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**Procedures for the Management of the IALA Domains under the IHO Registry**

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**Procedures for the Management of the IALA Domains under the IHO Registry**

# INTRODUCTION

This document describes the roles, responsibilities and procedures for IALA as a Submitting Organization under the International Hydrographic Organization (IHO) Registry, based on IHO Standards S-100 and S-99, for managing and operating the associated IALA domains.

This guideline explains the concepts of registries and domains, the responsibility of IHO as manager of the IHO Registry and the role of IALA as a domain owner and manager.

IALA’s roles and responsibilities as a submitting organisation are set out and the process for managing submissions is laid down.

The overall context of IALA’s involvement in the IHO Registry is considered, in particular the move towards a Common Maritime Data Structure (CMDS) and the proposed IMO/IHO Harmonization Group on Data Modelling (HGDM).

# BACKGROUND

The IHO S-100 Universal Hydrographic Data Model was published as an international standard in 2010. One objective of S-100 is providing an ISO-conformant registry, managed by the IHO, containing registers such as feature concept dictionaries and product feature catalogues that are flexible and capable of managed expansion; another objective is to provide separate registers for different user communities. The operational procedures for the organization and management of the IHO Registry are set out in IHO Publication S-99.

There is a Memorandum of Understanding between the IHO and IALA, which was signed in 2001 and covers work on the IHO Registry, which is governed by S-99. Within the IHO Registry, “Supplementary Registers” may be used by external Submitting Organisations. The S-99 and S-100 standards are maintained and developed by TSMAD (Transfer Standard Maintenance and Applications Development working group) on which IALA has a seat. There are two aspects to IALA’s participation. The first is to participate as a Submitting Organization. The second is to become a domain owner under the Registry.

At its 57th session IMO NAV agreed to the use of the IHO Registry as a baseline for the collection, exchange, and distribution of data. At the same meeting it was proposed to set up an IMO / IHO Harmonization Group on Data Modelling, which is tasked with establishing the Common Maritime Data Structure. By becoming a Domain Owner in the IHO Registry, IALA will contribute to the HGDM and to the CMDS.

At its 52nd session, the IALA Council approved registration of IALA at IHO as a Domain Owner for Aids to Navigation (AtoN), VTS and for other data areas under IALA’s remit, and as a Submitting Organization, in accordance with the IHO / IALA Memorandum of Understanding (MoU).

Because of IALA’s breadth of expertise in AtoN, IALA domains within the IHO Registry are logical extensions of the Registry beyond hydrographical applications. The IHO continues to handle operation of the Registry; the responsibility for the management of the IALA domains rests with IALA. Other Submitting Organisations will be able to propose amendments to existing Registry entries.

As a benefit, IALA gains synergies regarding definition procedures, operational resources, and international standing. This approach is in line with the terms of reference of the proposed HGDM.

IALA will serve as a Submitting Organisation to support its requirements for product specifications.

A “product” is in most cases understood as a technical or operational data service provided to the mariners and to the maritime community at large.

In some cases the product may be associated with a particular piece of equipment, a system or its software.

A “Maritime Service Portfolio” is a set of “products” construed as services in a given sea area, waterway, or port, as appropriate.

The IALA operational procedures addressed in this Guideline conform to the Registry procedures outlined in the IHO standard S-99, although some terms have been renamed for clarity and to better indicate IALA’s internal processes. IALA has developed these internal procedures to interact with the IHO Registry within the context of the Association.

# SCOPE

The scope of this Guideline is to advise IALA about the interaction between IALA and IHO and its Registry. The governing documentation for this interaction is the IHO S-100 standard and the associated procedures in IHO standard S-99. The IALA operational procedures addressed in this Guideline conform to the Registry procedures outlined in IHO standard S-99. IALA has developed these procedures solely to manage the IALA domains and its role as a Submitting Organization within the context of the Association. Should there be any conflict between this Guideline and IHO standard S-100 or S-99, IALA should defer to the IHO documentation.

