Multiscale modelisation for VAWT floating applications

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Résumé

The motion due to the floating platform adds extra complexity to the unsteady aerodynamics of VAWT and hence, both numerical and experimental studies become very challenging. The presentation focuses on the different approaches developed to assess the performance of an original VAWT developed by BlueTwin based on O-shape double contra-rotating rotors. IFREMER together with BlueTwin and LEGI Lab have developed experimental campaigns at different scale from small scale in wave tank test using controlled actuators (SiL), wind tunnel test with realistic rotors with pitch and surge motion, medium scale tests with a 10kW prototype installed onshore at Ifremer testing site in Brest. A fast simulation tool dedicated to floating VAWT consisting of the actuator line method combined with CFD is developed and validated by the tests measurements. These different approaches are developed to design full scale floating VAWTs, with a first 35kW prototype installed in Ste Anne du Portzic Testing site at the end of 2024 before a 5MW installed in Mistral test site in 2027.

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