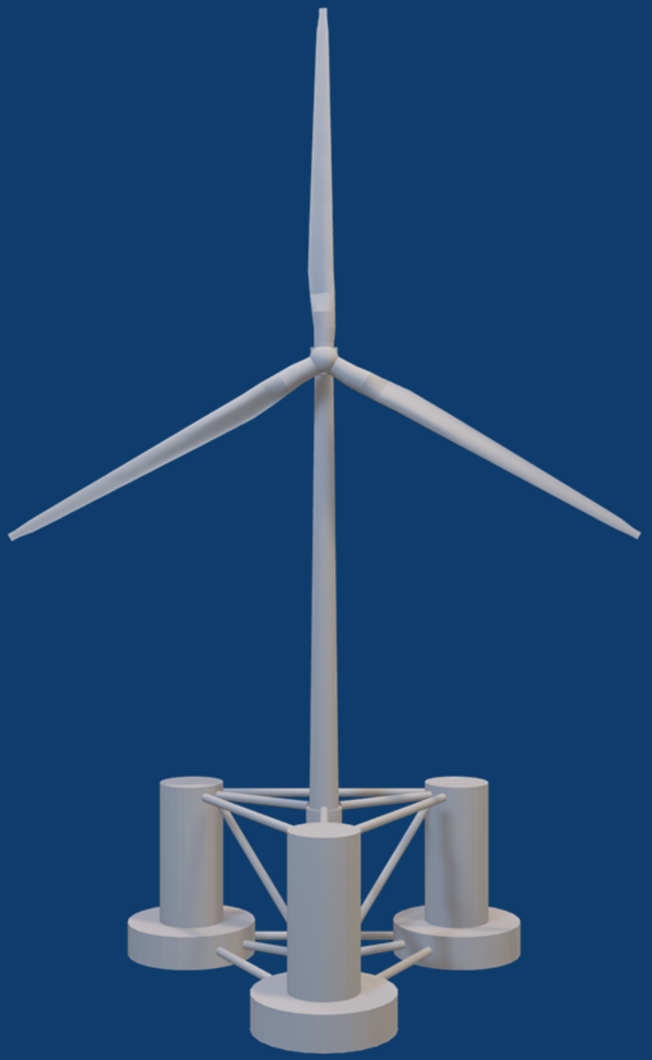


METU RÜZGEM Workshop on "CFD and Performance Simulations of Wind Turbines"

"Wind Turbine Modeling and Performance Simulations"