It is important to note the difference between the Registry, as a whole, the different Registers, the IALA domains, the domains to which IALA contributes and the individual entries.



1. The IALA Domains in the IHO Registry

# THE IALA DOMAINS

The IALA domains are not a single entity because the IHO Registry is composed of one Product Specification Register, and several Registers, which are used in order to build product specifications. These Registers capture feature concepts and types in the Feature Concept Dictionary Register, methods of presenting information to the user in the Portrayal Register and qualifying properties of data in the Metadata Register. In addition, currently, each Register is subdivided by IHO into a Main Space[[1]](#footnote-1) and Supplementary Space. The IALA domains reside in the Supplementary Space.

*domain*

*nn*

*domain*

*2*

*domain*

*1*

**Supplementary Space**

*domain*

*xx*

*domain*

*B*

*domain*

*A*

**Main Space**

1. Subdivision of a Register by Domains

The list of Registers is:

## Product Specification Register:

The Product Specification Register contains a list of product specifications developed and maintained by a recognised organisation. This register is based on the principle of *organisational* responsibility, i.e. a domain is assigned to a specific recognised organisation. In the case of IALA, the scope of IALA is so large that it is advisable to subdivide one organisational domain into several organisational domains that reflect the IALA’s different areas of competence. For example, amongst others, there will be an IALA AtoN domain and an IALA VTS domain.

An important part of most product specifications is a *feature catalogue*, which is normally produced as a result of modelling the product. It uses item types, such as feature classes and attributes, from the Feature Concept Dictionary Register, and documents the binding between them. In addition, constraints, units of measurement and format description of attributes can be specified.

## Portrayal Register:

Portrayal relates to how the data is presented to the user of the product.

The portrayal of data is independent of the data but closely related to the data. There may be many different portrayals for the same data.

The Portrayal Register contains both symbols for portraying features and general rules that invoke the symbols under certain conditions. More specific rules can also be given in a product specification.

The construction of the Portrayal Register follows the same principles as the other Registers and is shown in Figure 2.

## Feature Concept Dictionary Register:

The Feature Concept Dictionary Register hosts all feature concept dictionaries, within the appropriate domains of the Feature Concept Dictionary Register. (See Figure 2)

A *feature concept dictionary* specifies independent sets of definitions of features, attributes, enumerated values and information types that may be used to describe relevant maritime information. A feature concept dictionary may be used to develop a feature catalogue. Unlike a feature catalogue, a feature concept dictionary does not make associations or bind attributes to features.

## Metadata Register:

Metadata is structured information that describes, explains, locates or otherwise makes it easier to retrieve, use or manage an information resource. Metadata is often called data about data or information about information.

The Metadata Register contains the metadata elements from the ISO19115 standard (for an extract of the main metadata table see Annex A). It will also contain additional metadata elements required for an IALA product specification.

## Producer Code Register:

This topic is currently beyond the scope of IALA’s activities but this decision may be reconsidered in the future.

There are two other Registers needed to completely capture IALA work: *Harmonized User Requirement Register* and *Maritime Data Exchange Format Register*. These Registers would also be available to other organizations.

## Harmonized User Requirement Register:

The Registry does not contain user requirements, yet. Formalized user requirement management is essential to capture the existing user requirements and thus provide the traceability. A register concept can be applied to formalized user requirements, thereby creating a structured repository for formalized user requirements. Hence, a Harmonized User Requirement Register will be included in the Registry as the uppermost layer that would have a similar internal structure as the other Registers. The Harmonized User Requirement Register informs and directs all other Registers (including the Product Specification Register), as appropriate.

## Maritime Data Exchange Format (MDEF) Register:

The Registry does not contain data exchange format definitions, yet. While the Portrayal Register captures all entries relevant to the human interaction, the Maritime Data Exchange Format Register captures the data sentence syntax and semantics and the data interface encoding for machine to machine data exchange. The Maritime Data Exchange Format would also contain general rules for data sentence usage as well as general rules for data encoding, while a product specification may contain more specific rules for data sentence usage and encoding.

