TECHNICAL SPECIFICATION

ISO/TS 19127

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Geographic information — Geodetic codes and parameters

Information géographique — Codes et paramètres géodésiques

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of normative document:

— an ISO Publicly Available Specification (ISO/PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50 % of the members of the parent committee casting a vote;

— an ISO Technical Specification (ISO/TS) represents an agreement between the members of a technical committee and is accepted for publication if it is approved by 2/3 of the members of the committee casting a vote.

An ISO/PAS or ISO/TS is reviewed after three years in order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn. If the ISO/PAS or ISO/TS is confirmed, it is reviewed again after a further three years, at which time it must either be transformed into an International Standard or be withdrawn.

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.

ISO/TS 19127 was prepared by Technical Committee ISO/TC 211, *Geographic information/Geomatics*.

Introduction

ISO 19135 specifies procedures for the registration of items of geographic information. ISO/IEC JTC 1 defines registration as the assignment of an unambiguous name to an object in a way that makes the object available to interested parties.

ISO 19111 describes elements necessary to define fully coordinate reference systems and coordinate systems so that coordinates for positions on or near the Earth's surface can be unambiguously referenced. ISO 19111 also describes elements to define coordinate operations that change coordinate values from one coordinate reference system to coordinate values based on another coordinate reference system.

Currently, many lists of geodetic codes and parameters exist in national standards, standards of liaison organizations, and industrial specifications and software products. Little guidance is provided on applicability and appropriate use of these geodetic codes and parameters. Applicability and appropriate use are of great concern, as geographic information systems become more widely available to non-experts in cartography and geodesy.

This Technical Specification describes how the procedures specified in ISO 19135 are to be applied to registers of elements applicable to spatial referencing by coordinates in compliance with ISO 19111. Some elements that are optional in ISO 19111 become mandatory in this Technical Specification to provide guidance on applicability and appropriate use.

Geographic information — Geodetic codes and parameters

1 Scope

This Technical Specification defines rules for the population and maintenance of registers of geodetic codes and parameters and identifies the data elements, in compliance with ISO 19111 and ISO 19135, required within these registers. Recommendations for the use of the registers, the legal aspects, the applicability to historic data, the completeness of the registers, and a mechanism for maintenance are specified by the registers themselves.

2 Conformance

To conform to this Technical Specification, a register of items of geographic information shall satisfy all of the conditions specified in the Abstract test suite (Annex A).

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.

ISO 19111:2003, *Geographic information ⎯ Spatial referencing by coordinates*

ISO 19112, *Geographic information ⎯ Spatial referencing by geographic identifiers*

ISO 19135:⎯[1], *Geographic information ⎯ Procedures for item registration*

4 Terms and definitions

For the purposes of this document, the terms, definitions, symbols, notations and abbreviated terms given in ISO 19111 and ISO 19135 apply.

5 Registers of geodetic codes and parameters

The ISO geodetic registry network is defined as:

a) The ISO register of geodetic registers. This principal register holds a set of items that describe the subregisters described in b) and c);

b) The ISO register of geodetic codes and parameters. This subregister shall contain coordinate reference system data and coordinate transformation data that conform to ISO 19111 and are international in

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1) To be published.

geographic extent of application, widely used, and well defined. See Tables B.1, B.2 and B.3 for requirements for entries in the ISO register;

c) External subregisters of geodetic codes and parameters. These subregisters shall contain coordinate reference system data and coordinate transformation data that conform to ISO 19111. See Tables B.1, B.2 and B.3 for requirements for entries in the external subregisters of geodetic codes and parameters.

Figure 1 illustrates the ISO geodetic registry network.
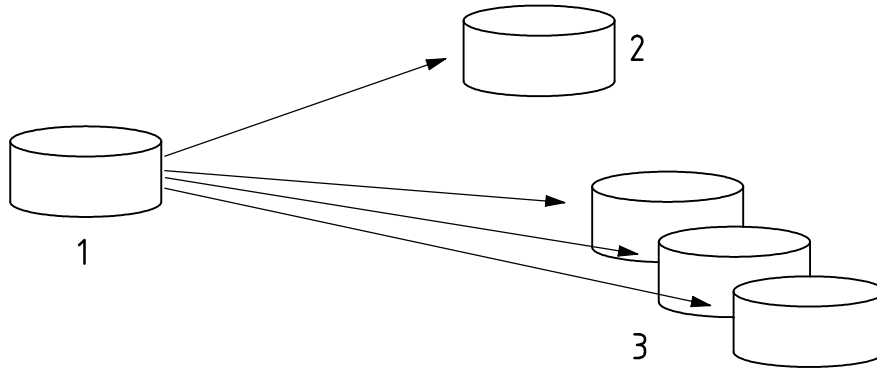
Key

1   ISO register of geodetic registers

2   ISO register of geodetic codes and parameters

3   1..n ISO-approved external registers conforming to ISO 19111 and ISO 19135

Figure 1 — The ISO geodetic registry network

6   Management of a register of geodetic codes and parameters

Rules for managing a register of geographical information items, including the submission of information, are found in ISO 19135.