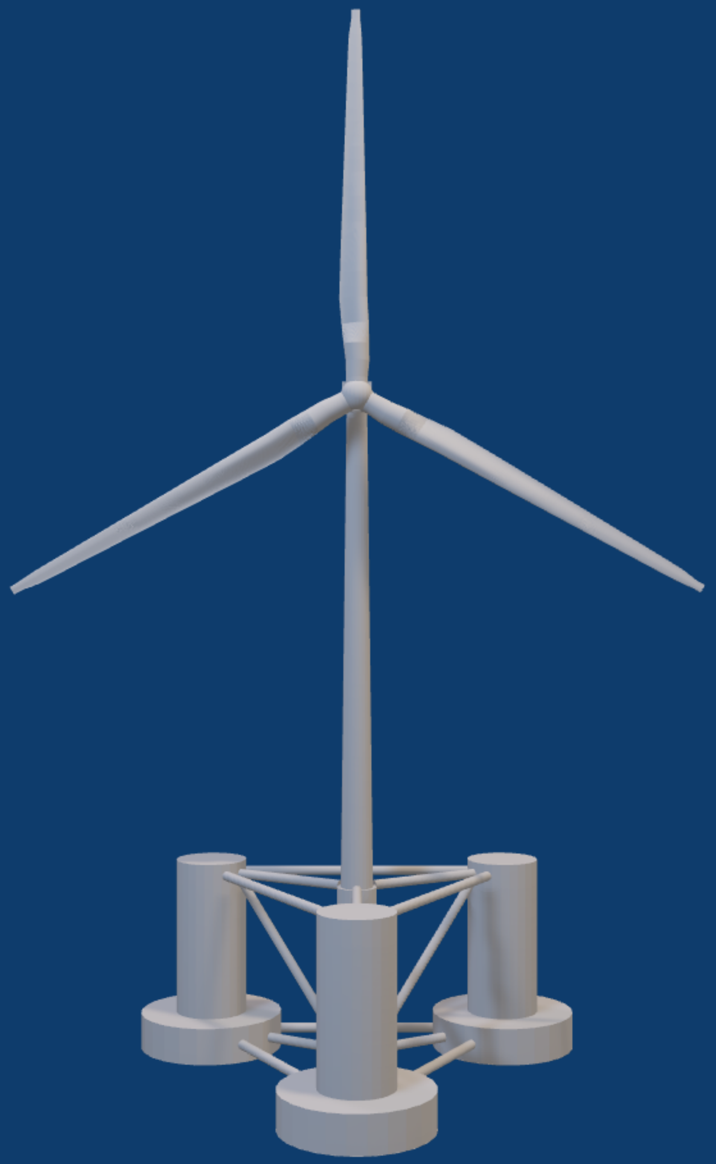
Muhammad Juanda Putra

16.12.2023

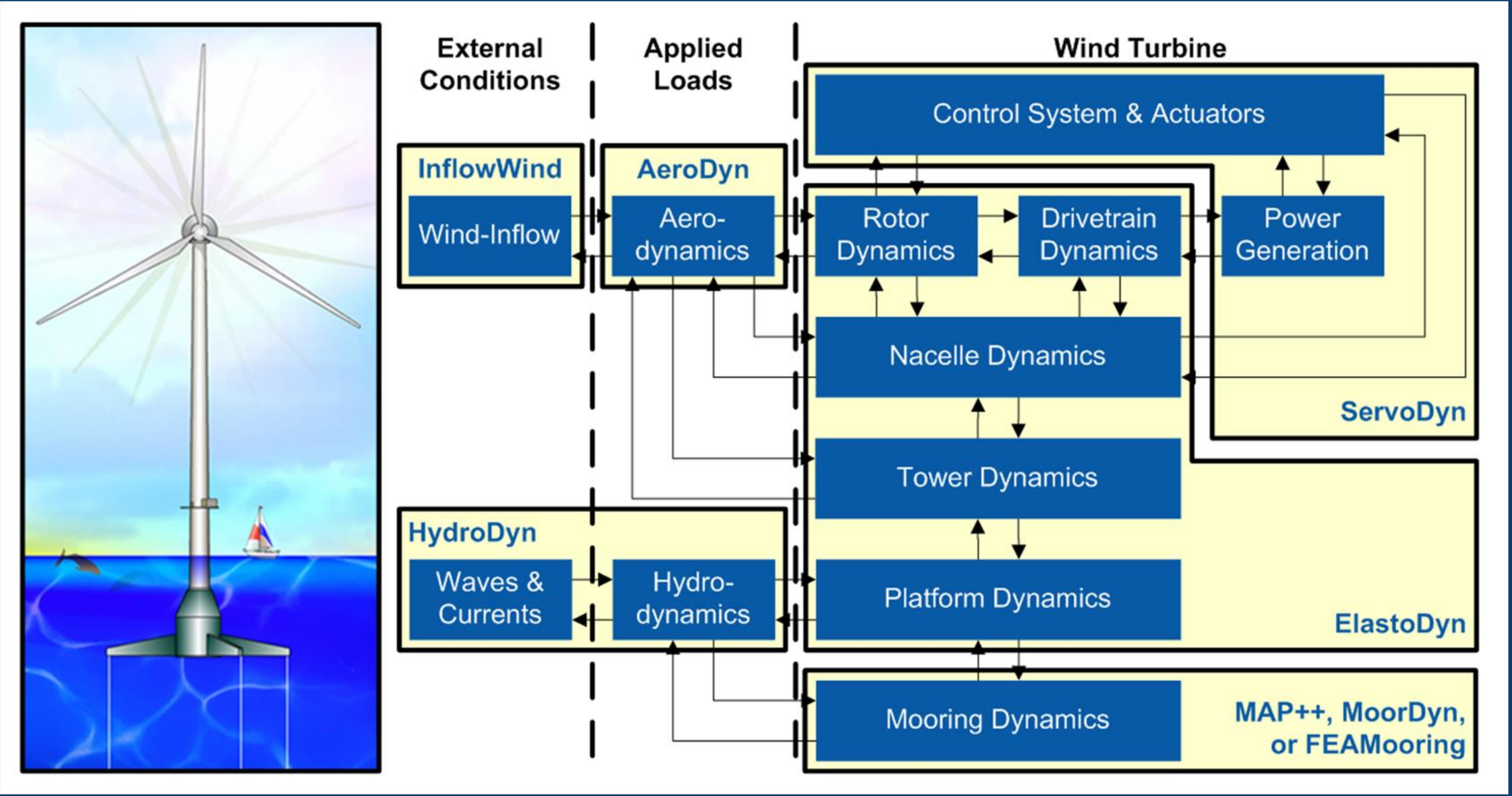
TÜBİTAK EURO² TRUBA Türk Ulusal Bilim e-Altyapısı ODTÜ METU RÜZGEM www.ruzgem.metu.edu.tr

Outline

- Brief reminder of OpenFAST
- What can be done with OpenFAST
- Hands on activities on TRUBA



OpenFAST review [1]

