

This is a preview of "ISO/TS 19159-1:2014". [Click here to purchase the full version from the ANSI store.](#)

First edition
2014-07-15

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

Part 1: Optical sensors

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

Partie 1: Capteurs optiques



Reference number
ISO/TS 19159-1:2014(E)

© ISO 2014



COPYRIGHT PROTECTED DOCUMENT

© ISO 2014

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

This is a preview of "ISO/TS 19159-1:2014". [Click here to purchase the full version from the ANSI store.](#)

Contents

	Page
Foreword	iv
Introduction	v
1 Scope	1
2 Conformance	1
3 Normative references	1
4 Terms and definitions	1
5 Abbreviated terms and symbols	8
5.1 Abbreviated terms.....	8
5.2 Symbols.....	10
5.3 Variable names of the Jacobsen model.....	10
5.4 Conventions.....	10
6 Calibration	11
6.1 Project.....	11
6.2 Package OpticsSensor, Geometry.....	16
6.3 Package OpticsSensor, Radiometry.....	25
6.4 Package OpticsCalibrationFacility, Geometry.....	35
6.5 Package OpticsCalibrationFacility, Radiometry.....	41
6.6 Package OpticsValidation.....	45
7 Documentation	46
7.1 Semantics.....	46
7.2 Package Documentation.....	47
Annex A (normative) Abstract test suite	49
Annex B (normative) Data dictionary	54
Annex C (normative) Self calibration models	85
Annex D (informative) Calibration and validation quality measures	94
Bibliography	100

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

— *Part 1: Optical sensors*

Part 2 is planned to cover laser scanning, also known as light detection and ranging (LIDAR), SAR/InSAR (RADAR) and SONAR (sound). Parts 3 and 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

This is a preview of "ISO/TS 19159-1:2014". [Click here to purchase the full version from the ANSI store.](#)

Introduction

Imaging sensors are one of the major data sources for geographic information. Typical spatial outcomes of the production process are vector maps, Digital Elevation Models, and three-dimensional city models. There are typically two streams of spectral data analysis, that is, the statistical method, which includes image segmentation, and the physics-based method, which relies on characterization 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 used 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 19159.

This part of ISO 19159 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, ISO 19159 has been split into more than one part. Part 1 covers optical sensors, i.e. airborne photogrammetric cameras and spaceborne optical sensors. Part 2 is intended to cover laser scanning, also known as LIDAR (Light detection and ranging).

Parts 3 and 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.