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Wind energy generation systems –
Part 50-4: Use of floating lidar systems for wind measurements

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WIND ENERGY GENERATION SYSTEMS –

Part 50-4: Use of floating lidar systems for wind measurements

FOREWORD

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IEC TS 61400-50-4 has been prepared by of IEC technical committee 88: Wind energy generation systems. It is a Technical Specification.

The text of this Technical Specification is based on the following documents:

Draft	Report on voting
88/1042/DTS	88/1094/RVDTS

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this Technical Specification is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts of the IEC 61400 series, under the general title: *Wind energy generation systems*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

WIND ENERGY GENERATION SYSTEMS –

Part 50-4: Use of floating lidar systems for wind measurements

1 Scope

The purpose of this part of IEC 61400, which is a Technical Specification, is to describe procedures and methods which ensure that wind measurements using floating wind lidar systems are carried out and reported consistently and according to best practice. This document does not prescribe the purpose or use case of the wind measurements. However, as this document forms part of the IEC 61400 series of standards and technical specifications, it is anticipated that the wind measurements will be used in relation to some form of wind energy testing or resource assessment.

The scope of this document is limited to vertically profiling wind lidar devices in or on buoys.

This document aims to be applicable to any type and make of floating wind lidar system. The method and requirements provided in this document are independent of the model and type and of the measurement principle and allow application to new types of floating wind lidar systems as these become available.

This part of IEC 61400 aims to describe wind measurements using floating wind lidar with sufficient quality for the use case of wind resource assessment. Readers of this document can consider other use cases that can have other specific requirements.

Detailed guidance on metocean measurements in general is out of the scope of this document.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 61400-1, *Wind turbines – Part 1: Design requirements*

IEC 61400-3-1:2019, *Wind energy generation systems – Part 3-1: Design requirements for fixed offshore wind turbines*

IEC 61400-12-1:2022, *Wind energy generation systems – Part 12-1 Power performance measurements of electricity producing wind turbines*

IEC 61400-12-5:2022, *Wind energy generation systems – Part 12-5 Power performance – Assessment of obstacles and terrain*

IEC 61400-50-1:2022, *Wind energy generation systems – Part 50-1: Wind measurement – Application of meteorological mast, nacelle and spinner mounted instruments*

IEC 61400-50-2:2022, *Wind energy generation systems – Part 50-2: Wind measurement – Application of ground-mounted remote sensing technology*

IEC 61400-50-3:2022, *Wind energy generation systems – Part 50-3: Use of nacelle-mounted lidars for wind measurements*

IEC TS 62600-101, *Marine energy – Wave, tidal and other water current converters – Part 101: Wave energy resource assessment and characterization*

ISO 19901-1, *Petroleum and natural gas industries − Specific requirements for offshore structures − Part 1: Metocean design and operating considerations*

VIM, International vocabulary of metrology – Basic and general concepts and associated terms (VIM), Technical report, JCGM, 2012 (https://www.bipm.org/en/publications/guides/vim.html) [viewed 2024-04-09]

JCGM 100:2008, Evaluation of measurement data – Guide to the expression of uncertainty in measurement, (GUM 1995 with minor corrections) https://www.bipm.org/utils/common/documents/jcgm/JCGM_100_2008_E.pdf [viewed 2024-04-09]

3 Terms, definitions, symbols and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 61400-12-1:2022, IEC 61400-50-0:2022, IEC 61400-50-1:2022, IEC 61400-50-2:2022 and IEC 61400-50-3:2022 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1.1
ACARA principle
degree to which an uncertainty budget can be considered to be complete and representative of the range of measurement outcomes that can be expected following a thorough and systematic investigation of contributions to the uncertainty budget

Note 1 to entry: ACARA stands for "As Complete As Reasonably Achievable".

3.1.2
acceptance criteria
value or set of values that performance metrics or key performance indicators shall achieve for the data characterised by those metrics to be considered acceptable for the purposes of subsequent analysis

3.1.3
anticipated hub height
hub height of the wind turbines expected to be installed at the site for which a specific measurement campaign (SMC) has been undertaken

3.1.4
as-built report
report documenting the status and configuration of an instrument after it has been manufactured and system integration has been completed, prior to being deployed to a site to acquire measurements

Note 1 to entry: See also factory acceptance test (FAT).