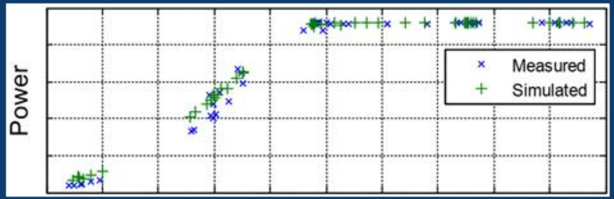


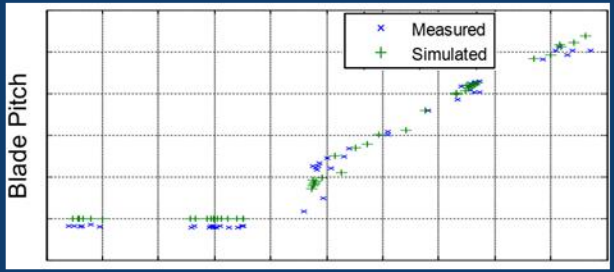
OpenFAST review

Validation cases

With real turbines

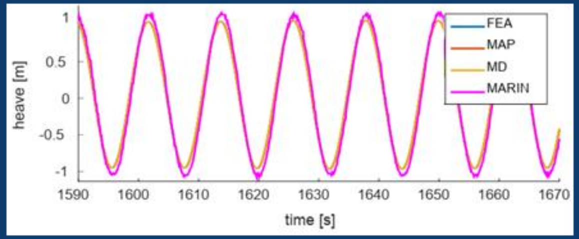
Siemens' 2.3-MW [2]

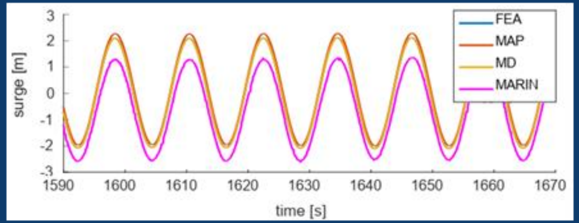




With lab experiment

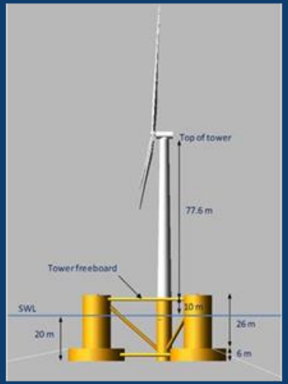
MARIN's lab [3]

