Cap Océan - 525, avenue Alexis de Rochon - 29280 Plouzané - France

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