Simplified Calibration for Floating Lidar Systems (FLS)

A new technical standard [1] for Floating Lidar Systems (FLS) introduces a faster, simplified route to calibration, helping wind farm developers kick off measurement campaigns sooner. This streamlined approach is a game-changer compared to 'full' calibration, but it's still relatively unfamiliar. We explore how the simplified process works and what the outputs look like.

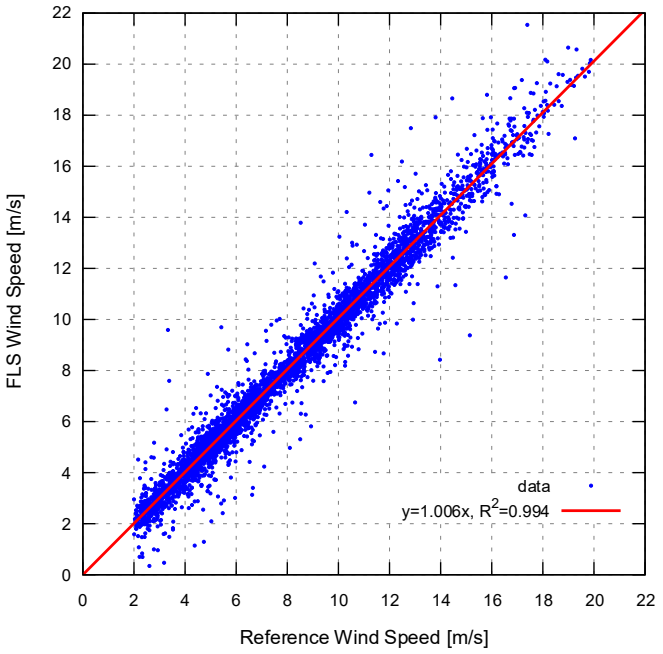

Figure 1: Wind speed comparison consistent with OWA Roadmap (full data set)

In a typical 'full' calibration, resulting in a calibration uncertainty which feeds into wind resource assessments, the measured data set must populate wind speed bins regardless of how long this takes. The bin-filling criteria are also required for OWA Roadmap [2] compliance - a representative output is shown in Figure 1. This type of plot is very familiar. The standard introduces a new possibility where (provided certain other conditions are met) a simplified calibration can be carried out using a minimum of 1440 data points, which in principle can be achieved in as little as 14 days. For the 'simplified' calibration, the nature of the comparison between FLS and reference data is different from that required for the 'full' calibration or in the OWA Roadmap. To demonstrate this, the full representative data set has been down-sampled to 1440 points, and the required wind speed comparison shown in Figure 2. This comparison disregards the time-coincident nature of the data pairs and instead orders each data set by wind speed and compares each quantile. An ideal match follows the 1:1 line, and the analysis is deemed acceptable if the mean deviation from the ideal does not exceed the calibration uncertainty established in a previous 'full' calibration for the same unit. In this case, this threshold has been achieved. As long as any individual excursions beyond the established calibration uncertainty can be understood and accepted, then the calibration can be deemed complete and the calibration uncertainties from previously may be applied.

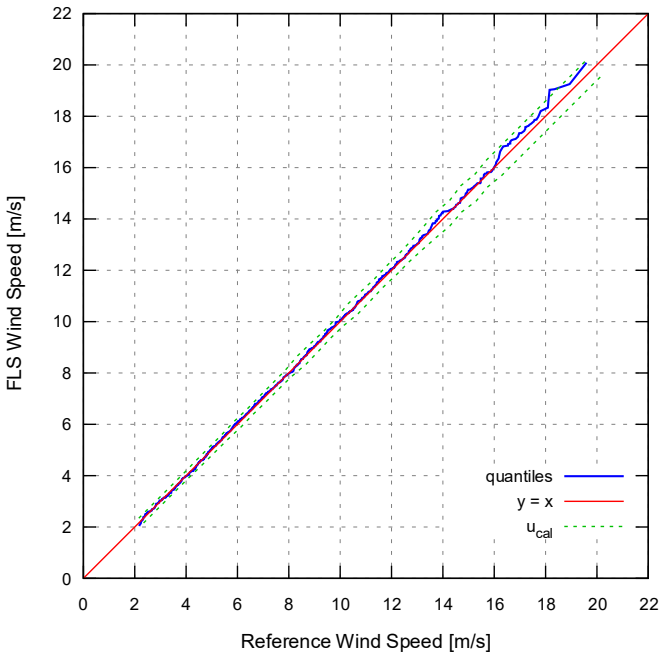

Figure 2: Quantile comparison consistent with IEC TS with reduced data set (1440 points)

This revised route offers a significant advantage in reducing timescales for deploying FLS units by potentially shortening the pre-deployment verification or calibration phase from a small number of months to a small number of weeks.

References

[1] IEC TS 61400-50-4:2025 Wind energy generation systems – Part 50-4: Use of floating lidar systems for wind measurements.

[2] The Carbon Trust Offshore Wind Accelerator Roadmap for the Commercial Acceptance of Floating LiDAR Technology, Version 3.0 June 2025.