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BSI Standards Publication

Geographic information — Calibration and validation of remote sensing imagery sensors and data

Part 2: Lidar

National foreword

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**Geographic information — Calibration
and validation of remote sensing
imagery sensors and data —**

**Part 2:
Lidar**

*Information géographique – Calibration et validation de capteurs de
télédétection —*

Partie 2: Lidar



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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 211 *Geographic information/Geomatics*.

ISO/TS 19159 consists of the following parts, under the general title *Geographic information — Calibration and validation of remote sensing imagery sensors and data*:

- Part 1: *Optical sensors* [Technical Specification]
- Part 2: *Lidar* [Technical Specification]

The following parts are planned:

- Part 3: *SAR/InSAR*
- Part 4: *SONAR*

Introduction

Imaging sensors are one of the major data sources for geographic information. The image data capture spatial and spectral measurements are applied for numerous applications ranging from road/town planning to geological mapping. Typical spatial outcomes of the production process are vector maps, Digital Elevation Models, and 3-dimensional city models. There are typically two streams of spectral analysis data, i.e. the statistical method, which includes image segmentation and the physics-based method which relies on characterisation of specific spectral absorption features.

In each of the cases the quality of the end products fully depends on the quality of the measuring instruments that has originally sensed the data. The quality of measuring instruments is determined and documented by calibration.

A calibration is often a costly and time consuming process. Therefore, a number of different strategies are in place that combine longer time intervals between subsequent calibrations with simplified intermediate calibration procedures that bridge the time gap and still guarantee a traceable level of quality. Those intermediate calibrations are called validations in this part of ISO/TS 19159.

The ISO 19159 series standardizes the calibration of remote sensing imagery sensors and the validation of the calibration information and procedures. It does not address the validation of the data and the derived products.

Many types of imagery sensors exist for remote sensing tasks. Apart from the different technologies the need for a standardization of the various sensor types has different levels of priority. In order to meet those requirements, the ISO 19159 series has been split into more than one part.

This part of ISO/TS 19159 covers the airborne land lidar sensor (light detection and ranging). It includes the data capture and the calibration. The result of a lidar data capture is a lidar cloud according to the ISO 19156:2011. The bathymetric lidar is not included in the ISO 19159 series.

ISO 19159-3 and ISO 19159-4 are planned to cover RADAR (Radio detection and ranging) with the subtopics SAR (Synthetic Aperture RADAR) and InSAR (Interferometric SAR) as well as SONAR (Sound detection and ranging) that is applied in hydrography.

Geographic information — Calibration and validation of remote sensing imagery sensors and data —

Part 2: Lidar

1 Scope

This part of ISO/TS 19159 defines the data capture method, the relationships between the coordinate reference systems and their parameters, as well as the calibration of airborne lidar (light detection and ranging) sensors.

This part of ISO/TS 19159 also standardizes the service metadata for the data capture method, the relationships between the coordinate reference systems and their parameters and the calibration procedures of airborne lidar systems as well as the associated data types and code lists that have not been defined in other ISO geographic information international standards.

2 Conformance

This part of ISO/TS 19159 standardizes the metadata for the data recording and the calibration procedures of airborne lidar systems as well as the associated data types and code lists. Therefore conformance depends on the type of entity declaring conformance.

Mechanisms for the transfer of data are conformant to this part of ISO/TS 19159 if they can be considered to consist of transfer record and type definitions that implement or extend a consistent subset of the object types described within this part of ISO/TS 19159.

Details of the conformance classes are given in the Abstract test suite in [Annex A](#).

3 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/TS 19130:2010, *Geographic information - Imagery sensor models for geopositioning*

ISO 19157:2013, *Geographic information — Data quality*

4 Terms and definitions

4.1

absolute accuracy

closeness of reported coordinate values to values accepted as or being true

Note 1 to entry: Absolute accuracy is stated with respect to a defined *datum* ([4.11](#)) or reference system.

Note 2 to entry: Absolute accuracy is also termed “external accuracy”.