Design and construction of a turbine model for testing in MarinLab

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M30

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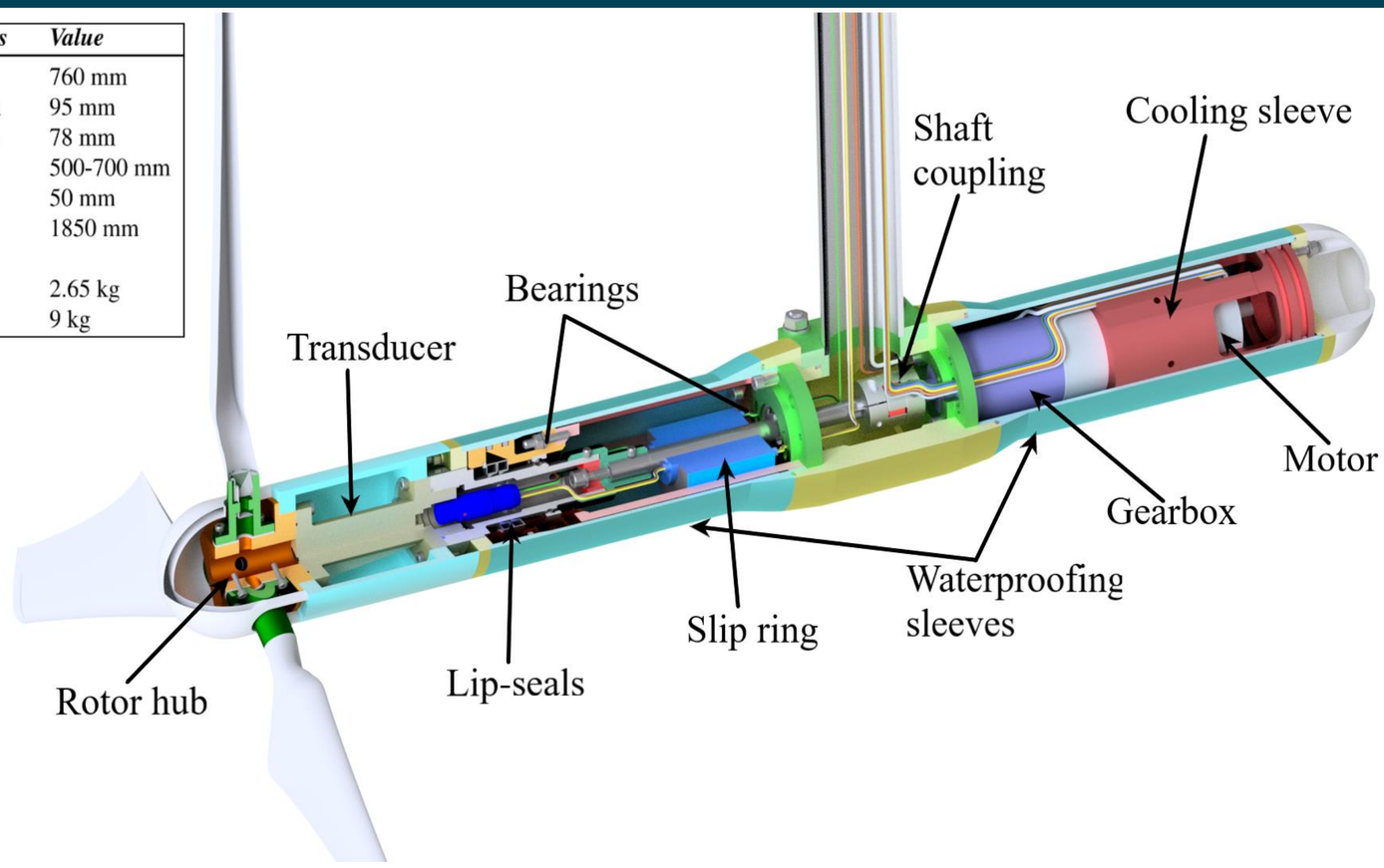
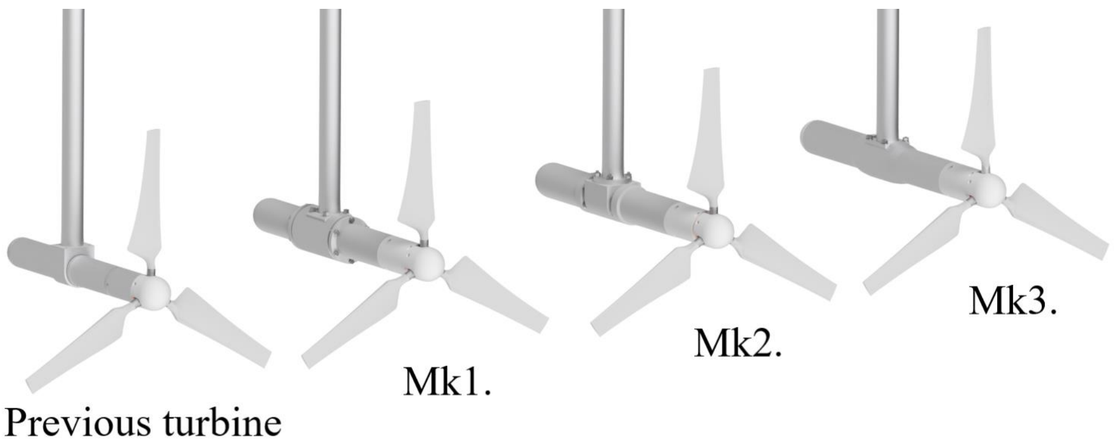
Abstract

