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Geospatial  
Consortium

# OGC DOCUMENT TITLE

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## ABSTRACT

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<Insert Abstract Text here>



## KEYWORDS

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The following are keywords to be used by search engines and document catalogues.

keyword\_1, keyword\_2, keyword\_3, etc.



## PREFACE

---

**NOTE:** Insert Preface Text here. Give OGC specific commentary: describe the technical content, reason for document, history of the document and precursors, and plans for future work.

There are two ways to specify the Preface: “simple clause” or “full clause”

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## SECURITY CONSIDERATIONS

---

No security considerations have been made for this Standard.



## SUBMITTERS

---

All questions regarding this submission should be directed to the editor or the submitters:

NAME	AFFILIATION	OGC MEMBER
Steve Liang	University of Calgary, Canada / SensorUp Inc.	Yes



## SOURCE OF THE CONTENT FOR THIS OGC DOCUMENT

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## VALIDITY OF CONTENT

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## FUTURE WORK

---

**NOTE:**If you need to place any further sections in the preface area use the [.preface] attribute.





## CONTRIBUTORS

---

Additional contributors to this Standard include the following:

Individual name(s), Organization



1

# SCOPE

---



# SCOPE

---

<Insert Scope text here>

**NOTE:** Give the subject of the document and the aspects of that scope covered by the document.



2

# CONFORMANCE

---



## CONFORMANCE

---

<Insert conformance content here>

**NOTE:** Provide a short description of the content approached in subsequent sections and the main subject of the document



3

# 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.

*Identification of Common Molecular Subsequences.* Smith, T.F., Waterman, M.S., J. Mol. Biol. 147, 195–197 (1981)

*ZIB Structure Prediction Pipeline: Composing a Complex Biological Workflow through Web Services.* May, P., Ehrlich, H.C., Steinke, T. In: Nagel, W.E., Walter, W.V., Lehner, W. (eds.) Euro-Par 2006. LNCS, vol. 4128, pp. 1148–1158. Springer, Heidelberg (2006)

*The Grid: Blueprint for a New Computing Infrastructure.*, Foster, I., Kesselman, C.. Morgan Kaufmann, San Francisco (1999).

*Grid Information Services for Distributed Resource Sharing.* Czajkowski, K., Fitzgerald, S., Foster, I., Kesselman, C. In: 10th IEEE International Symposium on High Performance Distributed Computing, pp. 181–184. IEEE Press, New York (2001)



4

# TERMS AND DEFINITIONS

---



This document uses the terms defined in OGC Policy Directive 49, which is based on the ISO/IEC Directives, Part 2, Rules for the structure and drafting of International Standards. In particular, the word “shall” (not “must”) is the verb form used to indicate a requirement to be strictly followed to conform to this document and OGC documents do not use the equivalent phrases in the ISO/IEC Directives, Part 2.

This document also uses terms defined in the OGC Standard for Modular specifications (OGC 08-131r3), also known as the ‘ModSpec’. The definitions of terms such as standard, specification, requirement, and conformance test are provided in the ModSpec.

For the purposes of this document, the following additional terms and definitions apply.

## 4.1. example term

---

term used for exemplary purposes

**Note 1 to entry:** An example note.

Example      Here’s an example of an example term.

[SOURCE: ]



5

# CONVENTIONS

---

**NOTE:** This section provides details and examples for any conventions used in the document. Examples of conventions are symbols, abbreviations, use of XML schema, or special notes regarding how to read the document.

## 5.1. Identifiers

---

The normative provisions in this standard are denoted by the URI

<http://www.opengis.net/spec/{standard}/{m.n}>

All requirements and conformance tests that appear in this document are denoted by partial URIs which are relative to this base.

## 5.2. Other conventions

---

<Place any other convention needed with its corresponding title>



6

# CORE

---

This clause establishes the **Core** Requirements class, with IRI `/req/core`, which has a corresponding Conformance Class, **Core**, with IRI `/conf/core`.

## 6.1. Class: `geosrs:CoordinateSystem`

---

The class `geosrs:geosrs:CoordinateSystem` is defined by the following:

Set of axes that spans a given coordinate space and of mathematical rules for specifying how coordinates are to be assigned to points. Cf. ISO 19111:2007:2007-07, part 9.2, table 17 and annex B.2.

