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Geografske informacije - Model domene za zemljiško administracijo (LADM) - 3. del: Georegulacija morja (ISO/DIS 19152-3:2023)

Geographic information - Land Administration Domain Model (LADM) - Part 3: Marine georegulation (ISO/DIS 19152-3:2023)

Land Administration Domain Model (LADM) - Teil 3: Georegulierung des Meeres (ISO/DIS 19152-3:2023)

Information géographique - Modèle du domaine de l'administration des terres (LADM) - Partie 3: Géoréglementation marine (ISO/DIS 19152-3:2023)

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Geographic information — Land Administration Domain Model (LADM) —

Part 3:
Marine georegulation

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ISO/DIS 19152-3:2023(E)

Contents

Page

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ISO/DIS 19152-3:2023(E)

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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

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

An additional part is planned to address Implementation Aspects (Part 6) under the general title Geographic information — Land Administration Domain Model (LADM).

This edition of the ISO 19152 multi-part series of standards is backwards compatible to ISO 19152:2012 version of the Land Administration Domain Model.

In accordance with the ISO/IEC Directives, Part 2, 2018, Rules for the structure and drafting of International Standards, in International Standards the decimal sign is a comma on the line. However, the General Conference on Weights and Measures (Conférence Générale des Poids et Mesures) at its meeting in 2003 passed unanimously the following resolution:

"The decimal marker shall be either a point on the line or a comma on the line."

In practice, the choice between these alternatives depends on customary use in the language concerned. In the technical areas of geodesy and geographic information it is customary for the decimal point always to be used, for all languages. That practice is used throughout this document.

A list of all parts in the ISO 19152 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

The initial version of this document, ISO 19152:2012, specifically addressed the land registration aspects of land administration. This version introduces the broader term georegulation that addresses any area of geographic information in which Rights, Restrictions or Responsibilities (RRR) can be applied. Georegulation is the activity to delimit and assert control over geographical spaces through regulations. This standard allows the objects of georegulation to be documented in a systematic and consistent manner. Although the broader term georegulation is used throughout the document, the title of the document remains the "Land Administration Domain Model" to retain compatibility with the previous version of the standard.

This part of the document addresses georegulation in the marine environment. Rights and obligations created by georegulation share a basic structure described in Part 1 of this document. Marine activity is of great importance including transportation, resource extraction and food production (fishing and marine aquaculture). Different rights and obligations may exist on the surface, in the water column and on the seabed. The model defined in this part (Part 3) may be used for marine cadastres as well as other Use Cases such as Conservation Areas, Living Resources and Fishery Management Areas, Non-Living Resources Management Areas, Seabed tenure, etc, as well as to describe data in support of the United Nations Convention on the Law of the Sea (UNCLOS)[15] or other conventions such as administrative areas described in support of safe navigation under the International Convention for the Safety of Life At Sea (SOLAS)[16].

The oceans are the common heritage of humankind, and specific areas along coastlines are the jurisdiction of nation states. In specific cases there are private rights, such as the rights associated with fishing or resource extraction. Some individuals may have property rights on land adjacent to water potentially extending into the area covered by water. This may be described in a marine cadastre, described using the structures available in this document.

International marine rights are addressed in international treaties globally through UN conventions and between nations; in particular, the United Nations Convention on the Law of the Sea (UNCLOS)[15]. Marine safety and navigation are addressed by the IMO international convention on Safety Of Life At Sea (SOLAS) 1974[16]. Other international conventions, treaties and national laws establish rights and obligations.

United Nations' Sustainable Development Goal 14C and United Nations' General Assembly Resolution A/RES/59/24 directed the International Hydrographic Organisation (IHO) to provide technical standards for maritime zones. The International Hydrographic Organization (IHO)[1) is an international standards development organization that supports standards development for oceanography, marine science and the UN SOLAS and UNCLOS conventions. IHO has developed a series of standards and specifications[2)] that address the marine space. In particular the IHO standard S-121 on Maritime Limits and Boundaries[8].