The following figure illustrates the layout of the proposed Registry.

Field

Fld

Field

p

p

p

p

p

d

d

d

d

d

d

Harmonized User

Requirement Register[\*]

Product Specification

Register

d

d

d

d

d

d

d

d

d

d

Portrayal

Register

d

d

d

d

d

Feature Concept

Dictionary Register

Metadata

Register

d

d

d

d

Producer Code

Register

Maritime Data

Exchange Register

d

d

d

d

1. Registry Layout with Products and Fields; d = domain; p = product

Note: This figure is an example that is limited in the options for combinations of fields, products and domains. Actual usage can be much more complex.

# IALA AS DOMAIN OWNER

Recognising that the IALA domains comprise several functional domains (e.g. VTS, AtoN, AIS, World-Wide RadioNavigation (WWRN) and Formal Risk Assessment) in the Feature Catalogue Dictionary, Portrayal and Metadata Registers, as well as several organisational domains in the Product Specification Register, it is envisaged that IALA will become a domain owner, as indicated below.

1. Envisaged IALA domains

|  |  |
| --- | --- |
| Harmonized User Requirements Register | VTS domain |
|  | AtoN domain |
|  | AIS domain |
|  | Formal Risk Assessment domain |
|  | WWRN domain |
| Product Specification Register | IALA VTS domain |
|  | IALA AtoN domain |
|  | IALA AIS domain |
|  | IALA IWRAP domain |
|  | IALA WWRN domain |
| Portrayal Register | VTS domain |
|  | AtoN domain |
|  | AIS domain |
|  | Formal Risk Assessment domain |
|  | WWRN domain |
| Feature Concept Dictionary Register | VTS domain |
|  | AtoN domain |
|  | AIS domain |
|  | Formal Risk Assessment domain |
|  | WWRN domain |
| Metadata Register | VTS domain |
|  | AtoN domain |
|  | AIS domain |
|  | Formal Risk Assessment domain |
|  | WWRN domain |
| Maritime Data Exchange Format Register | VTS domain |
|  | AtoN domain |
|  | AIS domain |
|  | Formal Risk Assessment domain |
|  | WWRN domain |

# MANAGEMENT OF IALA DOMAINS

## Interaction with IHO

IALA interacts with IHO via the IALA Domains Manager who needs to be aware of the IHO’s structure for the IHO Registry and its processes so that the appropriate body within IHO can be addressed.

### Domain application

A domain is established by application to IHO (Registry Manager), providing the information requested.

Assuming that IHO approves and sets up the requested domain, the domain is then ready to be populated. The process of populating a domain is explained in Section 7.

### Domain responsibilities

In order to avoid too many different roles, such as a role manager for each individual domain (see Table 1), the following roles are designed to minimise their number, while taking into account the structure imposed by the IHO Registry and the large number of IALA’s fields of interest. A single person cannot fulfil the roles detailed below due to the wide range of technical, operational and organisational competence required.

Thus the overall responsibility of IALA for its domains in the IHO Registry is distributed over three types of management role:

1. The IALA Domains Manager.
2. IALA Field Managers.
3. IALA Product Specification Managers.

Being a Domain Owner, IALA is represented in IHO’s Domain Control Body. This will entail interaction with the IHO’s Domain Control Body within the timescales for the IHO’s internal process. This activity affects the work of the IALA Domains Manager and could lead to the involvement of IALA Field Managers and IALA Product Specification Managers. Membership of the IHO’s Domain Control Body allows Submitting Organisations to advocate their own proposals.

#### IALA Domains Manager

The IALA Domains Manager who resides in the IALA Secretariat, co-ordinates the activities of each of the IALA Field Managers and is the single point of contact with the IHO.

