AS/NZS ISO 19111:2008
ISO 19111:2007
Reconfirmed 2018

AS/NZS ISO 19111:2008

Australian/New Zealand Standard™

Geographic information—Spatial referencing by coordinates

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee IT-004, Geographical Information/Geomatics. It was approved on behalf of the Council of Standards Australia on 25 July 2008 and on behalf of the Council of Standards New Zealand on 21 July 2008.
This Standard was published on 16 September 2008.

The following are represented on Committee IT-004:

ACT Planning and Land Authority
ANZLIC - the Spatial Information Council
Australian Antarctic Division
Australian Bureau of Statistics
Australian Hydrographic Office
Australian Key Centre In Land Information Studies
Australian Map Circle
Australian Spatial Information Business Association
CSIRO Exploration & Mining
Department for Administrative and Information Services (SA)
Department of Defence (Australia)
Department of Lands NSW
Department of Natural Resources and Water (Qld)
Department of Planning and Infrastructure (NT)
Department of Primary Industries and Water Tasmania
Department of Sustainability and Environment (Victoria)
Geoscience Australia
InterGovernmental Committee on Surveying and Mapping
Land Information New Zealand
Office of Spatial Data Management
Western Australian Land Information System

Keeping Standards up-to-date

Standards are living documents which reflect progress in science, technology and systems. To maintain their currency, all Standards are periodically reviewed, and new editions are published. Between editions, amendments may be issued. Standards may also be withdrawn. It is important that readers assure themselves they are using a current Standard, which should include any amendments which may have been published since the Standard was purchased.

Detailed information about joint Australian/New Zealand Standards can be found by visiting the Standards Web Shop at www.standards.com.au or Standards New Zealand web site at www.standards.co.nz and looking up the relevant Standard in the on-line catalogue.

Alternatively, both organizations publish an annual printed Catalogue with full details of all current Standards. For more frequent listings or notification of revisions, amendments and withdrawals, Standards Australia and Standards New Zealand offer a number of update options. For information about these services, users should contact their respective national Standards organization.

We also welcome suggestions for improvement in our Standards, and especially encourage readers to notify us immediately of any apparent inaccuracies or ambiguities. Please address your comments to the Chief Executive of either Standards Australia or Standards New Zealand at the address shown on the back cover.

This Standard was issued in draft form for comment as DR 08105.

STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

RECONFIRMATION

OF
AS/NZS ISO 19111:2008
Geographic information–Spatial referencing by coordinates

RECONFIRMATION NOTICE

Technical Committee IT-004 has reviewed the content of this publication and in accordance with Standards Australia procedures for reconfirmation, it has been determined that the publication is still valid and does not require change.

Certain documents referenced in the publication may have been amended since the original date of publication. Users are advised to ensure that they are using the latest versions of such documents as appropriate, unless advised otherwise in this Reconfirmation Notice.

Approved for reconfirmation in accordance with Standards Australia procedures for reconfirmation on 9 April 2018.

Approved for reconfirmation in New Zealand on behalf of the New Zealand Standards Approval Board on 26 June 2018.

The following are represented on Technical Committee IT-004:

ANZLIC - the Spatial Information Council
Australian Antarctic Division
Australian Bureau of Meteorology
Australian Bureau of Statistics
Australian Maritime Safety Authority
CSIRO
Curtin University of Technology
Department of Defence (Australian Government)
Department of Human Services (Australian Government)
Geoscience Australia
InterGovernmental Committee on Surveying and Mapping
New Zealand Geospatial Office
Science New Zealand Inc
Spatial Industries Business Association

NOTES

Australian/New Zealand Standard™

Geographic information—Spatial referencing by coordinates

Originated as AS/NZS ISO 19111:2004.
Second edition 2008.

Jointly published by Standards Australia, GPO Box 476, Sydney, NSW 2001 and Standards New Zealand, Private Bag 2439, Wellington 6020

ISBN 0 7337 8893 9

PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee IT-004, Geographical Information/Geomatics to supersede AS/NZS ISO 19111:2004.

The objective of this Standard is define conceptual schema for the description of spatial referencing by coordinates, optionally extended to spatial-temporal referencing.

This Standard is identical with, and has been reproduced from ISO 19111:2007, *Geographic information—Spatial referencing by coordinates*.

As this Standard is reproduced from an international standard, the following applies:

(a) Its number appears on the cover and title page while the international standard number appears only on the cover.

(b) In the source text 'this International Standard' should read 'this Australian/New Zealand Standard'.

(c) A full point substitutes for a comma when referring to a decimal marker.

