Verified SoDAR and LiDAR measurements speed up wind power development

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Company overview

- 20-year long experience in Germany, other European countries and overseas
- Offering wind measurements and wind power assessments to wind farm developers, operators, and investors
- Subsidiary RSC Finland Oy since 2014
- ISO/EN/DIN 17025 accredited company
Verification of remote measurements

* IEC 61400-12-1 2nd edition (draft) Annex L describes methods for
  * classification and
  * verification
  of the remote sensing devices for power curve tests

* Verification guidelines recommended also in IEA WIND RP15

* Classification of each instrument type to assess the influence of changing environmental conditions

* Periodic verifications to ensure that a single unit conforms to its classification during field deployment
Verification procedure

- SoDAR or LiDAR located near a wind measurement mast that conforms to IEC 61400-12-1
- Verification to be conducted at topographically suitable site (non-complex terrain)
- Guideline requires wind speed bins 4...16 m/s to be filled → data collected typically at least for one month
Verification procedure

- Data pre-processing to be conducted in the similar way than during normal field deployment (filtering etc.)
- Bin regressions and uncertainties are calculated
- Uncertainties are compared to those observed during the classification
- Wind speed, wind direction and turbulence intensity are verified in the similar manner
Example of LiDAR verification: speed
Example of LiDAR verification: direction

- Raw data
- Deviation raw data

80 m wind direction

- Bin average
- Deviation

80 m wind direction

mean deviation: 0.10°, 0.1%
standard deviation of deviation: 27.43°, 264.4%
Implications to the development of a wind park

- Met mast with cup anemometers is the standard device in wind power industry
- Verification makes remote sensing devices fully comparable to a met mast
- When conducted by an accredited body, a verification makes SoDAR or LiDAR measurement bankable
- Verification ensures all advantages of SoDAR or LiDAR are achieved in wind farm development!
Take-home message

* Verifications will be part of the guideline and thus will be a necessary part of any SoDAR or LiDAR measurement campaign

* All wind measurements made using SoDAR or LiDAR should be verified to ensure bankability also in the future

* Verification allows flexibility of SoDAR or LiDAR to be fully exploited in the development of a wind park
  * Full rotor area measured
  * Possible to deploy anywhere
  * Easy to relocate if needed

* RSC offers verifications for all makes & models of SoDARs and LiDARs!