## 6.2. Class: `geosrs:CartesianCoordinateSystem`

---

The class `geosrs:geosrs:CartesianCoordinateSystem` is defined by the following:

Coordinate system which gives the position of points relative to *n* mutually perpendicular axes. Cf. ISO 19111:2007:2007-07, tables 15 and 18.

## 6.3. Class: `geosrs:EllipsoidalCoordinateSystem`

---

The class `geosrs:geosrs:EllipsoidalCoordinateSystem` is defined by the following:

Coordinate system which gives the position is specified by geodetic latitude, geodetic longitude and (in the three-dimensional case) ellipsoidal height. Cf. ISO 19111:2007:2007-07, tables 15 and 20.

## 6.4. Class: `geosrs:LinearCoordinateSystem`

---

The class `geosrs:geosrs:LinearCoordinateSystem` is defined by the following:

One-dimensional coordinate system in which a linear feature forms the axis.

## 6.5. Class: geosrs:OrdinalCoordinateSystem

---

The class `geosrs:geosrs:OrdinalCoordinateSystem` is defined by the following:

n-dimensional coordinate system in which every axis uses integers.

## 6.6. Class: geosrs:ParametricCoordinateSystem

---

The class `geosrs:geosrs:ParametricCoordinateSystem` is defined by the following:

One-dimensional coordinate system where the axis units are parameter values which are not inherently spatial.

## 6.7. Class: geosrs:PolarCoordinateSystem

---

The class `geosrs:geosrs:PolarCoordinateSystem` is defined by the following:

Two-dimensional coordinate system in Euclidean space in which position is specified by one distance coordinate and one angular coordinate.

## 6.8. Class: geosrs:SphericalCoordinateSystem

---

The class `geosrs:geosrs:SphericalCoordinateSystem` is defined by the following:

Three-dimensional coordinate system in Euclidean space with one distance measured from the origin and two angular coordinates

## 6.9. Class: geosrs:VerticalCoordinateSystem

---

The class `geosrs:geosrs:VerticalCoordinateSystem` is defined by the following:

One-dimensional coordinate system used for gravity related height or depth measurements. Cf. ISO 19111:2007:2007-07, tables 15 and 25.

## 6.10. Class: geosrs:CoordinateSystemAxis

---

The class `geosrs:geosrs:CoordinateSystemAxis` is defined by the following:

Axis relative to which a coordinate of a point is specified in a coordinate system. See ISO 19111:2007:2007-07, part 9.3, table 27 and annex B.2.2.

## 6.11. Class: geosrs:AreaOfUse

---

The class `geosrs:geosrs:AreaOfUse` is defined by the following:

## 6.12. Class: geosrs:CRS

---

The class `geosrs:geosrs:CRS` is defined by the following:

Depending on the spatial dimension of coordinates (1D, 2D, 3D), this piece of metadata is used for specifying the elements of definition associated to a given set of coordinates: its datum, its ellipsoid, its prime meridian, the type of coordinates (geocentric, geographic, projected,...), the coordinates units of measure, when appropriate the cartographic projection used, the vertical coordinate reference system.

## 6.13. Class: geosrs:EngineeringCRS

---

The class `geosrs:geosrs:EngineeringCRS` is defined by the following:

## 6.14. Class: geosrs:GeodeticCRS

---

The class `geosrs:geosrs:GeodeticCRS` is defined by the following:

Coordinate reference system associated with a geodetic datum. Cf. ISO 19111:2007:2007-07, part 8.2.2.a, table 10 and annex B.1.2.1.a.

## 6.15. Class: geosrs:GeographicCRS

---

The class `geosrs:geosrs:GeographicCRS` is defined by the following:

## 6.16. Class: geosrs:ProjectedCRS

---

The class `geosrs:geosrs:ProjectedCRS` is defined by the following:

Coordinate reference system derived from a two-dimensional geodetic coordinate reference system by applying a map projection. Cf. ISO 19111:2007:2007-07, part 8.2.3.b, table 11 and annex B.1.2.3.

## 6.17. Class: geosrs:SingleCRS

---

The class `geosrs:geosrs:SingleCRS` is defined by the following:

Coordinate reference system consisting of one coordinate system and one datum. Cf. ISO 19111:2007:2007-07, table 5.