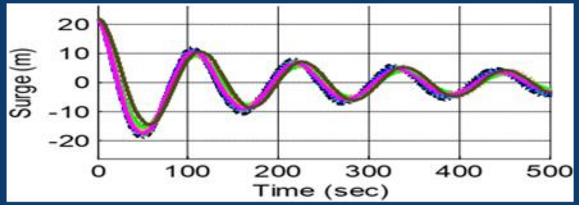


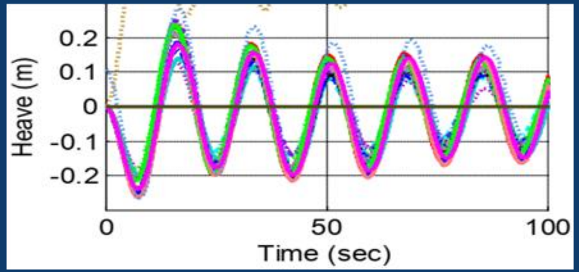


With other codes

OC4 in IEA WT 30 [4]







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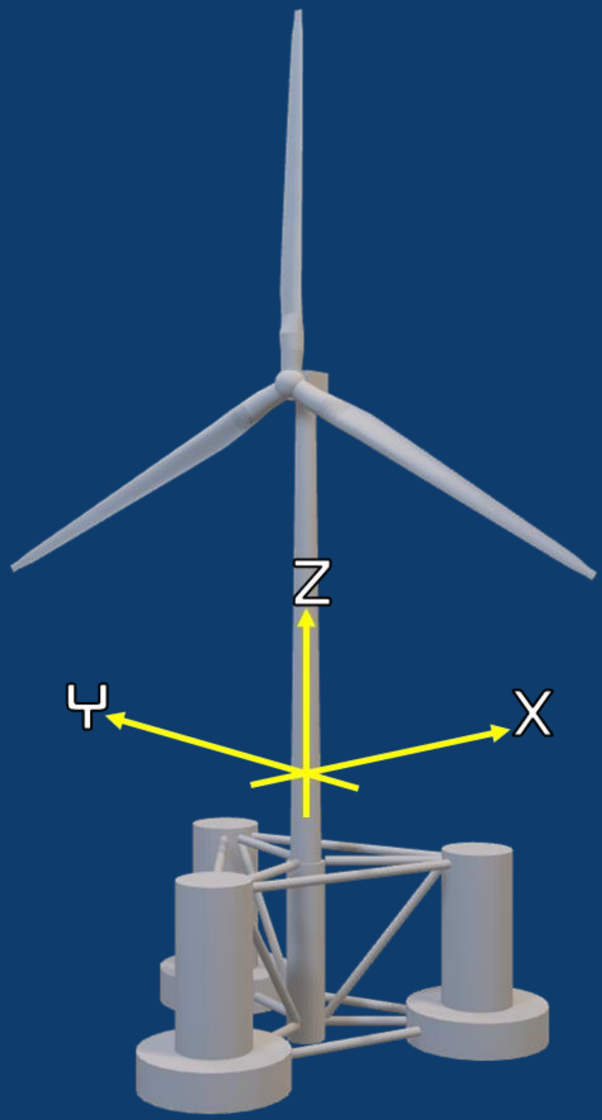
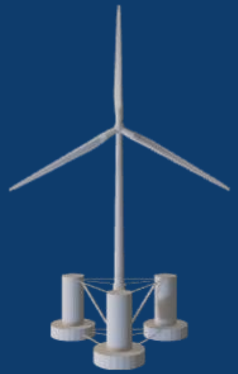
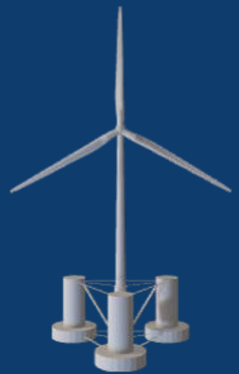
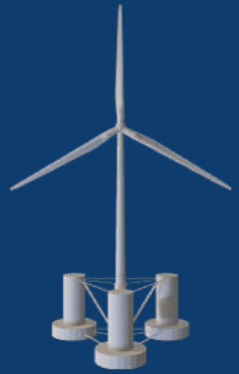
DEGREES OF FREEDOM



Motion	X	Y	Z
Translational	 surge	 sway	 heave
Rotational	 roll	 pitch	 yaw

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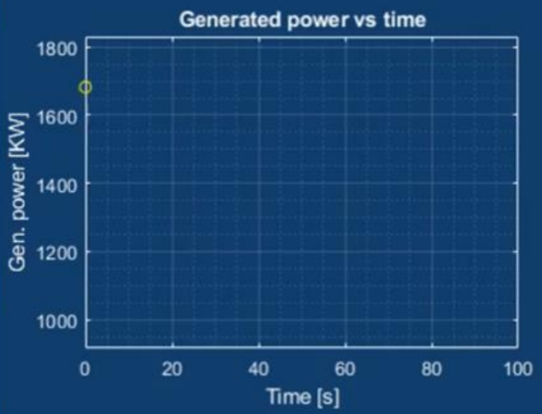

