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Geographic information — Land Administration Domain Model (LADM) —

Part 3:
Marine georegulation

Information géographique — Modèle du domaine de l'administration des terres (LADM) —

Partie 3: Géoréglementation marine

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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.

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 document 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).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents.www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

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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,* in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 287, *Geographic Information,* in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement), and in collaboration with the International Hydrographic Organization (IHO).

This edition of ISO 19152-3, together with all other parts in the ISO 19152 series, cancels and replaces the first edition (ISO 19152:2012), which has been technically revised. This document is a new part to the ISO 19152 series and makes no changes to the original ISO 19152:2007.

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.

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Introduction

The initial version of this document, ISO 19152:2012, specifically addressed the land registration aspects of land administration. The current editionThis document (ISO 19152-3:2023) introduces the broader term "georegulation", which addresses any area of geographic information in which rights, restrictions or responsibilities (RRR) can be applied. Georegulation is the activity to delimitof delimiting and assertasserting control over geographical spaces through regulations. This document 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 main element of the title of the document remains “Land Administration Domain Model” to retain compatibility with the previous edition of the document.

This document addresses georegulation in the marine environment. Rights and obligations created by georegulation share a basic structure, as described in Part ISO 19152-1 of this document.. Marine activity is of great importance, including transportation, resource extraction and food production (fishing and marine aquaculture).), is of great importance. Different rights and obligations can exist on the surface, in the water column and on the seabed. The model defined in this document can 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.), and to describe data in support of the United Nations Convention on the Law of the Sea (UNCLOS)[15])[27] or other conventions, e.g. administrative areas described in support of safe navigation under the International Convention for the Safety of Life At Sea (SOLAS).[16]).[28]

The oceans are of importance to all humankind, and specific areas along coastlines are under the jurisdiction of nation states. The jurisdiction of coastal Statesstates extends to certain maritime zones. Users and Statesstates have rights, restrictions and responsibilities in specific zones. The Areaarea beyond coastal States’states’ zones is without exercise or claim of sovereignty and the rights inregarding the resources are vested in mankind[15 part XI]..[27] In specific cases there are private rights, such as the rights associated with fishing or resource extraction. Some individuals can have property rights on land adjacent to water potentially extending into the area covered by water. This can 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]).[27] Marine safety and navigation are addressed by the International Maritime Organization (IMO) international convention on Safety Of Life At Sea (SOLAS) 1974[16].[28] Other international conventions, treaties and national laws establish rights and obligations.

The International Hydrographic Organization is an international standards development organization that specializes in the marine space. It develops standards for safe navigation, marine jurisdictions, oceanography and other aspects of the marine space in close cooperation with other international organizations such as the UN DOALOS[17][29] and ISO. In particular it supports several UN conventions such as the UNCLOS[15][27] and the SOLAS[16][28] conventions —in cooperation with the UN IMO[18].[30] Alignment between ISO standardsInternational Standards for the marine space and the IHO is important.

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 (The IHO)[19] supports standards development for oceanography, marine science and the UN SOLAS and the UNCLOS conventions..[31] In particular, as part of the S-100 Universal Hydrographic Data Model,,[18] IHO has developed a series of standards and specifications[20] that address the marine space..[32] These include the IHO standard S-121[20] on Maritime Limitsmaritime limits and Boundaries.[8] boundaries and IHO S-122 Marine Protected Areas [21],[33] on marine protected areas.

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A characteristic of georegulation objects in the marine space is that their geometry structure can need to be aligned with the IHO S-100[6] standard[18] and ISO 19107. As such, there can be different "feature" types. This is in alignment with the way "feature" is defined in the General Feature Modelgeneral 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 many of the ISO ISO/TC 211 suite of Geographic Information standardsdocuments, through the IHO Universal Hydrographic Data Model S-100.[6] also known as the IHO S-100 standard The IHO. S-121 standard[20] on Maritime Limitsmaritime limits and Boundariesboundaries directly supports the UNCLOS[27] and is built upon the ISO 19152 series. Because ofdue to the close links between the IHO S-121 standard[20] and the ISO 19152 series, this document makes direct reference to IHO S-100 and IHO 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, within the context of georegulation, it can be necessary to express the text or preamble of theа treaty or law. A "Governancegovernance" object has therefore been added to the administrative structure in this document to allow 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 the ISO 19152 series will not necessarily apply. Unique code lists have been defined to address the marine space. AlsoFurther, treaties are often the reference source for both the administrative and spatial aspects, so the distinction between types of sources has been eliminated.

The ISO 19152 series of standards is a general abstract model for Land Administrative Domain Model (LADM) systems. It provides a uniform way of describing national or other systems. The ISO 19152 series is implemented through profiles, such as country profiles, in accordance with ISO 19106.[22] The IHO S-121 standard[8][20] is a profile for the description of Marine Limitsmarine limits and Boundariesboundaries (MLB) in the context of support for the SOLAS[16][28] and the UNCLOS[15][27] conventions supported by the IHO series of standards. This document has two conformance classes, one that directly supports the IHO S-121 profile, and the other more general conformance class that supports other aspects of marine georegulation. The profile for MLB is defined in the IHO S-121 standard[8]. The support of other aspects of marine georegulation will require the development of specific profiles to address these other areas.

