PD ISO/TS 19130-2:2014



BSI Standards Publication

Geographic information — Imagery sensor models for geopositioning

Part 2: SAR, InSAR, lidar and sonar

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National foreword

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Foreword

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

ISO/TS 19130 consists of the following parts, under the general title *Geographic information — Imagery sensor models for geopositioning*:

— *Geographic information — Imagery sensor models for geopositioning*

— *Part 2: Geographic information — Imagery sensor models for geopositioning — Part 2: SAR, InSAR, lidar and sonar*

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Introduction

The purpose of this Technical Specification is to specify the geolocation information that an imagery data provider shall supply in order for the user to be able to find the earth location of the data using a detailed physical sensor model for Synthetic Aperture Radar (SAR), Light Detection And Ranging (lidar) and Sound Navigation And Ranging (sonar). The intent is to standardize sensor descriptions and specify the minimum geolocation metadata requirements for data providers and geopositioning imagery systems. Observations in this document are the generic meaning of the word; observations are not in the meaning of ISO 19156 observations.

Vast amounts of data from imaging systems have been collected, processed and distributed by government mapping and remote sensing agencies and by commercial data vendors. In order for this data to be useful in extraction of geographic information, further processing of the data are needed. Geopositioning, which determines the ground coordinates of an object from image coordinates, is a fundamental processing step. Because of the diversity of sensor types and the lack of a common sensor model standard, data from different producers may contain different parametric information, lack parameters required to describe the sensor that produces the data, or lack ancillary information necessary for geopositioning and analysing the data. Often, a separate software package must be developed to deal with data from each individual sensor or data producer. Standard sensor models and geolocation metadata allow agencies or vendors to develop generalized software products that are applicable to data from multiple data producers or from multiple sensors. With such standards, different producers can describe the geolocation information of their data in the same way, thus promoting interoperability of data between application systems and facilitating data exchange.

Part 1 provided a location model and metadata relevant to all sensors. It also included metadata specific to whiskbroom, pushbroom, and frame sensors, and some metadata for Synthetic Aperture Radar (SAR) sensors. In addition, it provided metadata for functional fit geopositioning, whether the function was part of a correspondence model or a true replacement model. It also provided a schema for these metadata elements. Comments on Part 1 stated that metadata needed to be specified for additional sensors. The technology of such sensors has now become sufficiently mature that standardization is now possible. This Technical Specification extends the specification of the set of metadata elements required for geolocation by providing physical sensor models for LIght Detection And Ranging (lidar) and SOund Navigation And Ranging (sonar), and it presents a more detailed set of elements for SAR. This Technical Specification also defines the metadata needed for the aerial triangulation of airborne and spaceborne images. This Technical Specification also provides a schema for all of these metadata elements.

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Geographic information — Imagery sensor models for geopositioning —

Part 2: SAR, InSAR, lidar and sonar

1 Scope

This Technical Specification supports exploitation of remotely sensed images. It specifies the sensor models and metadata for geopositioning images remotely sensed by Synthetic Aperture Radar (SAR), Interferometric Synthetic Aperture Radar (InSAR), LIght Detection And Ranging (lidar), and SOund Navigation And Ranging (sonar) sensors. The specification also defines the metadata needed for the aerial triangulation of airborne and spaceborne images.

This Technical Specification specifies the detailed information that shall be provided for a sensor description of SAR, InSAR, lidar and sonar sensors with the associated physical and geometric information necessary to rigorously construct a Physical Sensor Model. For the case where precise geoposition information is needed, this Technical Specification identifies the mathematical formulae for rigorously constructing Physical Sensor Models that relate two-dimensional image space to three-dimensional ground space and the calculation of the associated propagated error.

This Technical Specification does not specify either how users derive geoposition data or the format or content of the data the users generate.

2 Conformance

This Technical Specification specifies 5 conformance classes. There is one conformance class for each type of sensor. Any set of geopositioning information claiming conformance to this Technical Specification shall satisfy the requirements for at least one conformance class as specified in Table 1. The requirements for each class are shown by the presence of an X in the boxes for all clauses in the application test suite (ATS) required for that class. If the requirement is conditional, the box contains a C. The conditions are defined in the corresponding UML models.

Table 1 — Conformance classes

		Section of this part of ISO 19130							
		A.1.1	A.1.2	A.1.3	A.2	A.3	A.4	A.5	A.6
Conformance Class	SAR	X	C		X				
	InSAR	X	C			X			
	Lidar	X	X	X			X		
	Sonar	X	X	X				X	
	Aerial triangulation	X	C						X

3 Normative references

The following referenced documents are indispensable for the application 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.

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