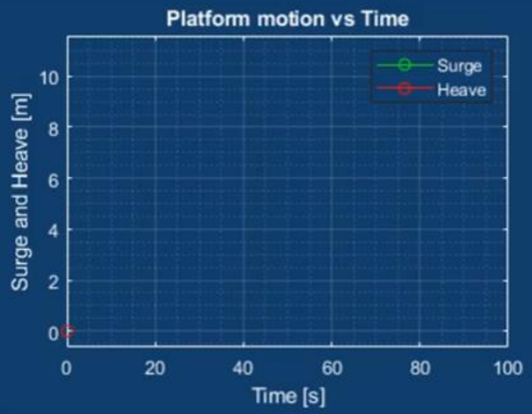

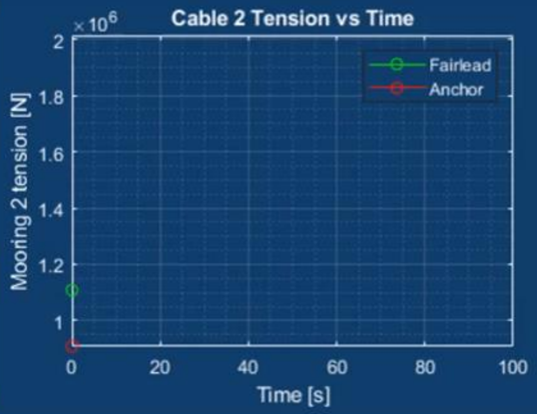

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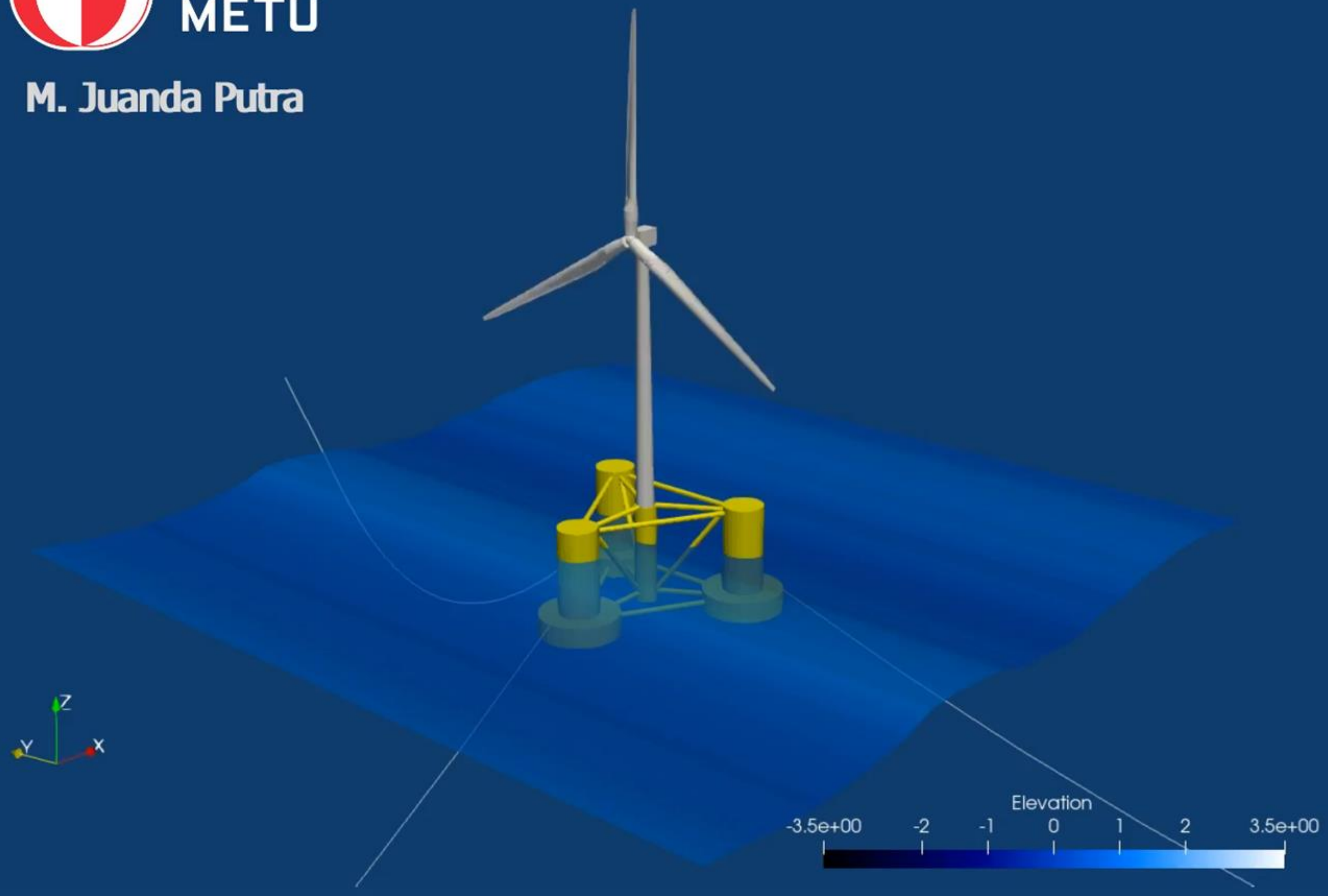
Multi physics simulation



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Multi scenarios Simulation

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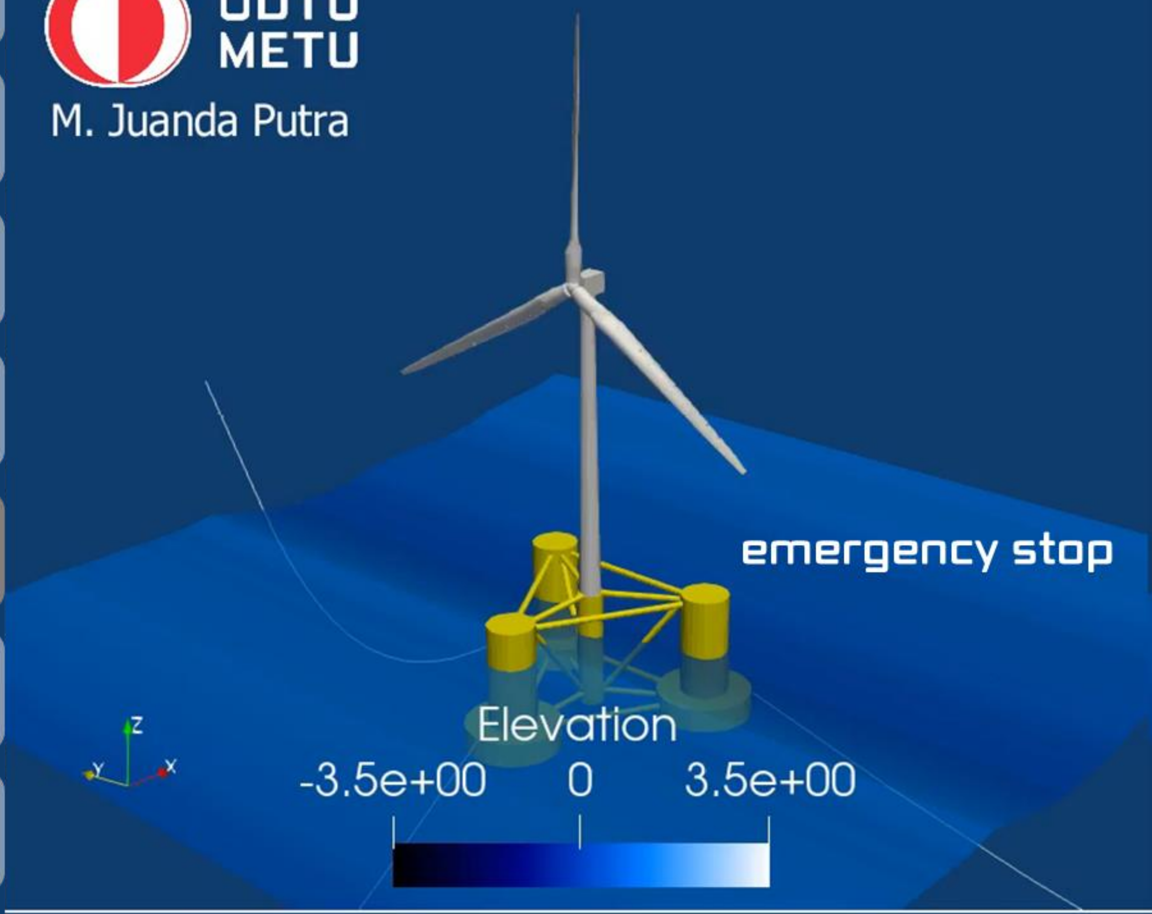

