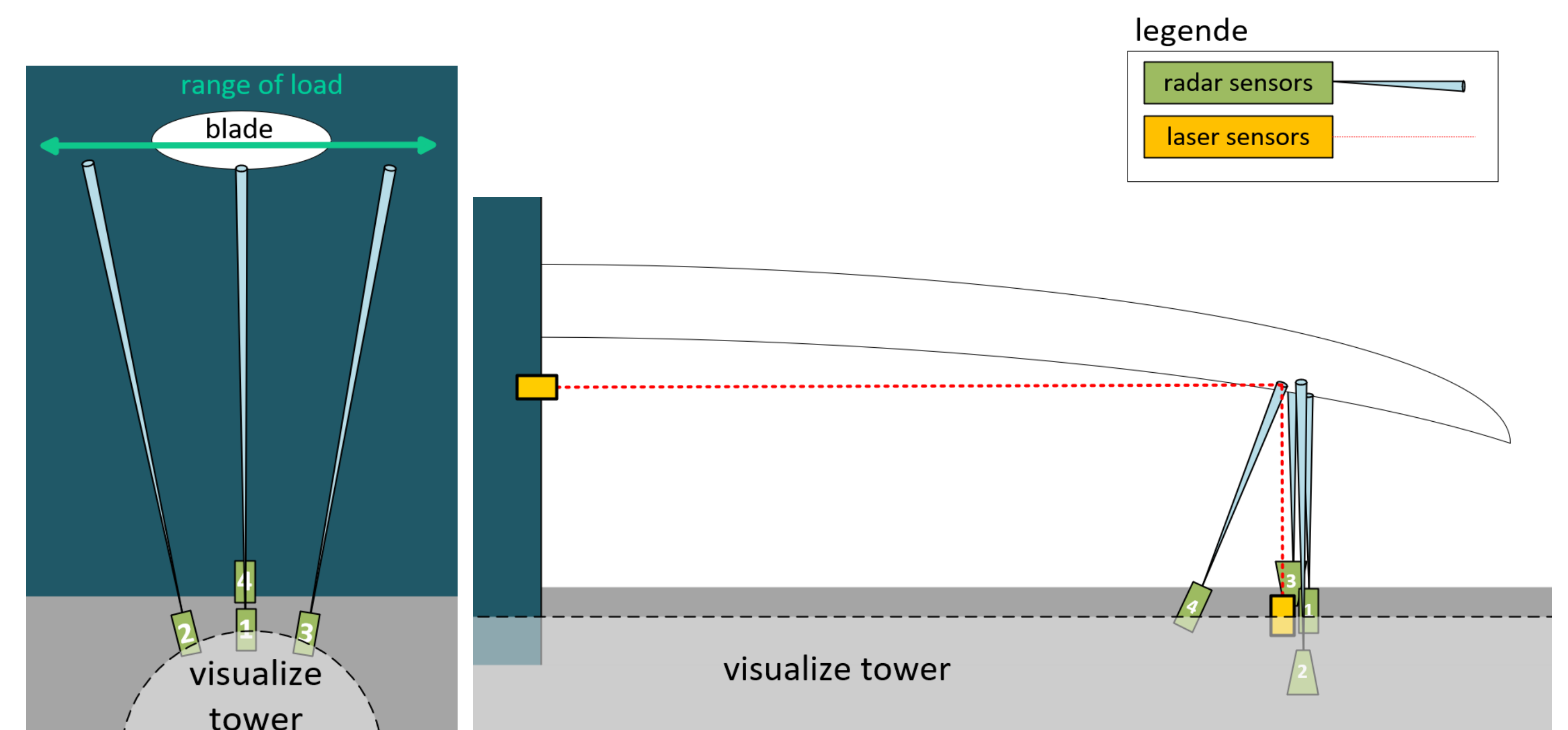
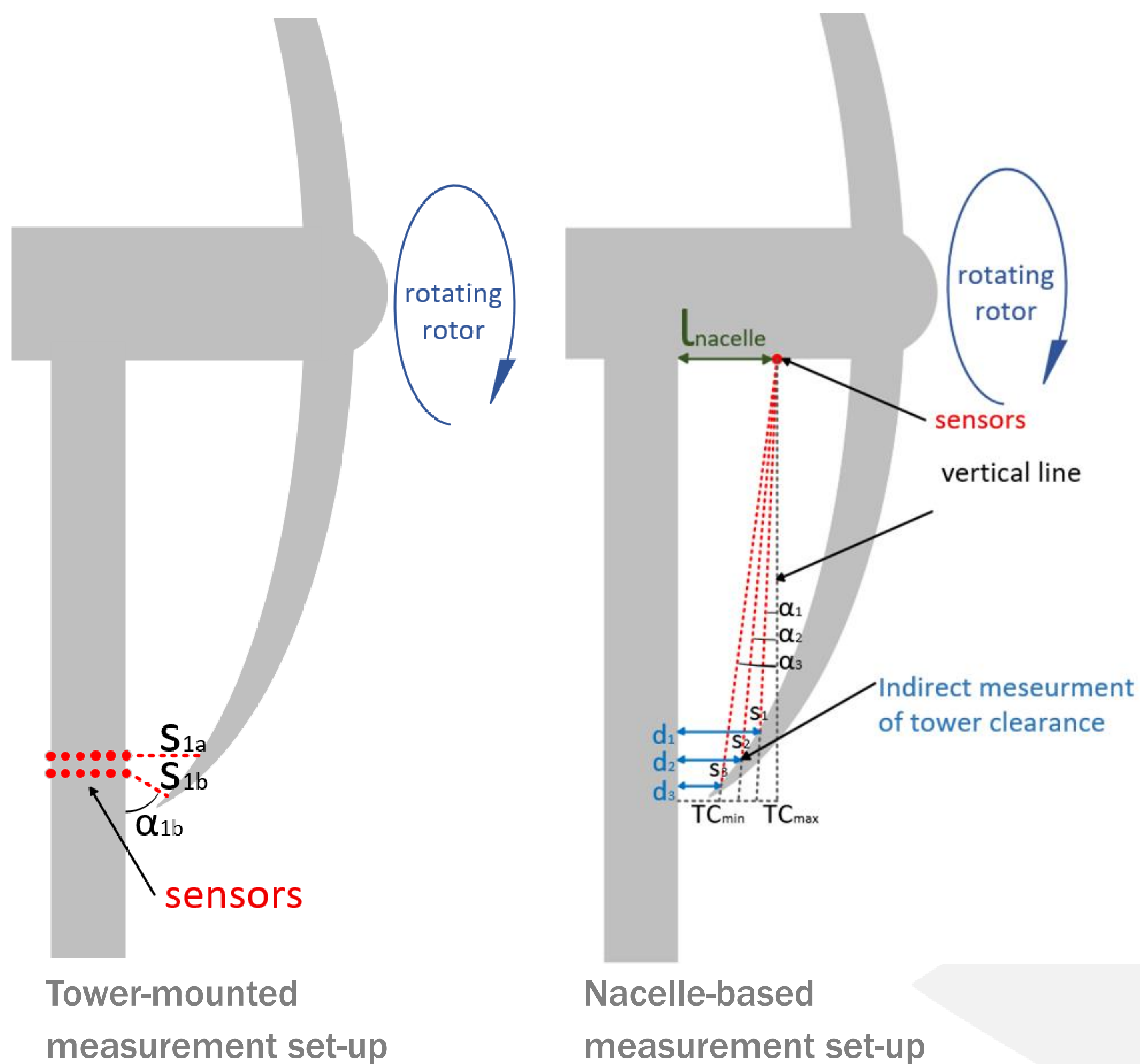