A characteristic of georegulation objects in the marine space is that their geometry structure may need to be aligned with the IHO S-100 standard and the ISO 19107 standard. As such there may be different "Feature" types. This is in alignment with the way feature is defined in the General Feature Model from ISO 19109 and the approach to feature cataloguing defined in ISO 19110. For their geographic information aspects, the IHO suite of hydrographic standards is based on the ISO ISO/TC 211 suite of Geographic Information standards, through the IHO Universal Hydrographic Data Model S-100[6]. The IHO S-121 standard on Maritime Limits and Boundaries directly supports the UNCLOS and is built upon the ISO standard 19152 LADM (this document). Because of the close links between the IHO S-121 standard and the ISO 19152 LADM suite of standards this document part makes direct reference to IHO S-100 and S-121.

Since many of the rights and restrictions in the marine space come either from international or bi-national treaties, or national proclamations or laws, there may be need to express the text or preamble of the treaty or law. A "Governance" object has been added to the administrative structure to allow

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1) International Hydrographic Organization <https://iho.int/>

2) IHO Standards, Specifications and Regulations <https://iho.int/en/standards-and-specifications>

ISO/DIS 19152-3:2023(E)

legal text to be associated with an administrative unit. In many cases the parties involved in Rights, Restrictions and Responsibilities (RRR) relationships in the marine space are nations. This means that the code lists of types of parties and administrative units defined in other parts of this document may not apply. Unique code lists have been defined to address the marine space. Also, treaties are often the reference source for both the administrative and spatial aspects, so the distinction between types of sources has been eliminated.

This document is a derived work, developed under a cooperative agreement with IHO based, on IHO standard S-121 and used with permission.

DRAFT INTERNATIONAL STANDARD ISO/DIS 19152-3:2023(E)

Geographic information — Land Administration Domain Model (LADM) —

Part 3:
Marine georegulation

1 Scope

This document provides the concepts and structure for standardization for georegulation in the marine space.

This document addresses the information structures related to management of legal spaces, such as the international maritime limits and boundaries, marine living and non-living resources management areas, marine conservation areas, etc. and their related rights and obligations.

This document establishes the common elements and basic schema to structure marine georegulation information system. It builds upon the common components defined in ISO 19152-1 — Generic Conceptual Model.

2 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 19103:2015, *Geographic information — Conceptual schema language*

ISO 19107:2019, *Geographic information — Spatial schema*

ISO 19109:2015, *Geographic information — Rules for application schema*

ISO 19110:2016, *Geographic information — Methodology for feature cataloguing*

ISO 19111:2019, *Geographic information — Referencing by coordinates*

ISO 19115-1:2014, *Geographic information — Metadata — Part 1: Fundamentals*

ISO 19126:2021, *Geographic information — Feature concept dictionaries and registers*

ISO 19131-1:2007, *Geographic information — Data product specifications*

ISO 19135,[3] *Geographic information registration — Requirements*

ISO 19152-1:—,[4] *Geographic information — Land Administration Domain Model (LADM) — Part 1: Generic Conceptual Model*

ISO 19152-2:—,[5] *Geographic information — Land Administration Domain Model (LADM) — Part 2: Land registration*

ISO 19157:2013, *Geographic information — Data quality*

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3)   Under preparation. (Stage at the time of publication ISO/CD 19135).

4)   Under preparation. (Stage at the time of publication ISO/DIS 19152-1).

5)   Under preparation. (Stage at the time of publication ISO/CD 19152-2).

ISO/DIS 19152-3:2023(E)

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 19152-1 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1.1
boundary
<marine_georegulation> delimitation between two or more zones

Note 1 to entry: A boundary involves two or more parties.

Note 2 to entry: Delimitation between two or more parties.

Note 3 to entry: Adapted from IHO S-121 Maritime Limits and Boundaries[8]

3.1.2
curve
1-dimensional geometric primitive, representing the continuous image of a line

Note 1 to entry: The *boundary* (3.1.1) 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.

[SOURCE: ISO 19136-1:2020, 3.1.17]

3.1.3
international boundary
<marine_georegulation> delimitation line between two or more States in accordance with UNCLOS Articles 15, 16, 74, 75, 83, and 84

Note 1 to entry: An international boundary involves two or more parties.

3.1.4
limit
<marine_georegulation> *curve* (3.1.2) that defines a *boundary* (3.1.1) or extent of a zone

Note 1 to entry: A limit involves one party.