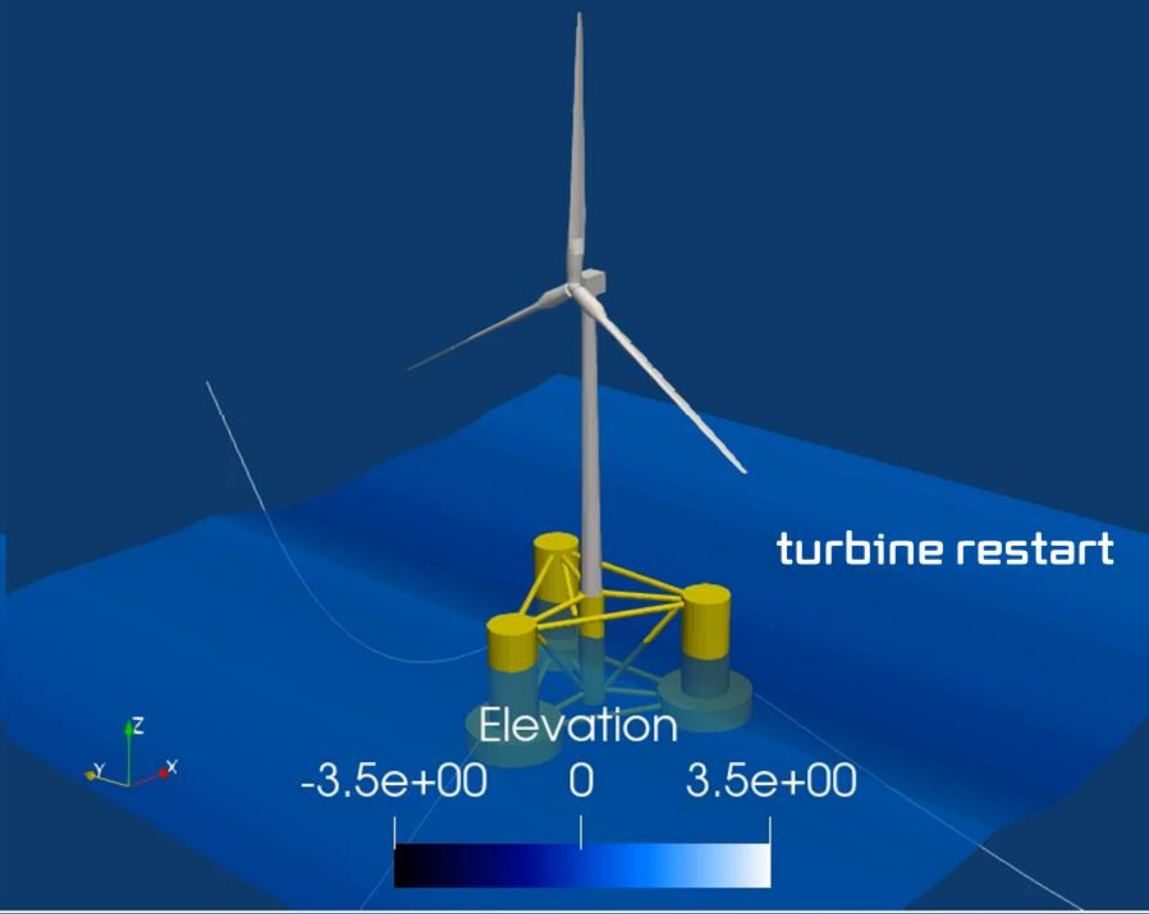

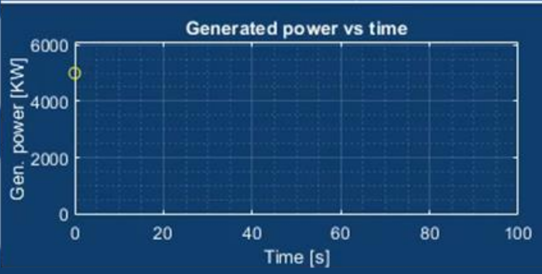

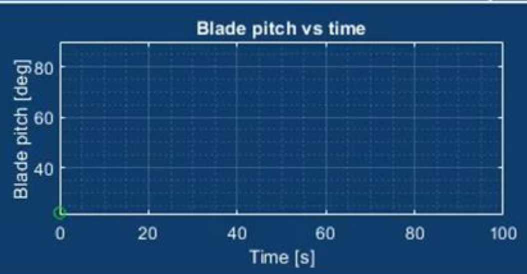

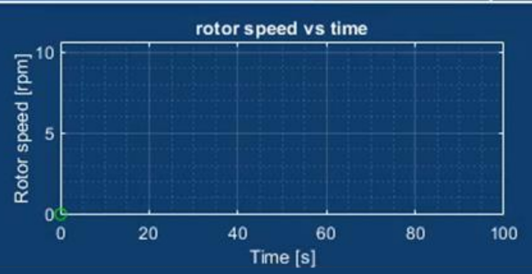

Failing Cases

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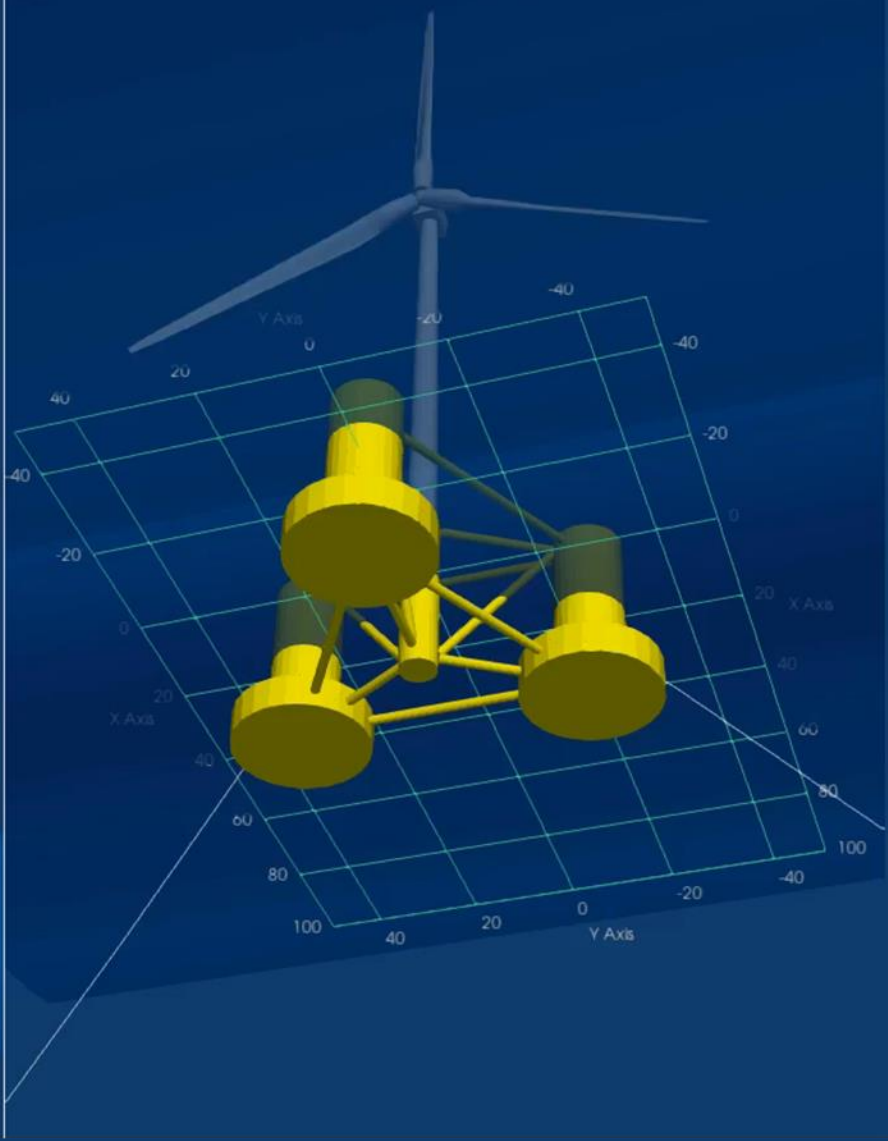

Multi turbines (FAST.Farm)

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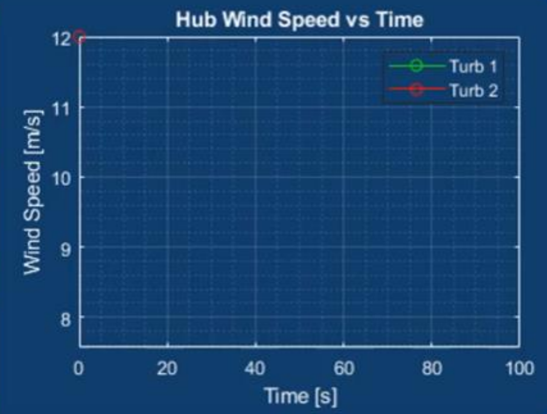