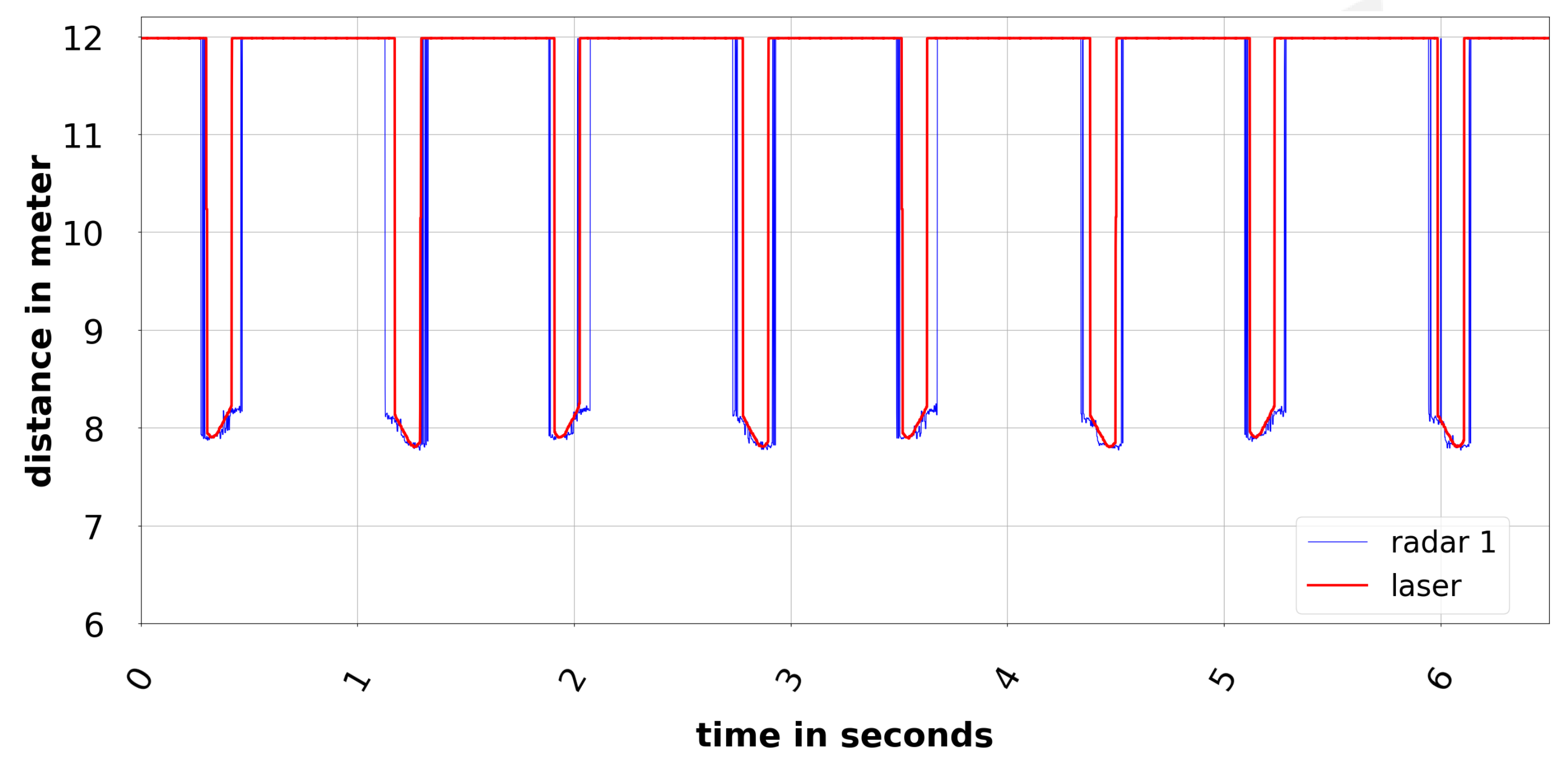
# Development of a Tower-Clearance Measurement System for 15+MW offshore WEC

