Grid21 shared mooring farm

SIMA FACTSHEET
Example case:
Grid21 shared mooring farm

The Grid21, [1] [2] , shared mooring farm consists of 2 INO WINDMOOR 12MW, [3] , reference floating wind turbines (FWTs) at a water depth of 350 m. Each FWT is connected to three anchor lines and a shared line.

Due to the four-line arrangement, the column supporting the tower contains two fairleads.

A 30-ton clump is attached at the center of the shared line to keep the line taut, as shown in Figure 1.

The anchor line footprint is 2.5 times the water depth, and the FWTs are initially spaced 8D apart, where D is the rotor diameter (D = 216.9 m).

A summary of the mooring system properties is provided in Table 1.

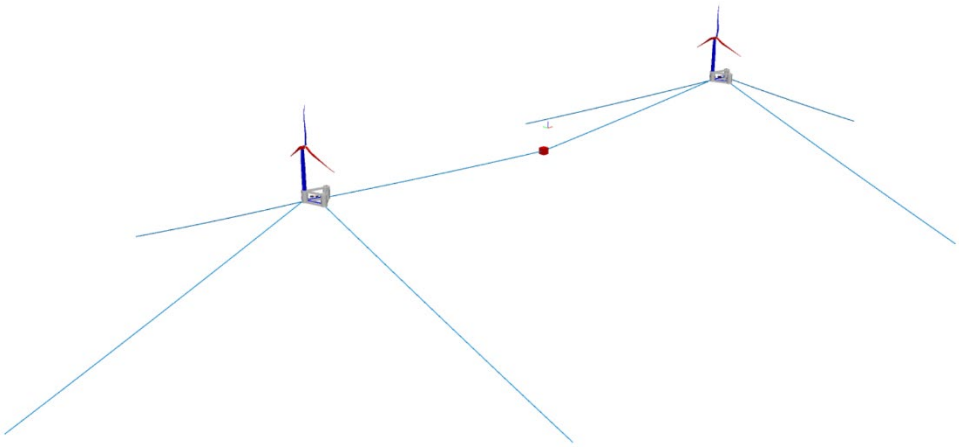
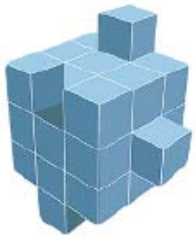


Figure 1 Grid21 shared mooring park

Table 1 Mooring system properties for Grid21

Property	Unit	Shared line	Anchor line
Line material	-	Polyester	Polyester
Line diameter	mm	241	241
MBL	MN	15.69	15.69
EA/MBL	-	27	27
Dry mass coefficient	kg/m	37.2	37.2
Wet mass coefficient	kg/m	9.3	9.3
Unstretched length	m	1657	936
Pretension	MN	2.7	3.0



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Note that the example model shows instability in the pitch-surge response due to negative aerodynamic damping at wind speeds of 12-14 m/s, as the current model uses the same controller as the reference FWT model. The controller might require modification to achieve better performance in the current setup, and it is left for future work.

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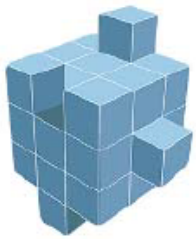
References

[1] V. Ramachandran Nair Rajasree, Y. Jenssen, T. Sauder, and E. Bachynski-Polic (2026): *Dynamic behaviour of floating wind farms with shared mooring in waves - Part I: Cyber-physical testing* [UNDER REVIEW]

[2] V. Ramachandran Nair Rajasree, T. Sauder, and E. Bachynski-Polic (2026): *Dynamic behavior of floating wind farms with shared mooring in waves - Part II: Modal description, and mooring line model fidelity*, [UNDER REVIEW], 2026.

[3] C. E. Silva de Souza, P. A. Berthelsen, L. Eliassen, E. E. Bachynski, E. Engebretsen, and H. Haslum (2024): *Definition of the INO WINDMOOR 12 MW base case floating wind turbine*. SINTEF Ocean, 2021. Accessed: Sep. 14, 2024. [Online]. Available: https://sintef.brage.unit.no/sintef-xmlui/handle/11250/2723188



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