## 6.18. Class: geosrs:SpatialReferenceSystem

---

The class `geosrs:geosrs:SpatialReferenceSystem` is defined by the following:

A reference system allowing the description of a position.

## 6.19. Class: geosrs:CoordinateOperation

---

The class `geosrs:geosrs:CoordinateOperation` is defined by the following:

Mathematical operation on coordinates, based on one-to-one relationship, that changes coordinates from one coordinate reference system to another. Cf. ISO 19111:2007:2007-07, part 11.1, table 42 and annex B.4.



## 6.20. Class: geosrs:SingleOperation

---

The class `geosrs:geosrs:SingleOperation` is defined by the following:

A non concatenated coordinate operation. Cf. ISO 19111:2007:2007-07, table 43.

## 6.21. Class: geosrs:Transformation

---

The class `geosrs:geosrs:Transformation` is defined by the following:

Coordinate operation in which the two coordinate reference systems are based on different datums. Cf. ISO 19111:2007:2007-07, table 44.

## 6.22. Class: geosrs:Conversion

---

The class `geosrs:geosrs:Conversion` is defined by the following:

Coordinate operation in which both coordinate reference systems are based on the same datum. Cf. ISO 19111:2007:2007-07, table 45 and annex B.4.2.

## 6.23. Class: geosrs:OperationMethod

---

The class `geosrs:geosrs:OperationMethod` is defined by the following:

Method used to perform an operation on coordinates. See ISO 19111:2007:2007-07, table 48 and annex B.4.5.

## 6.24. Class: geosrs:OperationParameter

---

The class `geosrs:geosrs:OperationParameter` is defined by the following:

Parameter used by a method to perform an operation on coordinates. See ISO 19111:2007:2007-07, table 52 and annex B.4.5.

## 6.25. Class: geosrs:OperationParameterValue

---

The class `geosrs:geosrs:OperationParameterValue` is defined by the following:

Value of a parameter used by a method to perform an operation on coordinates. See ISO 19111:2007:2007-07, table 55.

## 6.26. Class: geosrs:Datum

---

The class `geosrs:geosrs:Datum` is defined by the following:

Parameter or set of parameters that define the position of the origin, the scale and the orientation of a coordinate system. Cf. ISO 19111:2007:2007-07, part 10.1, table 33 and annex B.3.

## 6.27. Class: geosrs:GeodeticDatum

---

The class `geosrs:geosrs:GeodeticDatum` is defined by the following:

Datum describing the relation of a two- or three-dimensional coordinate system to the Earth. Cf. ISO 19111:2007:2007-07, part 10.2, table 34 and annex B.3.2.

## 6.28. Class: geosrs:PrimeMeridian

---

The class `geosrs:geosrs:PrimeMeridian` is defined by the following:

Meridian from which the longitudes of other meridians are quantified. Cf. ISO 19111:2007:2007-07, part 10.2.1, table 35 and annex B.3.2.2.

## 6.29. Class: geosrs:Ellipsoid

---

The class `geosrs:geosrs:Ellipsoid` is defined by the following:

Surface formed by the rotation of an ellipse about its minor axis, defined by a semi-major axis and a flattening parameter and fairly geocentric. NB : It is a mathematical model of the geoid, i.e.

the Earth without its relief. Many geodetic ellipsoids exist. Cf. ISO 19111:2007:2007-07, part 10.2.2, table 36 and annex B.3.2.3.

## 6.30. Class: geosrs:VerticalDatum

---

The class `geosrs:geosrs:VerticalDatum` is defined by the following:

Datum describing the relation of gravity-related heights or depths to the Earth. Cf. ISO 19111:2007:2007-07, table 41 and annex B.3.3.

## 6.31. Property: geosrs:semiMajorAxis

---

The class `geosrs:geosrs:semiMajorAxis` is defined by the following:

Indicates the length of the semi major axis of an ellipsoid. Cf. ISO 19111:2007:2007-07, table 36, attribute length of semi-major axis.