There are additional rules for managing registers of geodetic codes and parameters. The minimum level of information that the register manager shall accept from a submitting organization is complete data for a coordinate reference system or coordinate transformation that conforms to requirements as specified in Clause 7 of this Technical Specification. The register manager shall also accept data for compound coordinate reference systems, single coordinate operations, and concatenated coordinate operations that conform to requirements of ISO 19111 and Clause 7 of this Technical Specification.

Higher-level records for coordinate reference system and coordinate transformation data are dependent on records for entities such as datums, coordinate systems, and coordinate operation parameters. The register manager shall assign individual registration identifiers for records for entities such as datums, coordinate systems, and coordinate operation parameters so that multiple higher-level records can point to them. When a record for an entity such as a datum, coordinate system, or coordinate operation parameter is modified, dependent records also shall be modified, according to rules in ISO 19135.

To promote interoperability among subregisters within the ISO geodetic registry network, register managers are encouraged to adopt the "best practices" in Annex C.

7 Content of a register of geodetic codes and parameters

Data included in a register of geodetic codes and parameters shall conform, at a minimum, to requirements of ISO 19111.

Additional rules for content of a register of geodetic codes and parameters are as follows:

a) Information on scope of coordinate reference system and coordinate operation and their elements in accordance with ISO 19111 is mandatory for acceptance in the register. Some coordinate reference systems have a legal status in their valid area; this status shall be included in the scope.

b) Information on valid area is mandatory for acceptance in the register.

c) If the submitting organization uses geographic identifiers (as documented in ISO 19112) to describe valid area, it shall provide a citation to the source.

d) The geographic area where use of the coordinate reference system is accepted shall be logically consistent with the geographic area where use of the datum is accepted and, if applicable, the geographic area where use of the map projection is accepted.

e) Description of valid area for a coordinate operation shall be logically consistent with the valid areas for the source coordinate reference system and the target coordinate reference system.

f) Information on datum type is mandatory for registration validation purposes.

Requirements for content of a subregister within the ISO geodetic registry network, as required by ISO 19111 and as specified in this clause, are documented in Tables B.1, B.2 and B.3. A mechanism for maintenance is discussed in ISO 19135.

Annex A
(normative)

Abstract test suite

A.1 Management procedures

a) Test Purpose: Verify that the register is managed according to the rules specified in this Technical Specification.

b) Test Method: Check the procedures described in the information distributed by the registration manager.

c) Reference: Clause 6 and ISO 19135, Clause 6.

d) Test Type: Capability.

A.2 Register content

a) Test Purpose: Verify that the register contains the minimum specified content.

b) Test Method: Inspect entries in the register to ensure that they include all elements of information required by ISO 19135 and this Technical Specification.

c) Reference: Clause 7 and ISO 19135, Clause 8.

d) Test Type: Capability.

A.3 Publication of register contents

a) Test Purpose: Verify that the contents of the register are publicly available.

b) Test Method: Check the information distributed by the registration manager. Visit the web site and inspect the information made available.

c) Reference: ISO 19135, 6.4.

d) Test Type: Capability.

Annex B
(normative)

Register of geodetic codes and parameters

This annex contains Tables B.1, B.2 and B.3, which specify information for elements to be included in a subregister within the ISO geodetic registry network. Many of these elements are taken from ISO 19111 and ISO 19135, but this annex contains additional elements and guidance for completing those elements beyond those provided in ISO 19111.

Table B.1 — Requirements for describing an entry for a coordinate reference system

	E N	$\varphi\,\lambda\,h$ $\varphi\,\lambda$ $r\,\Omega\,\Theta$ $r\,\Omega$	X Y Z	i j k i j k r $\Omega\,\Theta$ r Θ H	
Datum type:	Geodetic	Geodetic	Geodetic	Engineering or vertical	
Coordinate system type:	Projected	Geodetic or spherical polar	Cartesian	Cartesian or spherical polar or gravity-related height	
Element name					**Comments**
Coordinate reference system identifier	M[a]	M	M	M	See ISO 19111 for requirements to describe a source citation. Information for source citation as part of the element identifier is mandatory for acceptance into the register.
Coordinate reference system alias	O	O	O	O	
Coordinate reference system valid area	*M*	*M*	*M*	*M*	If the submitting organization uses geographic identifiers (as documented in ISO 19112) to describe valid area, it shall provide a citation for the geographic identifiers.
Coordinate reference system scope	*M*	*M*	*M*	*M*	