Note 2 to entry: IHO S-121 Maritime Limits and Boundaries[8]

3.1.5
marine
relating to navigation or shipping or relating to or connected with the sea or used, or adopted for use at sea

Note 1 to entry: Sometimes called *maritime*, but maritime is more frequently applied to that which borders on the sea.

Note 2 to entry: IHO S-32 Hydrographic Dictionary, item 3123, 2019 – reformatted [10]

3.1.6
marine cadastre
management tool which spatially describes, visualizes and realizes formally and informally defined boundaries and associated rights, restrictions and responsibilities in the *marine* (3.1.5) environment as a data layer in a marine SDI, allowing them to be identified, administered and accessed

Note 1 to entry: In addition to boundaries a marine cadastre may also address locations, *limits* (3.1.4), baselines, zones and spaces.

Note 2 to entry: A marine cadastre is a type of georegulation related to property registration as addressed in 19152-2 where the concept of "land" is extended to include "over water".

Note 3 to entry: Adapted from FIG, 2006 Administering Marine Spaces: International Issues [5]

3.1.7
maritime
bordering on, or concerned with, or related to the sea.

Note 1 to entry: IHO S-32 Hydrographic Dictionary, item 3125, 2019 – reformatted[9]

3.2   Abbreviated terms

baunit	Basic administrative unit
CRS	Coordinate Reference System
DOALOS	Division of Ocean Affairs and the Law of the Sea, Office of Legal Affairs, United Nations
ENC	Electronic Nautical Chart
FIG	Fédération Internationale des Géomètres / International Federation of Surveyors
GUID	Globally Unique Identifier
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities
IETF	Internet Engineering Task Force
IHO	International Hydrographic Organization
IMO	International Maritime Organization of the United Nations
LADM	Land Administration Domain Model
MRN	Maritime Resource Name
RRR	Right, Restriction, Responsibility
SOLAS	International Convention on Safety of Life at Sea
UML	Unified Modelling Language
UNCLOS	United Nations Convention on the Law Of the Sea
URI	Uniform Resource Identifier
URN	Uniform Resource Name

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288fd7c751c3/osist-pren-iso-19152-3-2023

4   Conformance

4.1   Conformance requirements and testing

Conformance to this part of the ISO 19152 series on a Land Administration Domain Model (LADM) (Part 3 – Marine georegulation) consists of alignment with the requirements established in Clauses 4.3 and 4.4, The Abstract Test Suite given in Annex A describes a methodology for testing conformance to these requirements.

4.2   Conformance classes

Two conformance classes are identified in this part of ISO 19152, one for the description of a Land Administration Domain Model – Marine georegulation system in support of Maritime Limits and Boundaries for UNCLOS and the other in support of other marine georegulation domain areas as outlined in Annex B. The conformance class for marine georegulation system in support of Maritime Limits and Boundaries for UNCLOS provides a general model that is used by the IHO standard S-121[8]. This includes code lists and other structures such as the governance class MG_Goverance and the attribute type Marine Resource Name (MRN) as defined in IHO standard S-100[6] and geometry constraints to align with IHO standard S-101[7]. The more general conformance class for other types of marine georegulation, permits but does not require the use of the code lists and other structures specific to Maritime Limits and Boundaries for UNCLOS. These code lists and structures may be extended or other code lists and structures included. Where compatibility is desirable between data products that comply with conformance class 1 and extensions that comply with conformance class 2 it is desirable that extensions be used. That is, these two conformance classes are not mutually exclusive. By making use of extensions it is possible to support both conformance criteria. Support for the geometric constraints described in Clause 7.2 is required for any marine georegulation data product that supports compatibility with the IHO S-100 based suite of Electronic Nautical Chart (ENC) navigation standards.

4.3   Conformance class 1 — Marine Limits and Boundaries in support of UNCLOS

Requirement 1: The description of a Land Administration Domain Model – Marine georegulation schema in support of Maritime Limits and Boundaries for UNCLOS using this part (Part 3) of ISO 19152 LADM shall consist of a set of UML classes with associated attributes that make use of or subtype the classes defined in Clause 8 including the code lists defined in Clauses 8.4.6, 8.4.7, 8.5.4, 8.5.15, 8.8.16, 8.8.26, 8.8.33, and 8.8.34, the attribute Marine Resource Number defined in Clause 8.3 and the geometry constraints defined in Clause 7.2.