Model testing provides important data for further innovation in the renewable energy sector. The aim of this thesis is to design an efficient and fully functional model turbine for future research in MarinLab.

Turbine spesifications	*Value*
Nacelle length	760 mm
Nacelle diameter max	95 mm
Nacelle diameter min	78 mm
Rotor diameter	500-700 mm
Tower diameter	50 mm
Tower total height	1850 mm
Tower mass	2.65 kg
Turbine mass	9 kg





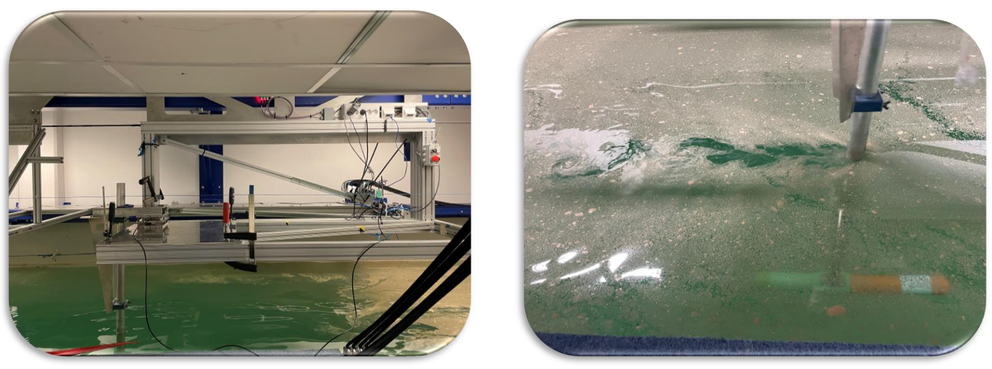
Design

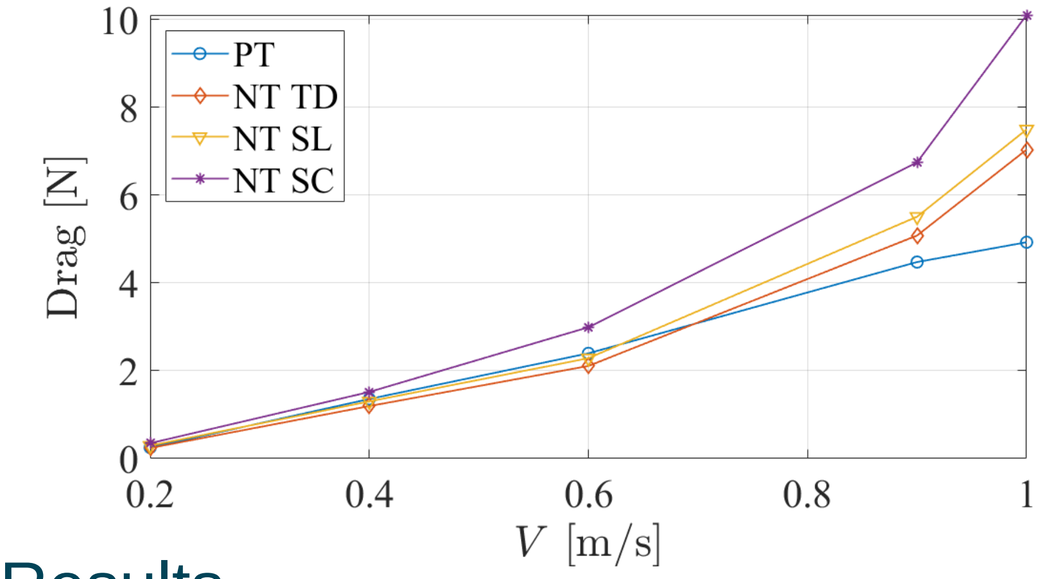
Several revisions are made before settling for the final design.

Rapid prototyping has become an integral part of the process

Experiments

A series of resistance tests are conducted in MarinLab to compare the efficiency of different 3D-printed nacelle configurations





Results

New sealing solutions increases the nacelle size which contributes to higher hydrodynamic drag. Despite this, a streamlined design has been shown to compensate for the losses.

Conclusion

The new turbine offers a much-improved design, improving the reliability of the turbine and allows for easy use and maintainability in the future.

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