This document is a derived work, developed under a cooperative agreement with the IHO, based on IHO standard S-121[20] and used with permission.

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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.

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Geographic information — Land Administration Domain Model (LADM) — Part 3: Marine georegulation

1 Scope

This document specifies 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.

2 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.

ISO 19103, *Geographic information — Conceptual schema language*

ISO 19107, *Geographic information — Spatial schema*

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

ISO 19115 ISO 19152-1, *Geographic information — Metadata — Part 1: Fundamentals*

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

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

ISO 19157-1, *Geographic information — Data quality — Part 1:General requirements*

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:

[1] Under preparation. (Stage at the time of publication ISO/FDIS 19152-1).
[2] Under preparation. (Stage at the time of publication ISO/CD 19152-2).

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

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

[SOURCE: Adapted from IHO S-121 Maritime Limits and Boundaries[8]]Reference [20]]

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

Note 1 to entry: 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.

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

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3.1.3
international boundary
<marine_georegulation> delimitation line between two or more Statesstates in accordance with the UNCLOS Articles 15, 16, 74, 75, 83, and 84[15][27]

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

[SOURCE: Adapted from IHO S-121 Maritime Limits and Boundaries[8]]Reference [20]]

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3.1.4
limit
<marine_georegulation> curve that defines a boundary or extent of a zone

Note 1 to entry: A limit involves one party.

[SOURCE: Adapted from IHO S-121 Maritime Limits and Boundaries[8]]Reference [20]]

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.

[SOURCE: IHO S-32 Hydrographic Dictionary, item 3123, 2019 – reformatted [10]]

[SOURCE: Reference [22]]

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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 environment

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

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

[SOURCE: Adapted from FIG, 2006 Administering Marine Spaces: International Issues [5]]Reference [17]]

3.1.7
marine georegulation
expression of a right, restriction or responsibility for one or more parties or group parties for a spatial location, boundary, zone or space in the marine domain

3.1.8
maritime
bordering on, or concerned with, or related to the sea

[SOURCE: IHO S-32 Hydrographic Dictionary, item 3125, 2019 – reformatted[9]]

[SOURCE: Reference [31]]

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3.2 Abbreviated terms

baunitBAUnit	Basicbasic administrative unit
CRS	coordinate reference systemCoordinate 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
GIS	Geographic Information Systemgeographic information system
GUIDguid	Globally Unique Identifierglobally unique identifier
IALA	International Association of Mmmarinemarine 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
MLB	Marine Limitsmarine limits and Boundariesboundaries
MRN	Maritime Resource Name
Oid	object ID

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RRR	Right, Restriction, Responsibilityright, 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
uom	units of measure
URI	Uniform Resource Identifier
URN	Uniform Resource Name

4 Conformance

4.1 Conformance requirements and testing

Conformance to this document consists of alignment with the requirements established in 4.3 and 4.4. The Abstract Test Suite given in Annex A4.3 and 4.4. The abstract test suite given in Annex A describes a methodology which shall be used for testing conformance to these requirements.

4.2 Conformance classes

Two conformance classes are identified in this document,:

— one for the description of a LADM marine georegulation system in support of Maritime Limitsmaritime limits and Boundariesboundaries for the UNCLOS and the other

— one in support of other marine georegulation domain areas as outlined in Annex B. Annex B.

The conformance class for a marine georegulation system in support of Maritime Limitsmaritime limits and Boundariesboundaries for the UNCLOS[27] provides a general model that is used by the IHO standard S-121.[8],[20] This includes code lists and other structures, such as the governance class MG_Governance and the attribute type Marine Resource Name (MRN) as defined in IHO standard S-100[6],[18] and geometry constraints to align with IHO standard S-101.[7],[19] 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 Limitsmaritime limits and Boundariesboundaries for the UNCLOS. These code lists and structures can be extended, or other code lists and structures can be included. Where compatibility is desirable between data products that conform with conformance class 1 and extensions that conform with conformance class 2, it is desirable that extensions be used. These two conformance classes are not mutually exclusive, but rather by making use of extensions it is possible to support both conformance criteria. Support for the geometric constraints described in 7.27.2 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 Limitslimits and Boundariesboundaries in support of the UNCLOS

Requirement 1: The description of a Land Administration Domain Model — MarineLADM marine georegulation schema in support of Maritime Limitsmaritime limits and Boundariesboundaries for the UNCLOS using this document (ISO 19152-3) shall consist of a set of UML classes with associated attributes that make use of or subtype the classes defined in Clause 8Clause 8 including the code lists defined in 8.4.6, 8.4.7, 8.5.4, 8.5.14.7, 8.8.16, 8.8.27, 8.8.34,8.4.6, 8.4.7, 8.5.4, 8.5.14.7, 8.8.16, 8.8.27, 8.8.34, and 8.8.35,8.8.35, the attribute Marine Resource Name defined in 8.38.3 and the geometry constraints defined in 7.27.2 which are enumerated in Annex B.Annex B.

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