PO.083

Advancing Floating Offshore Wind Technology: Real-Scale Validation of the 2MW DemoSATH Prototype

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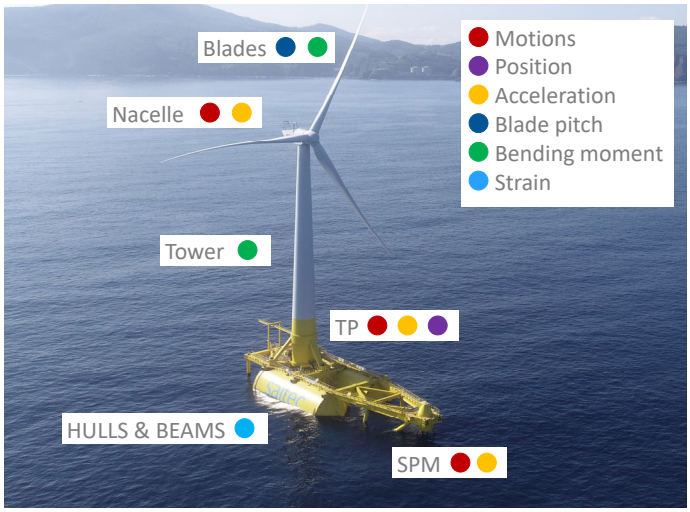
CONTEXT

The DemoSATH is a 2MW full-scale prototype floating offshore wind turbine, which was installed 2 miles off the coast of Biscay (Spain) in 2023. Developed and patented by Saitec Offshore Technologies, this innovative floater technology is based on the Swinging Around Twin Hull (SATH) concept.

DemoSATH is considered a full-scale experiment, making the monitoring of both the platform and wind turbine a key aspect of the project.



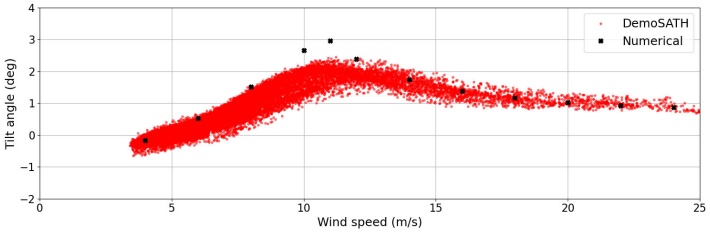
DEMOSATH VERIFICATION

After a full year of continuous operation, the numerical and empirical validation of the SATH platform confirms its ability to meet and exceed design expectations in real-world conditions. These results highlight the technology's reliability and scalability, reinforcing its potential for large-scale deployment.

Key performance parameters, including platform stability and hydrodynamic behaviour, must be assessed against the design drivers to ensure optimal performance.

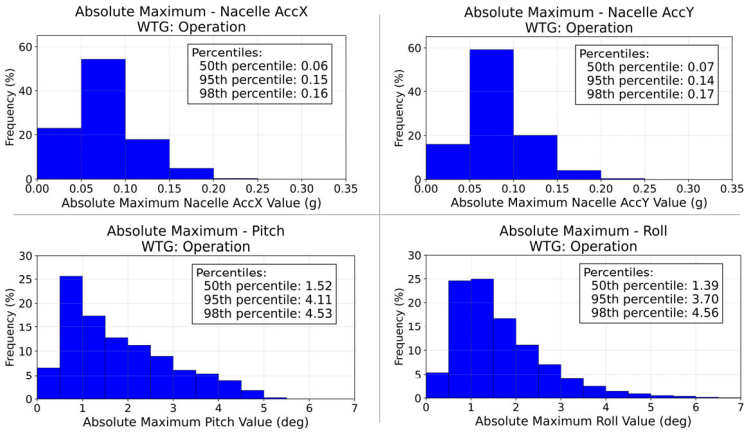
STABILITY EVALUATION

Floating stability is assessed through static tilt, determined by the intersection of heeling and righting curves across all wind speed ranges.

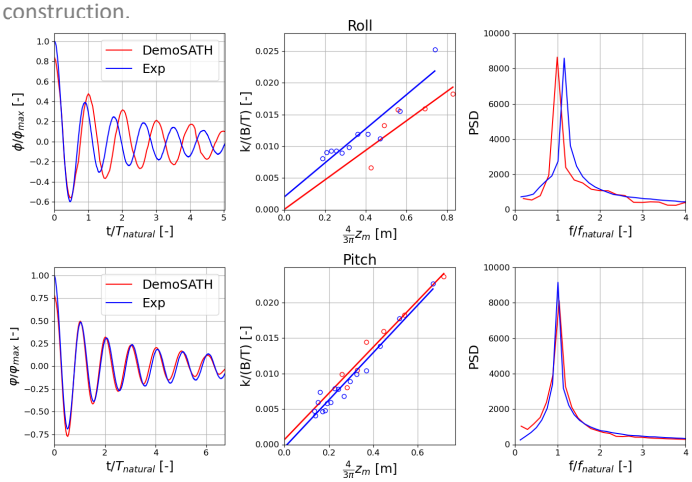


DYNAMIC EVALUATION

DemoSATH dynamics are analysed by evaluating the distribution of absolute max nacelle accelerations and platform motions with the wind turbine in operation.



Controlled decay tests in roll and pitch were conducted by using the wind turbine's thrust to incline the platform to a set angle. The thrust was then rapidly reduced by adjusting the pitch of the blades, inducing free oscillations. The results were compared to a 1:36 scale experimental campaign conducted two years before DemoSATH's construction.



CONCLUSIONS

- After one year of operation DemoSATH's stability and hydrodynamic performance has been verified.
- The prototype meets standard design criteria.
- Pitch decay shows good correspondence between DemoSATH and the experimental results.
- Roll period differs due to a reduction in the hulls spacing after the experimental campaign. The changes in roll damping and period align with the expected trend.

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