IALA Guideline No. 1087

on

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

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Document Revisions

Revisions to the IALA Document are to be noted in the table prior to the issue of a revised document.

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25 September 2013		As result of suggested changes from the workshop on producing an IALA S-100 Product Specification, June 2013

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

1   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).

2   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, external Submitting Organisations may use "Supplementary Registers". 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 (HGDM), which is tasked with establishing the Common Maritime Data Structure. As a Domain Owner within the IHO Registry, IALA can expect to 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.

3   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.
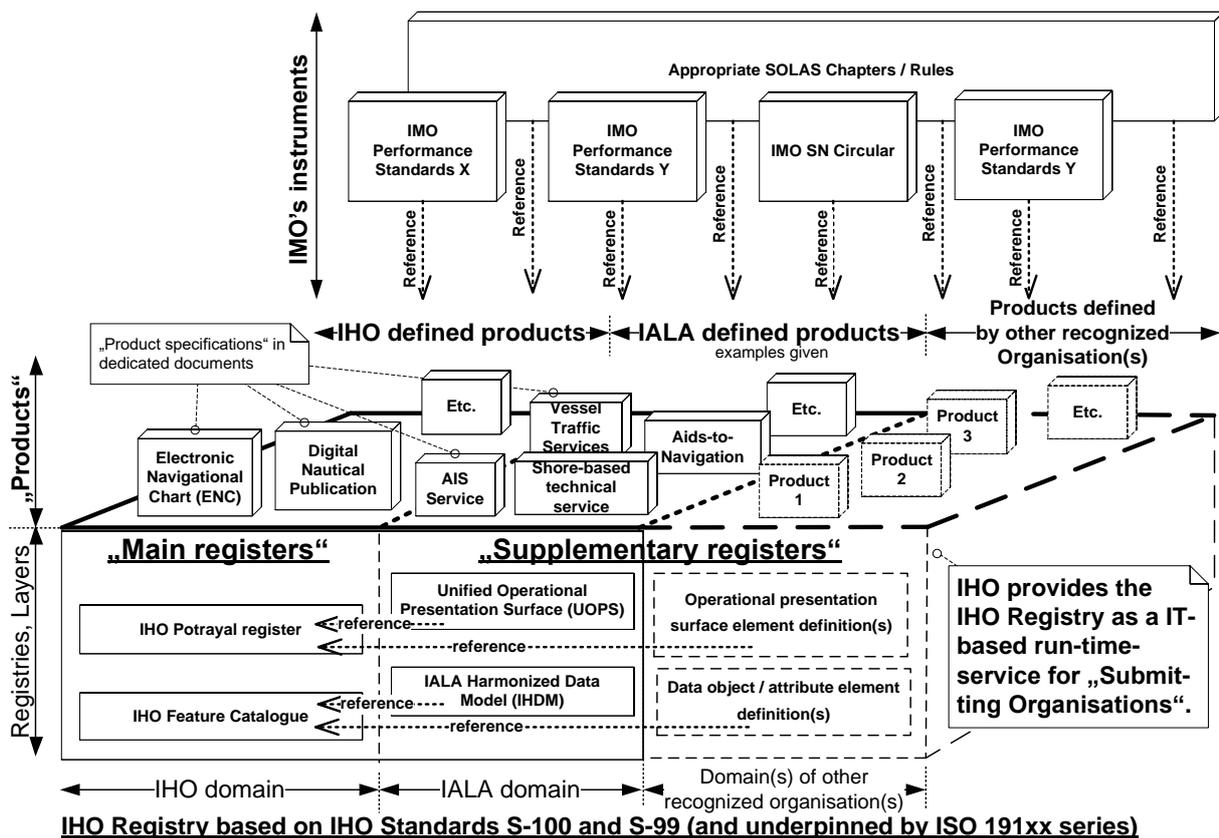
Note 1: The "IHO Registry (based on S-100/S-99) is capable of supporting additional recognized organisations, other than and in addition to IHO and IALA, such as IEC, ISO, etc. This is indicated by "recognised organisation(s)".
Note 2: The "references" introduced between the registries and layers of the "main register" and the "supplementary registers" are provided as examples, only, for simplicity's sake. There could be, by default, "references" between any registry of any international organisation, provided they are of the same kind (i. e. features/attributes or portrayal elements).