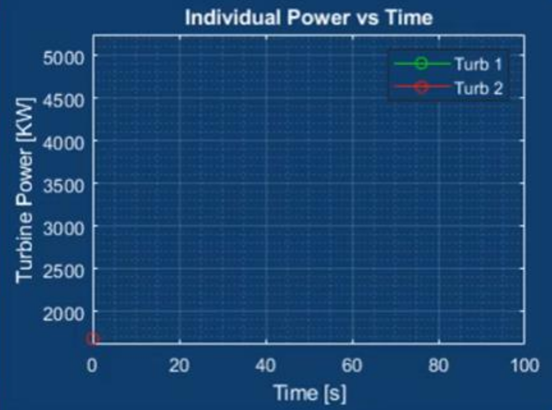

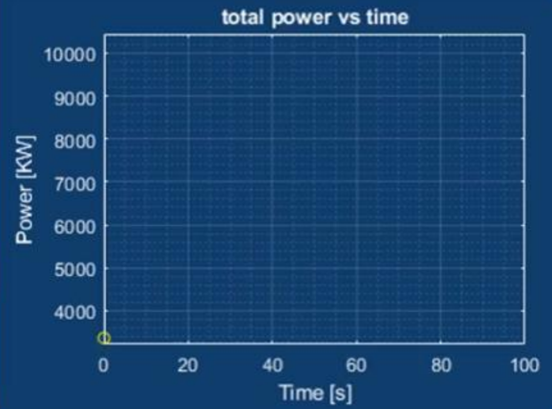

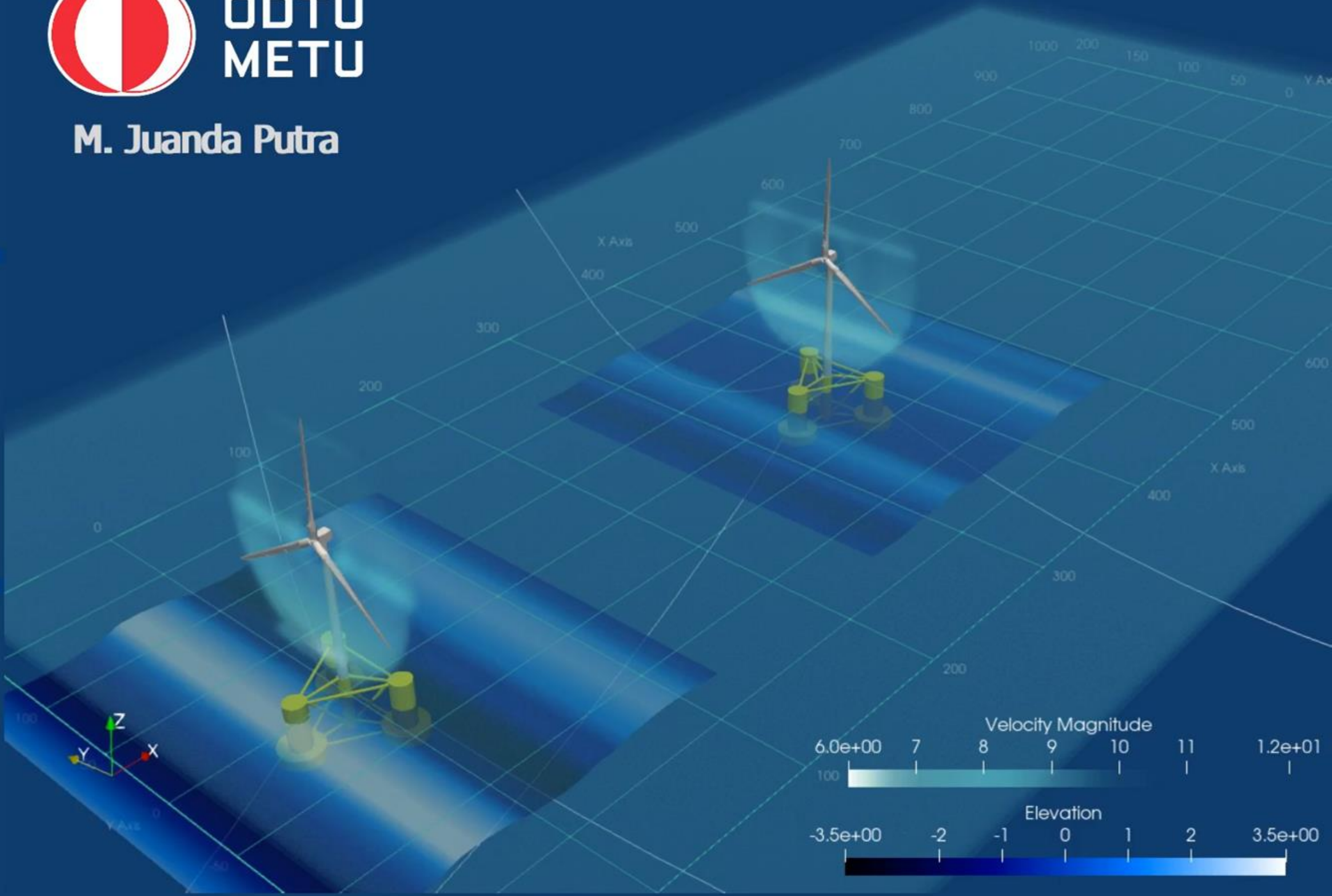

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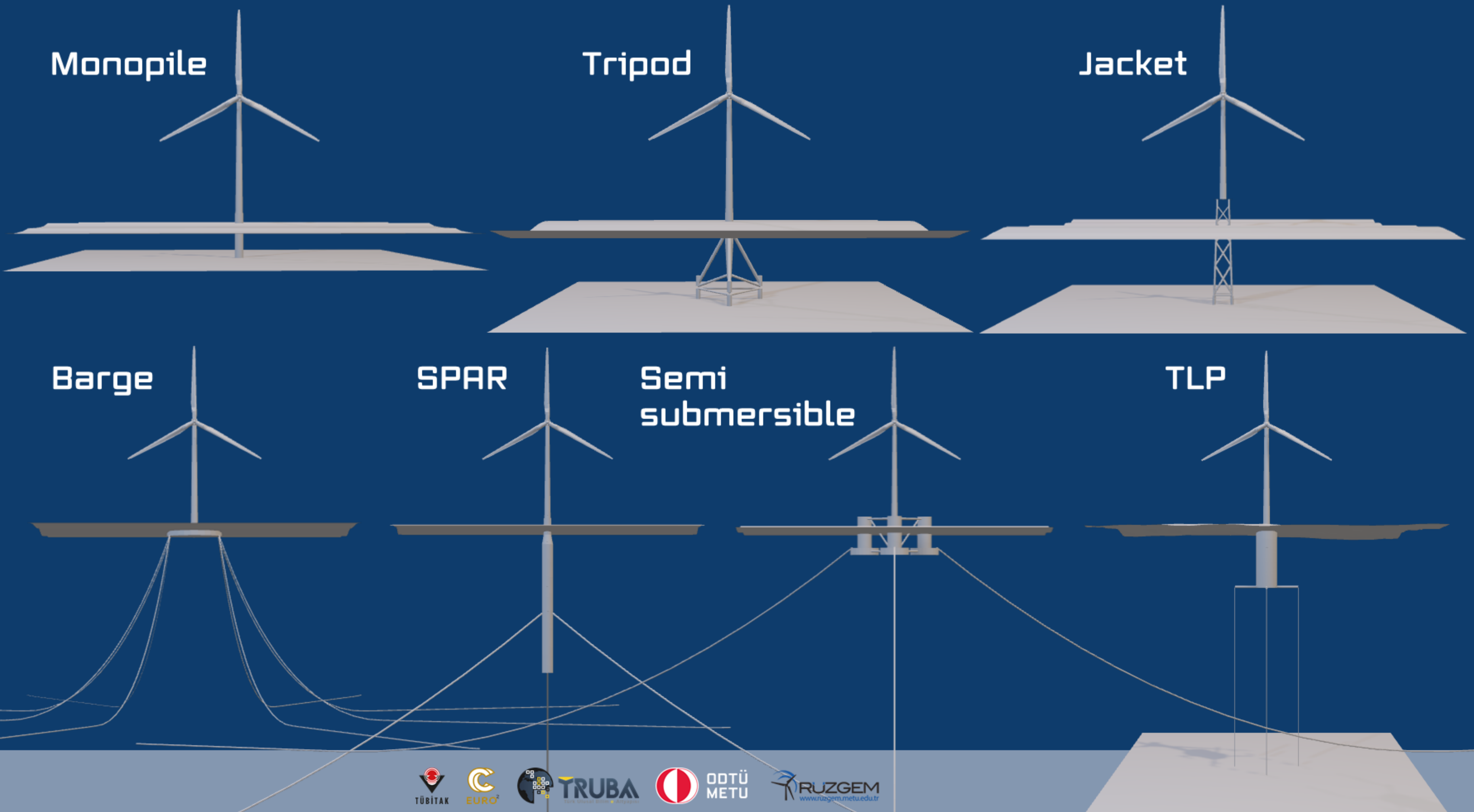
Offshore Horizontal Axis Wind Turbine (HAWT)



