Call ID: **Horizon-CL5-2026-D3-02-07**
Call Topic: **Improved reliability and optimised operations and maintenance for wind energy systems**

Title: Reliable and Resilient Solutions for Monitored and Optimized Floating Offshore Wind Turbines (Tentative)
Acronym: RELFLOAT (Tentative)

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Budget by EU: ~5M Euros

Proposal Summary:

To reach net-zero carbon emissions by 2050, the European Union (EU) has made offshore wind power a central pillar of its energy transition. The EU aims to: i) increase offshore wind capacity nearly 20-fold, ii) develop cross-border offshore grids, iii) invest in new technologies (e.g., offshore wind turbines), and iv) coordinate regionally and streamline regulations. Hence, a significant fraction of Europe's economy is directly or indirectly dependent on offshore wind, which plays a vital role in energy, the environment, and sustainable development. Energy-related offshore infrastructures present an emerging, viable, and sustainable solution, unlocking the great potential of offshore wind energy. Among such systems, the deployment of floating offshore wind turbines (FOWT) marks a pivotal step in achieving deep-water wind energy capacity, offering a novel technological solution in a rapidly evolving field. While floating wind technology is compelling, its implementation is quite challenging. Complex installation procedures, associated high costs, and evolving regulations can hinder widespread adoption of its technology. However, these challenges also present opportunities for innovation and cost reduction, which are ultimately necessary to meet the renewable, reliable, and sustainable energy needs of millions across Europe.

The main objective is to develop validated solutions that employ state-of-the-art, data-driven digital tools to increase the reliability of FOWT systems by reducing risks associated with their operations and management, thereby ensuring safety in the offshore wind energy supply.

XX proposes innovative, cost-effective, and reusable solutions to enhance the reliability of FOWT systems. In this respect, ML-based solutions will be provided for seabed-anchor-mooring systems, accounting for optimized site characterization strategies. Advanced numerical models and computational tools will be developed to predict the response and instability of FOWT components under environmentally critical loads. Model-scale experiments will be performed for the seabed-anchor system using centrifuge testing and large-wave flume testing with a scaled FOWT to validate these numerical solutions. The project will also integrate structural health monitoring tools for FOWTs by incorporating advanced sensors and autonomous inspection systems. Thus, XX will open the floodgates for the reliable and sustainable installation of next-generation, +10 GW capacity FOWTs across many seas around Europe.