## 6.32. Property: geosrs:semiMinorAxis

---

The class `geosrs:geosrs:semiMinorAxis` is defined by the following:

Indicates the length of the semi minor axis of an ellipsoid. Cf. ISO 19111:2007:2007-07, table 37, attribute length of semi-minor axis.

## 6.33. Property: geosrs:axis

---

The class `geosrs:geosrs:axis` is defined by the following:

The property relates a coordinate system to one of its axis

## 6.34. Property: geosrs:baseCRS

---

The class `geosrs:geosrs:baseCRS` is defined by the following:

The geodetic coordinate reference system on which a projected coordinate reference system is based. Cf. ISO 19111:2007:2007-07, table 11, association role baseCRS.

## 6.35. Property: geosrs:coordinateSystem

---

The class `geosrs:geosrs:coordinateSystem` is defined by the following:

The property relates a coordinate reference system to its coordinate system

## 6.36. Property: geosrs:datum

---

The class `geosrs:geosrs:datum` is defined by the following:

The property relates a coordinate reference system to a datum

## 6.37. Property: geosrs:domainOfValidity

---

The class `geosrs:geosrs:domainOfValidity` is defined by the following:

Geographic area or time interval in which the referring object is valid. Cf. ISO 19111:2007:2007-07, tables 4, 33 and 42, attribute domainOfValidity.

## 6.38. Property: geosrs:ellipsoid

---

The class `geosrs:geosrs:ellipsoid` is defined by the following:

The properties relates a datum to its ellipsoid definition

## 6.39. Property: geosrs:sourceCRS

---

The class `geosrs:geosrs:sourceCRS` is defined by the following:

The coordinate reference system associated to the data used as input of a given operation. Cf. ISO 19111:2007:2007-07, table 42, named association Source.

## 6.40. Property: geosrs:targetCRS

---

The class `geosrs:geosrs:targetCRS` is defined by the following:

The coordinate reference system associated to the data obtained as output of a given operation.  
Cf. ISO 19111:2007:2007-07, table 42, named association Target.



7

# COORDINATE OPERATION MODULE

---

# 7

## COORDINATE OPERATION MODULE

---

This clause establishes the **Co** Requirements class, with IRI `/req/co`, which has a corresponding Conformance Class, **Co**, with IRI `/conf/co`.

### 7.1. Property: `geosrs:derivingConversion`

---

The class `geosrs:geosrs:derivingConversion` is defined by the following:

### 7.2. Property: `geosrs:method`

---

The class `geosrs:geosrs:method` is defined by the following:

### 7.3. Property: `geosrs:parameter`

---

The class `geosrs:geosrs:parameter` is defined by the following:



8

# COORDINATE SYSTEM MODULE

---



This clause establishes the **CS** Requirements class, with IRI `/req/cs`, which has a corresponding Conformance Class, **CS**, with IRI `/conf/cs`.

## 8.1. Property: `geosrs:axisDirection`

---

The class `geosrs:geosrs:axisDirection` is defined by the following:

The direction of an axis. Cf. ISO 19111:2007:2007-07, table 27, attribute coordinate system axis direction.

## 8.2. Property: `geosrs:cylindricalCS`

---

The class `geosrs:geosrs:cylindricalCS` is defined by the following:

Links a coordinate reference system to a cylindrical coordinate system

9

# DATUM MODULE

---

This clause establishes the **Datum** Requirements class, with IRI `/req/datum`, which has a corresponding Conformance Class, **Datum**, with IRI `/conf/datum`.

## 9.1. Property: `geosrs:inverseFlattening`

---

The class `geosrs:geosrs:inverseFlattening` is defined by the following:

Indicates the inverse flattening value of an ellipsoid, expressed as a number or a ratio (percentage rate, parts per million, etc.). Cf. ISO 19111:2007:2007-07, table 37, attribute inverse flattening

## 9.2. Property: `geosrs:primeMeridian`

---

The class `geosrs:geosrs:primeMeridian` is defined by the following:

The prime meridian used by a geodetic datum. Cf. ISO 19111:2007:2007-07, table 34, association role `primeMeridian`.

10

# SRS APPLICATION MODULE

---

This clause establishes the **SRSAPP** Requirements class, with IRI /req/srsapp, which has a corresponding Conformance Class, **SRSAPP**, with IRI /conf/srsapp.