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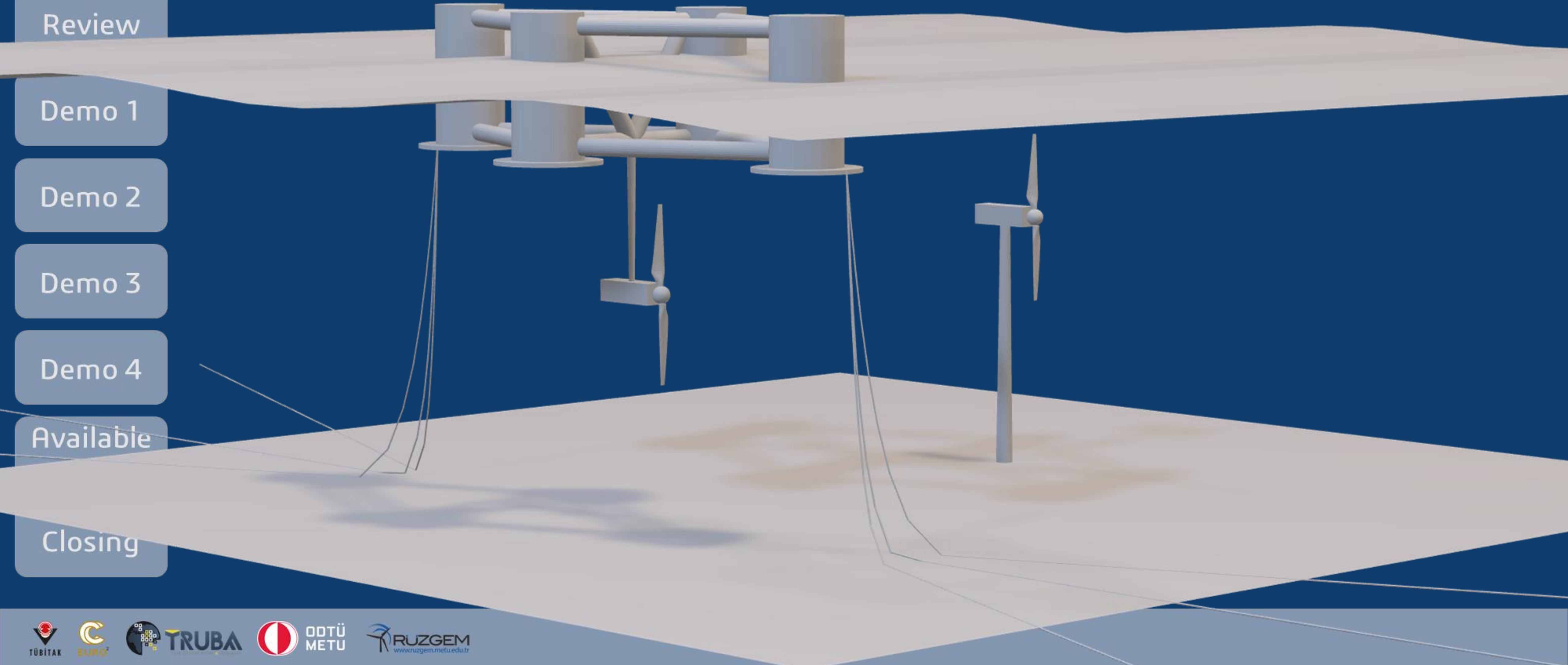
Fixed and floating
MHK = Marine Hydro Kinetic



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TRUBA	https://docs.truba.gov.tr

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REFERENCE

1. Jonkman BJ, Jonkman JM. FAST v8.16.00a-bjj User's Guide. Nrel 2016:58.
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3. Andersen MT, Wendt FF, Robertson AN, Jonkman JM, Hall M. Verification and validation of multisegmented mooring capabilities in FAST v8. Proc Int Offshore Polar Eng Conf 2016;2016-Janua:371–8.
4. Robertson A, Jonkman J, Vorpahl F, Popko W, Qvist J, Frøyd L, et al. Offshore code comparison collaboration continuation within IEA wind task 30: Phase II results regarding a floating semisubmersible wind system. Proc Int Conf Offshore Mech Arct Eng - OMAE 2014;9B. https://doi.org/10.1115/OMAE2014-24040.