Longer, more flexible rotors increase the risk of rotor-tower contact during operation. To address this, manufacturers seek to measure the distance between the tower and the blade tip (tower clearance) especially at prototype stage of new turbines. We examined two methods for measuring clearance and two different distance-sensor technologies for this application. Tests were conducted in the laboratory, on test benches, and in a field trial in front of an operating wind turbine.

Four radar sensors and one laser sensor were installed below the clamped rotor blade specimen on the floor of the rotor blade hall as shown in the following illustration.



Front view and side view of the clamped rotor blade and sensors



Results of distance measurement at test bench

Both sensor types, radar and laser accurately measure the distance to the rotor blade in both set-ups – tower-mounted and nacelle-based in the blade test bench. However, the blade speed in this test is lower than in real conditions.

The final pending tests must be performed on a multimegawatt turbine to show the ability of the sensors to measure fast moving blade tips, to adjust the sensor settings for maximum detection and to test the reliability of the system.

## Testing sensors on the rotor blade test bench

Tests in the blade test bench verified the sensor arrangement at the tower and the blade movement under realistic distance. Dynamic testing of rotor blades is done by clamping it horizontally and exciting it by actuators to swing in horizontal and vertical direction.

### Picture credits:

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ReaLCoE's vision is to unleash the full potential of offshore wind energy  
 €35/MWh LCoE Goal, +12MW WEC Capacity, ~32 mio € Total Budget, 42 month project duration



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