#### IALA Field Manager

In the context of IHO Registry, IALA currently recognises the following Product Fields: VTS, AtoN Information, AIS, IWRAP and WWRN. Fields comprise all relevant domains associated with that Field, e.g. the VTS Field would comprise the IALA VTS domain from the Product Specification Register, the VTS domain from the Feature Concept Dictionary Register, the VTS domain from the Portrayal Register and the VTS domain from the Metadata Register.

Each Field contains at least one IALA product and one IALA Product Specification. The IALA Field Manager harmonises the different products / Product Specifications within that Field. The IALA Field Manager also considers the usage of entries by others in his Field.

A list of the individual IALA Field Managers is maintained by the IALA Secretariat.

#### IALA Product Specification Manager

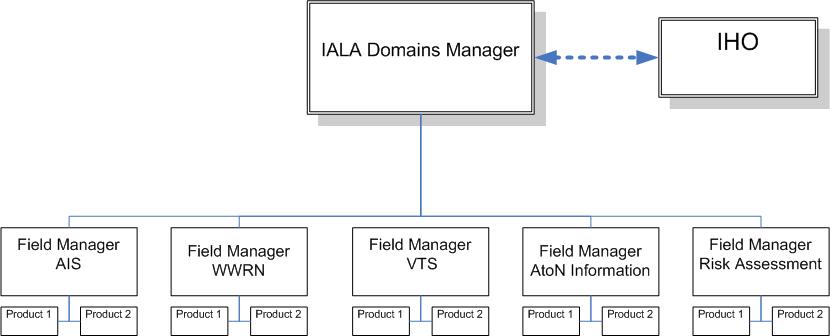
A manager is appointed to manage each IALA Product Specification.

An IALA Product Specification Manager co-ordinates the development of an IALA Product Specification, co-ordinates the usage of existing entries in the IHO Registry that are used by that IALA Product Specification and co-ordinates the creation of new entries required by that IALA Product Specification.

An IALA Product Specification Manager is able to draw on any Register in the IHO Registry.

A list of the individual Product Specification Managers is maintained by the IALA Secretariat.

#### IALA Organizational Chart



1. IALA Domains organisation

# IALA AS A SUBMITTING ORGANIZATION

IALA acts as a Submitting Organization to the IHO Registry. In accordance with S-99 paragraph 3.5, Submitting Organizations propose changes and additions to the contents and proposals for the contents of any domain in any Register. IALA members are encouraged to make submissions intended for the IHO Registry to IALA. IALA will apply its own procedures before submitting to IHO in its own name as the originator. Hence the distinction in IHO S-99 between the ‘submitting organization’ and the ‘proposer’ does not apply for IALA’s submissions.

For IALA the IHO stipulated role of a ‘Submitting Organization’ representative falls to the IALA Domains Manager, who acts as the point of contact between IALA and the IHO.

In regard to the approval and appeal processes, IALA will follow IHO S-99 rules.

# GLOSSARY / DEFINITIONS / ACRONYMS

Definitions and acronyms shall be in accordance with IHO S-100 and S-99 where appropriate. IALA-specific definitions and acronyms are as below.

## Glossary / Definitions

* Registry: The IHO maintains the IHO Registry based on S-100 on a dedicated server.
* Registers: The Registry consists of seven types of Register:
  + Harmonized User Requirement Register;
  + Product Specification Register;
  + Feature Concept Register;
  + Portrayal Register;
  + Metadata Register;
  + Maritime Data Exchange Format Register;
  + Data Producer Code Register.
* The **Feature Concept, Portrayal, Metadata and Maritime Data Exchange Format Registers** are managed lists of items. Selections from these four Registers are used to define Feature and Portrayal Catalogues used in individual product specifications.
* The **Product Specification Register** is a list of Product Specifications created by recognized organizations, which is currently confined to IHO Registry based product specifications. It contains metadata about the content, purpose, version, location and availability of those product specifications.
* The **Data Producer Code Register** is the authoritative list of the codes that can, if required, be stipulated in product specifications to identify the producers of a particular data product. This register is currently restricted to IHO products and so is not considered applicable for IALA’s purposes.
* **Main and Supplementary Spaces.** Each of the Registers above are currently subdivided into:
  + The Main Space of each Register is maintained by IHO for the purpose of directly supporting the official hydrographic products and services required to meet the chart and publications carriage requirements of the Convention on the Safety of Life at Sea (SOLAS);
  + The Supplementary Space of each Register allows organizations recognized by the IHO to register items not already included in the Main Space or items that extend existing items in the Main Space.

