



Thorben Bartsch

Team Lead Innovation & Research
SkySails Power GmbH
Research & Development

Wendenstraße 375
20537 Hamburg
Germany

thorben.bartsch@skysails.de
www.skysails-power.com



SkySails PN-14 Power Curve Measurement

Thorben Bartsch, Philip Knipper, Stefan Grazianski, Rafal Noga, Xaver Paulig
SkySails Power GmbH

Skysails Power GmbH is the leading manufacturer of light and efficient power kites that harness the wind's untapped supplies at high altitudes aiming at profoundly altering wind energy's impact in achieving the global energy transition. The key characteristic to describe the output of wind electricity producing systems is the power curve. Here we will present recent results on power curve measurement on our PN-14 System.

The experimental setup based upon standard IEC 61400-12-1 [1] for power performance measurements of conventional electricity producing wind turbines. Benefits and limitations of this standard for airborne power applications are discussed in the talk. With the presented measurement method, we propose a procedure for future specified power curve validations for ongoing discussion to the community [2,3]. The presented data are collected on our test site in Klixbüll in the north of Germany. We will discuss the data collecting method, the site assessment, as well as the statistical evaluation of the data base based upon standard IEC 61400-12-1 [1]. Different concepts of averaging the instantaneous power are compared.

Finally, we show that the data are in good agreement with our theoretical predictions based on three-dimensional model simulations.



SkySails PN-14 System in Klixbüll, Northern Germany.

References:

- [1] IEC 61400-12-1, Wind energy generation systems – Part 12-1: Power performance measurements of electricity producing wind turbines.*
- [2] M. Sommerfeld, M. Dörenkämpfer, J. De Shutter, C. Crawford, Wind Energy Science, **8**, 1153–1178, 2023. doi:10.5194/wes-8-1153-2023*
- [3] Glossary – Airbornewindeurope, 10/2023. <https://airbornewindeurope.org/glossary-2/>*