NOTE   The IHO standard S-121[7] is compliant with conformance class 1 of this document.

4.4   Conformance class 2 — General marine georegulation

Requirement 2: The description of a Land Administration Domain Model – Marine georegulation schema for general application, such as for marine cadastre or any of the other marine contexts described in Annex B using this part (Part 3) of ISO 19152 LADM shall consist of a set of UML classes with associated attributes that make use of or subtype the classes defined in Clause 8. The code lists, the attribute Marine Resource Number and the geometry constraints identified in conformance class 2 are optional and may be replaced with other code lists and geometric constraints.

5   Notation

The conceptual schema specified in this part of ISO 19144 is described using the Unified Modelling Language (UML), following the guidance of ISO 19103.

Several model elements used in this schema are defined in other ISO geographic information standards. By convention within some ISO/TC 211 standards, names of UML classes, with the exception of basic data type classes, include a two-letter prefix that identifies the standard and the UML package in which

the class is defined. This provides a global unique name for the class. UML classes defined in this part of ISO 19152 have the two-letter prefix of MG. The two-letter prefix of LA is used for Part 1 and Part 2 to support backward compatibility. Table 1 lists the other standards and packages in which UML classes used in this part of ISO 19152 have been defined.

Table 1 — Sources of externally defined UML classes

Prefix	Standard	Part
CI	19115-1	Metadata — Fundamentals
DQ	19157	Data quality
GM	19107	Spatial schema
LA	19152-1	LADM — Generic Conceptual Model
LA	19152-2	LADM — Land registration
MG	19152-3	LADM — Marine georegulation

<<MLB>> — This stereotype applies to attributes that are specific to conformance class 1 relating to Maritime Limits and Boundaries per IHO standard S-121[8].

<<MRN>> — This stereotype applies to attributes used to carry the Maritime Resource Name, which is a specific identifier managed by the IHO and defined for the IHO S-100[6] suite of standards, including IHO S-121[8].

6   Context

The purpose of this part of ISO 19152 is to establish a structure for the description of georegulation in the marine space.

Jurisdictions in the marine space may be quite different than those on land and may be covered by international conventions such as the UN Convention on the Law of the Sea (UNCLOS)[15]. Nations have internal waters in which they have jurisdiction. UNCLOS defines the marine zones and the rights and duties of a country regarding those zones. Other treaties and agreements between nations and national instruments define specific aspects of georegulation in the maritime space, including, among other subjects, fisheries, passage, exploration and exploitation and other activity.

Although georegulation in the marine space may be different than land administration, the same underlying structure of Rights, Restrictions and Responsibilities (RRR) established in ISO 19152-1 Land Administration Domain Model – Generic Conceptual Model, apply. There may be different rights assigned to the seafloor, the water column and the surface within different zones. An example is the "right of innocent passage" as described in UNCLOS Article 17 which is subject to restrictions as described in Article 19. However, in some cases individuals or corporations may also have rights, such as the fishing rights or exploration rights granted by nations in their waters or multilateral bodies. In some nations, property rights on land adjacent to water may extend into areas covered by water and property rights may exist in the water.

This part uses a feature-oriented approach for spatial geometry in alignment with the general feature model defined in ISO 19109 Rules for Application Schema. Features are defined in accordance with ISO 19110 Methodology for feature cataloguing. The features may be locations, limits, zones or spaces with associated spatial geometry as defined in ISO 19107 Spatial schema of points, curves, and surfaces. For example, a Base Line Point is a specific type of location represented as a point geometry. A zone such as the Exclusive Economic Zone[6] is represented as an area with surface geometryA specific type of limit such as the "Outer Limit of the Territorial Sea[7]" is represented as a line with curve geometry. This approach is similar to the approach taken in many other areas of geographic information and is fully supported by the ISO/TC 211 suite of standards.

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6)   UNCLOS Part V Exclusive Economic Zone

7)   UNCLOS Article 4 Outer limit of the territorial sea