11

# PROJECTIONS MODULE

---

This clause establishes the **PROJ** Requirements class, with IRI /req/proj, which has a corresponding Conformance Class, **PROJ**, with IRI /conf/proj.



12

# PLANET MODULE

---



This clause establishes the **PLANET** Requirements class, with IRI /req/planet, which has a corresponding Conformance Class, **PLANET**, with IRI /conf/planet.



# ANNEX A (INFORMATIVE) ALIGNMENTS

---



# ANNEX A (INFORMATIVE) ALIGNMENTS

Overview

## Overview

The prefixes used for the ontologies mapped to in all following sections are given in the following table.

**Table A.1** — Alignment: Namespaces

ign:	<a href="http://data.ign.fr/def/ignf#">http://data.ign.fr/def/ignf#</a>
iso19111:	<a href="http://def.isotc211.org/iso19112/2019/SpatialReferencingByGeographicIdentifier#">http://def.isotc211.org/iso19112/2019/SpatialReferencingByGeographicIdentifier#</a>
geosrs:	<a href="http://www.opengis.net/ont/geosparql#">http://www.opengis.net/ont/geosparql#</a>
ifc:	<a href="https://standards.buildingsmart.org/IFC/DEV/IFC4/ADD2_TC1/OWL/">https://standards.buildingsmart.org/IFC/DEV/IFC4/ADD2_TC1/OWL/</a>
owl:	<a href="http://www.w3.org/2002/07/owl#">http://www.w3.org/2002/07/owl#</a>
prov:	<a href="http://www.w3.org/ns/prov#">http://www.w3.org/ns/prov#</a>
rdf:	<a href="http://www.w3.org/1999/02/22-rdf-syntax-ns#">http://www.w3.org/1999/02/22-rdf-syntax-ns#</a>
rdfs:	<a href="http://www.w3.org/2000/01/rdf-schema#">http://www.w3.org/2000/01/rdf-schema#</a>

## A.1. IGN CRS Ontology

**Table A.2 — Alignment: IGN CRS Ontology**

FROM ELEMENT	MAPPING RELATION	TO ELEMENT	NOTES
geosrs:CoordinateSystem	<u>owl:equivalentClass</u>	<u>ign:CoordinateSystem</u>	-
geosrs:Datum	<u>owl:equivalentClass</u>	<u>ign:Datum</u>	-
geosrs:Ellipsoid	<u>owl:equivalentClass</u>	<u>ign:Ellipsoid</u>	-

## A.2. ISO 19111 Ontology

**Table A.3 — Alignment: ISO 19111 Ontology**

FROM ELEMENT	MAPPING RELATION	TO ELEMENT	NOTES
geosrs:CoordinateSystem	<u>owl:equivalentClass</u>	<u>iso19111:CoordinateSystem</u>	-
geosrs:Datum	<u>owl:equivalentClass</u>	<u>iso19111:Datum</u>	-
geosrs:Ellipsoid	<u>owl:equivalentClass</u>	<u>iso19111:Ellipsoid</u>	-

## A.3. IFCOWL Ontology

**Table A.4 — Alignment: IFCOWL Ontology**

FROM ELEMENT	MAPPING RELATION	TO ELEMENT	NOTES
geosrs:CRS	<u>owl:equivalentClass</u>	<u>ifc:CoordinateReferenceSystem</u>	-



# ANNEX B (INFORMATIVE) SHACL SHAPES

---



## ANNEX B (INFORMATIVE) SHACL SHAPES

---

Overview

### Overview

---



# ANNEX C (INFORMATIVE) REVISION HISTORY

---



## ANNEX C (INFORMATIVE) REVISION HISTORY

---

DATE	RELEASE	AUTHOR	PRIMARY CLAUSES MODIFIED	DESCRIPTION
2016-04-28	0.1	G. Editor	all	initial version





# BIBLIOGRAPHY





## BIBLIOGRAPHY

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**NOTE:** The TC has approved Springer LNCS as the official document citation type. Springer LNCS is widely used in technical and computer science journals and other publications. For citations in the text please use square brackets and consecutive numbers: [1], [2], [3]. Actual References: [n] Journal: Author Surname, A.: Title. Publication Title. Volume number, Issue number, Pages Used (Year Published)

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