Figure 1   The IALA Domains in the IHO Registry

4   THE IALA DOMAINS

Within the Feature Concept, the Portrayal and the Metadata Registers each entry is assigned to a recognised domain. The purpose of designating domains and a related Domain Control Body is to ensure that the key stakeholders (as represented by the domains) are consulted in any subsequent proposals to adjust items contained in a Register.
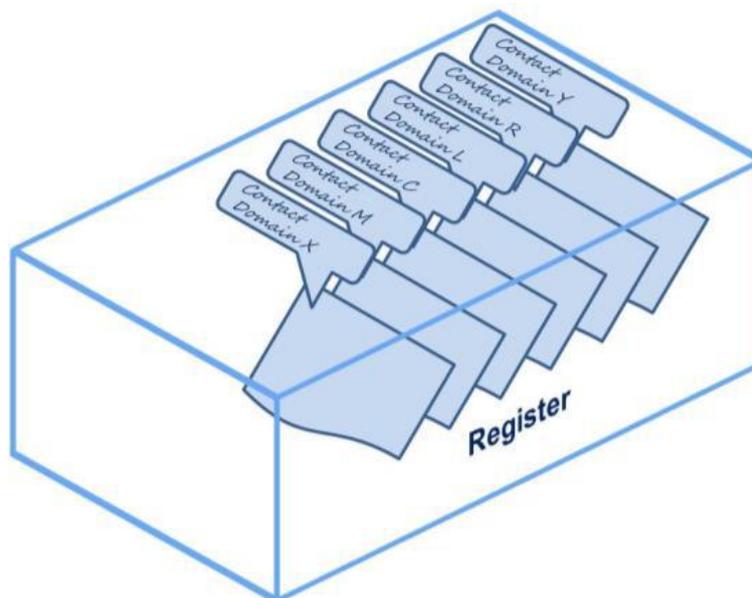

Figure 2   Domain with Registers

The list of Registers is:

4.1   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.

4.2   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 1

4.3 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 1)

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.

4.4 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.

4.5 Producer Code Register:

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

5 IALA AS DOMAIN OWNER

Recognising that the IALA domains comprise several functional domains (e.g. VTS, AtoN, 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.

Table 1   Envisaged IALA domains

Product Specification Register	IALA VTS domain
	IALA AtoN domain
	IALA IWRAP domain
	IALA WWRN domain
Portrayal Register	VTS domain
	AtoN domain
	Formal Risk Assessment domain
	WWRN domain
Feature Concept Dictionary Register	VTS domain
	AtoN domain
	Formal Risk Assessment domain
	WWRN domain
Metadata Register	VTS domain
	AtoN domain
	Formal Risk Assessment domain
	WWRN domain

The 'Product Specification Registry' has IALA prefixed in the name because it is of a different kind; it is organisational in orientation as opposed to the other Registers, which are functional in orientation.

6   MANAGEMENT OF IALA DOMAINS

6.1   The IHO Registry – IALA and Domain Management Relationship

The purpose of this section is to provide information regarding the interaction between the IALA Domain, the International Hydrographic Organization (IHO), and the Registry. It will also describe the roles, responsibilities and procedures for IALA as a Submitting Organization to the IHO Registry, as described by the governing documentation of IHO Standards S-100 and S-99. 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).

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.

6.1.1   IALA as a Domain Owner

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

6.1.2   Management of IALA Domains

The overall management responsibility of IALA for its domains in the IHO Registry is distributed over three types of managerial roles:

1   IALA Domains Management.

2   IALA Field Managers.

3   IALA Product Specification Developer.

As a Domain Owner, IALA will require interaction within the IHO's Domain Control Body and the adherence to the timelines of the IHO's Registry management processes. This activity affects the work of the IALA Domain Management and could lead to the involvement of IALA Field Managers and IALA Product Specification developers. The IALA committee working structure is not suited to meet the IHO's S-99 specified timelines of the product specification approval process and involvement between meetings will be necessary. Membership to the IHO's Domain Control Body provides the Submitting Organizations the opportunity to advocate their own proposals.

6.1.2.1   IALA Domains Management

The IALA Domains Management resides in the IALA Secretariat and coordinates the activities of each of the IALA Field Managers and acts as the single point of contact with the IHO.

6.1.2.2   IALA Field Manager

In the context of IHO Registry, IALA currently recognises the following Product Fields: VTS, AtoN Information, 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 includes 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.

6.1.2.3 IALA Product Specification Developer

A developer is appointed to manage each IALA Product Specification. An IALA Product Specification Developer coordinates the development of an IALA Product Specification, coordinates the usage of existing entries in the IHO Registry that are used by that IALA Product Specification and coordinates the creation of new entries required by that IALA Product Specification. An IALA Product Specification Developer is able to draw on any Register in the IHO Registry.