## Acronyms

AIS Automatic Identification System

AtoN Aid(s) to Navigation

CMDS Common Maritime Data Structure

ENC Electronic Nautical Chart

HDM Harmonised Data Model

HGDM IMO/IHO Harmonization Group on Data Modelling

IALA International Association of Marine Aids to Navigation and Lighthouse Authorities

IHO International Hydrographic Organization

IMO International Maritime Organization

ISO International Standards Organization

IWRAP IALA Waterways Risk Assessment Program

MDEF Maritime Data Exchange Format Register

MoU Memorandum of Understanding

NAV IMO Sub-Committee on Safety of Navigation

TSMAD Transfer Standard Maintenance and Applications Development working group

SN Circ. Safety of Navigation Circular (IMO)

S-99 Operational procedures for the organisation and management of the S-100 Geospatial Information Registry, January 2011

S-100 Universal Hydrographic Data Model

VTS Vessel Traffic Services

WWRN World-Wide RadioNavigation

# REFERENCES

1. IHO S-99 Operational procedures for the organisation and management of the S-100 Geospatial Information Registry, January 2011.
2. IHO S-100 Universal Hydrographic Data Model, January 2010.
3. ISO 19115 Geographic Information – Metadata, 2003.
4. Extract from ISO19115

The ISO 19115 International Standard defines an extensive set of metadata elements; typically only a subset of the full number of elements is used for any particular product specification. However, it is essential that a basic minimum number of metadata elements be maintained for a dataset.

Listed are the core metadata elements required to identify a dataset, typically for catalogue purposes. This list contains metadata elements answering the following questions: “Does a dataset on a specific topic exist (‘what’)?”, “For a specific place (‘where’)?”, “For a specific date or period (‘when’)?” and “A point of contact to learn more about or order the dataset (‘who’)?”. Using the recommended optional elements in ISO/DIS 19115 addition to the mandatory elements will increase interoperability, allowing users to understand without ambiguity the geographic data and the related metadata provided by either the producer or the distributor. Dataset metadata profiles of this International Standard shall include this core.

Metadata entity set information consists of the entity (UML class) MD\_Metadata, which is mandatory. The MD\_Metadata entity contains both mandatory and optional metadata elements (UML attributes). The MD\_Metadata entity is an aggregate of the following entities (which are further explained in the following subclauses):

• MD\_Identification

• MD\_Constraints

• DQ\_DataQuality

• MD\_MaintenanceInformation

• MD\_SpatialRepresentation

• MD\_ReferenceSystem

• MD\_ContentInformation

• MD\_PortrayalCatalogueReference

• MD\_Distribution

• MD\_MetadataExtensionInformation

• MD\_ApplicationSchemaInformation

ISO 19115:2003 defines the conceptual model required for describing geographic information and services. It provides information about the identification, the extent, the quality, the spatial and temporal schema, spatial reference, and distribution of digital geographic data.

The 19115 international metadata standard defines the mandatory and conditional metadata sections, metadata entities, and metadata elements; the minimum set of metadata required to serve the full range of metadata applications (data discovery, determining data fitness for use, data access, data transfer, and use of digital data); optional metadata elements - to allow for a more extensive standard description of geographic data, if required; a method for extending metadata to fit specialized needs.

1. In the context of Main and Supplementary Registers, as used in IHO’s S-99 Standard, the term ‘Space’ is used here to avoid possible confusion with the repeated use of the term ‘Register’. [↑](#footnote-ref-1)