References to International Standards should be replaced by references to Australian or Australian/New Zealand Standards, as follows:

Reference to International Standard ISO		*Australian/New Zealand Standard* AS/NZS ISO	
19103	Geographic information—Conceptual schema language	19103	Geographic information—Conceptual schema language
19108	Geographic information—Temporal schema	19108	Geographic information—Temporal schema
19115	Geographic information—Metadata	19115	Geographic information—Metadata

The terms 'normative' and 'informative' are used to define the application of the annex to which they apply. A normative annex is an integral part of a standard, whereas an informative annex is only for information and guidance.

CONTENTS

Page

INTRODUCTION

Geographic information contains spatial references which relate the features represented in the data to positions in the real world. Spatial references fall into two categories:

— those using coordinates;

— those based on geographic identifiers.

Spatial referencing by geographic identifiers is defined in ISO 19112 [4]. This International Standard describes the data elements, relationships and associated metadata required for spatial referencing by coordinates. It describes the elements that are necessary to fully define various types of coordinate systems and coordinate reference systems applicable to geographic information. The subset of elements required is partially dependent upon the type of coordinates. This International Standard also includes optional fields to allow for the inclusion of non-essential coordinate reference system information. The elements are intended to be both machine and human readable.

The traditional separation of horizontal and vertical position has resulted in coordinate reference systems that are horizontal (2D) and vertical (1D) in nature, as opposed to truly three-dimensional. It is established practice to define a three-dimensional position by combining the horizontal coordinates of a point with a height or depth from a different coordinate reference system. In this International Standard, this concept is defined as a compound coordinate reference system.

The concept of coordinates can be expanded from a strictly spatial context to include time. ISO 19108 describes temporal schema. Time can be added as a temporal coordinate reference system within a compound coordinate reference system. It is even possible to add two time-coordinates, provided the two coordinates describe different independent quantities.

EXAMPLE An example is the time/space position of a subsurface point of which the vertical coordinate is expressed as the two-way travel time of a sound signal in milliseconds, as is common in seismic imaging. A second time-coordinate indicates the time of observation, usually expressed in whole years.

Certain scientific communities use three-dimensional systems where horizontal position is combined with a non-spatial parameter. In these communities, the parameter is considered to be a third, vertical axis. The parameter, although varying monotonically with elevation or depth, does not necessarily vary in a simple manner; thus, conversion from the parameter to height or depth is non-trivial. The parameters concerned are normally absolute measurements and the datum is taken with reference to a direct physical measurement of the parameter. These non-spatial parameters are beyond the scope of this International Standard. However, the modelling constructs described within this International Standard can be applied through a profile specific to a community.

In addition to describing a coordinate reference system, this International Standard provides for the description of a coordinate transformation or a coordinate conversion between two different coordinate reference systems. With such information, spatial data referred to different coordinate reference systems can be related to one specified coordinate reference system. This facilitates spatial data integration. Alternatively, an audit trail of coordinate reference system manipulations can be maintained.

AUSTRALIAN/NEW ZEALAND STANDARD

Geographic information — Spatial referencing by coordinates

1 Scope

This International Standard defines the conceptual schema for the description of spatial referencing by coordinates, optionally extended to spatio-temporal referencing. It describes the minimum data required to define one-, two- and three-dimensional spatial coordinate reference systems with an extension to merged spatial-temporal reference systems. It allows additional descriptive information to be provided. It also describes the information required to change coordinates from one coordinate reference system to another.

In this International Standard, a coordinate reference system does not change with time. For coordinate reference systems defined on moving platforms such as cars, ships, aircraft and spacecraft, the transformation to an Earth-fixed coordinate reference system can include a time element.

This International Standard is applicable to producers and users of geographic information. Although it is applicable to digital geographic data, its principles can be extended to many other forms of geographic data such as maps, charts and text documents.

The schema described can be applied to the combination of horizontal position with a third non-spatial parameter which varies monotonically with height or depth. This extension to non-spatial data is beyond the scope of this International Standard but can be implemented through profiles.

2 Conformance requirements

This International Standard defines two classes of conformance, Class A for conformance of coordinate reference systems and Class B for coordinate operations between two coordinate reference systems. Any coordinate reference system claiming conformance to this International Standard shall satisfy the requirements given in A.1. Any coordinate operation claiming conformance to this International Standard shall satisfy the requirements given in A.2.

3 Normative references

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

ISO/TS 19103, *Geographic information — Conceptual schema language*

ISO 19108, *Geographic information — Temporal schema*

ISO 19115, *Geographic information — Metadata*

Normative reference to ISO 19115 is restricted as follows. In this International Standard, normative reference to ISO 19115 excludes the MD_CRS class and its component classes. ISO 19115 class MD_CRS and its component classes specify descriptions of coordinate reference systems elements. These elements are modelled in this International Standard.

NOTE The MD_CRS class and its component classes were deleted from ISO 19115:2003 through Technical Corrigendum 1:2006.