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

6.1.2.4 IALA Organizational Chart
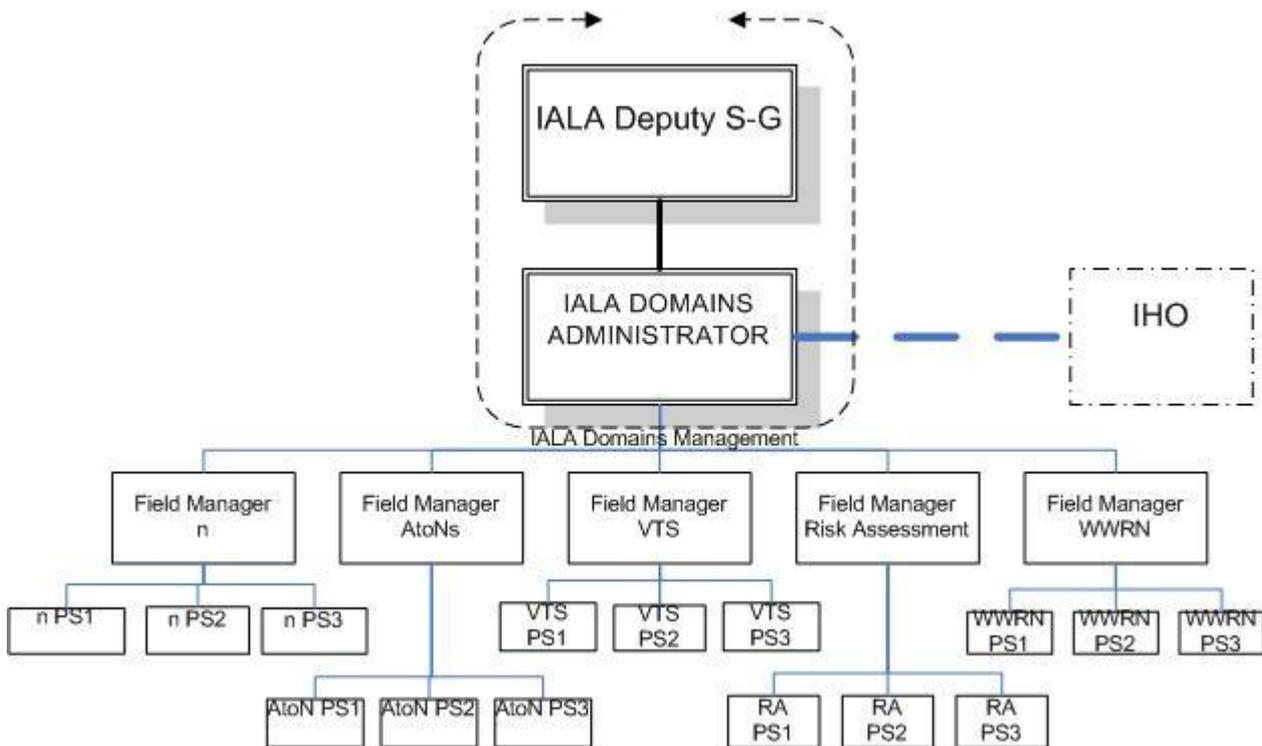
Figure 3   IALA Domains organisation

6.2 Procedure on registering product specifications under development

In order to prevent several organizations working on similar product specifications it is necessary that those launching projects are known to the community. Organizations can check if the development of a product specification is already started and contact the organisation regarding the details. Then they can decide if this product specification will become a joint effort or co-development, which will save time and costs.

Appendix 3 of the guideline *On Producing an IALA S-100 Product Specification* contains a template which will have to be filled in by the product specification developer and sent to the IALA Field Manager. The IALA Field Manager will send the information to the IALA Domains Manager. The Domains Manager will publish this information within the IALA Domain.

6.3   Procedure on getting "draft status" for a Product Specification

If a product specification is at the stage that an application schema is ready, the PS developer can submit his application schema to the IALA Field manager. After review the Field manager will send this to the IALA Domains Manager and request that the status from "launching project" is changed to draft status indicating to the community that the product specification is nearing completion.

