SLOVENSKI STANDARD
SIST EN ISO 19141:2009

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Geografske informacije - Shema za premikajoḷ e enote (ISO 19141:2008)

Geographic information - Schema for moving features (ISO 19141:2008)

Information géographique - Schéma des entités mobiles (ISO 19141:2008)

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Geographic information - Schema for moving features (ISO 19141:2008)

Information géographique - Schéma des entités mobiles (ISO 19141:2008)

Geoinformation - Schema für sich bewegende Objekte (ISO 19141:2008)

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Foreword

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INTERNATIONAL STANDARD

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Geographic information — Schema for moving features

Information géographique — Schéma des entités mobiles

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Foreword

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ISO 19141 was prepared by Technical Committee ISO/TC 211, *Geographic information/Geomatics*.

Introduction

This International Standard specifies a conceptual schema that addresses moving features, i.e., features whose locations change over time. This schema includes classes, attributes, associations and operations that provide a common conceptual framework that can be implemented to support various application areas that deal with moving features, including:

— Location Based Services,

— Intelligent Transportation Systems,

— Tracking and navigation (land-based, marine, or space), and

— Modeling and simulation.

The schema specifies mechanisms to describe motion consisting of translation and/or rotation of the feature, but not including deformation of the feature. The schema is based on the concept of a one parameter set of geometries that may be viewed as a set of leaves or a set of trajectories, where a leaf represents the geometry of the moving feature at a particular value of the parameter (e.g., a point in time) and a trajectory is a curve that represents the path of a point in the geometry of the moving feature as it moves with respect to the parameter.

Geographic information — Schema for moving features

1 Scope

This International Standard defines a method to describe the geometry of a feature that moves as a rigid body. Such movement has the following characteristics.

a) The feature moves within any domain composed of spatial objects as specified in ISO 19107.

b) The feature may move along a planned route, but it may deviate from the planned route.

c) Motion may be influenced by physical forces, such as orbital, gravitational, or inertial forces.

d) Motion of a feature may influence or be influenced by other features, for example:

1) The moving feature might follow a predefined route (e.g. road), perhaps part of a network, and might change routes at known points (e.g. bus stops, waypoints).

2) Two or more moving features may be "pulled" together or pushed apart (e.g. an airplane will be refuelled during flight, a predator detects and tracks a prey, refugee groups join forces).

3) Two or more moving features may be constrained to maintain a given spatial relationship for some period (e.g. tractor and trailer, convoy).

This International Standard does not address other types of change to the feature. Examples of changes that are not adressed include the following:

— The deformation of features.

— The succession of either features or their associations.

— The change of non-spatial attributes of features.

— The feature's geometric representation cannot be embedded in a geometric complex that contains the geometric representations of other features, since this would require the other features' representations to be updated as the feature moves.

Because this International Standard is concerned with the geometric description of feature movement, it does not specify a mechanism for describing feature motion in terms of geographic identifiers. This is done, in part, in ISO 19133.

2 Conformance

2.1 Conformance classes

2.1.1 Introduction

This International Standard specifies four conformance classes (Table 1). They are differentiated on the basis of two criteria: purpose and level of complexity.

2.1.2 Purpose

This International Standard may be used in support of data transfer. Operations defined for objects are irrelevant to data transfer, which requires only descriptions of the state of the objects at the time of transfer. Thus, two conformance classes require only the implementation of attributes and associations of the classes specified in the schema. The other two conformance classes support the object-oriented implementation of systems or interfaces; they require implementation of operations as well as implementation of attributes and associations.

2.1.3 Complexity

Many applications do not need a complete description of the geometry of a feature and its orientation at any point in time. Their requirements are satisfied by describing the movement of a single reference point on the feature using its trajectory as specified in Clause 6. One pair of conformance classes supports these simple applications.

Other applications need knowledge of the positions at each time of all points or a significant subset of the points on a moving feature. They require the full description provided by the prism geometry specified in Clause 7.

Table 1 — Conformance classes

Complexity	**Purpose**	
	Data Transfer	Data with operations
Trajectory	**A.1.1**	**A.2.1**
Prism Geometry	**A.1.2**	**A.2.2**

2.2 Requirements

To conform to this International Standard, an application schema shall satisfy the requirements of the Abstract Test Suite in 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/TS 19103, *Geographic information — Conceptual schema language*

ISO 19107, *Geographic information — Spatial schema*

ISO 19108, *Geographic information — Temporal schema*

ISO 19109, *Geographic information — Rules for application schema*

ISO 19133, *Geographic information — Location-based services — Tracking and navigation*

4 Terms, definitions, and abbreviated terms

4.1 Terms and definitions

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

4.1.1
base representation
⟨moving features⟩ representation, using a local origin and local ordinate **vectors**, of a **geometric object** at a given reference time

NOTE 1 A rigid geometric object may undergo translation or rotation, but remains congruent with its base representation.

NOTE 2 The local origin and ordinate vectors establish an engineering coordinate reference system (ISO 19111), also called a local frame or a local Euclidean coordinate system.

4.1.2
curve
1-dimensional **geometric primitive**, representing the continuous image of a line

[ISO 19107:2003, definition 4.23]

NOTE The boundary of a curve is the set of **points** at either end of the curve. If the curve is a cycle, the two ends are identical, and the curve (if topologically closed) is considered to not have a boundary. The first point is called the start point, and the last is the end point. Connectivity of the curve is guaranteed by the "continuous image of a line" clause. A topological theorem states that a continuous image of a connected set is connected.

4.1.3
design coordinate reference system
engineering coordinate reference system in which the **base representation** of a moving object is specified

4.1.4
feature
abstraction of real world phenomena

[ISO 19101:2002, definition 4.11]

NOTE A feature may occur as a type or an instance. Feature type or feature instance shall be used when only one is meant.

4.1.5
feature association
relationship that links instances of one **feature** type with instances of the same or a different feature type

[ISO 19110:2004, definition 4.2]

NOTE Feature associations include aggregation of features.

4.1.6
feature attribute
characteristic of a **feature**

[ISO 19101:2002, definition 4.12]

4.1.7
feature operation
operation that every instance of a **feature** type may perform

[ISO 19110:2004, definition 4.5]