6.4   Procedures for Submitting a Product Specification

Representatives of recognized organizations may submit proposals for additions of a new Product Specification in the Product Specifications Register or for the Clarification, Supersession, or Retirement of existing Product Specification in the Register. Requests are to be submitted to the IALA Domain administrator by using the mechanisms[1] provided by IALA. After approval the IALA Domain administrator will submit the request to IHO using the Registry web interface. The process for submitting proposals for the registration of Product Specifications is illustrated in figure 4.
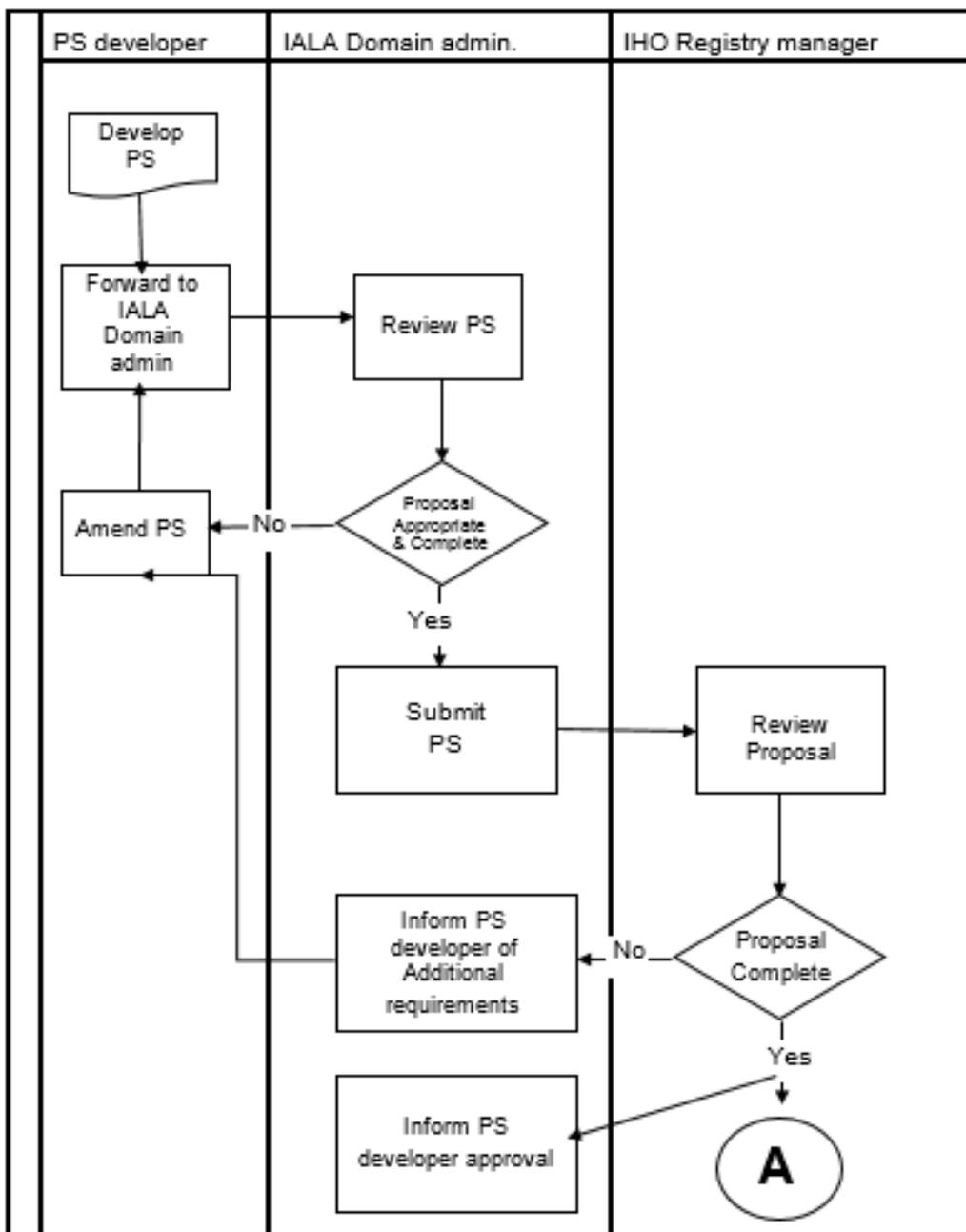

Figure 4   Processing of Proposals

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1   These mechanisms have to be developed

6.4.1   Submission of Proposals

The organization making a submission shall ensure that all proposals:

- are complete; and

- a copy of the final version of the new Product Specification is made available to the IALA Domain administrator.

6.4.2   IALA Domain Administrator

The IALA Domain administrator will:

- receive product specifications from product specification developers;

- determine if the proposed item does or does not fall within the scope of the Register; or

- if a registered item (or similar) to the proposed item already exists;

- review product specifications for completeness;

- return product specifications to the field managers if incomplete; or

- update the item management record, with the status set to 'pending'.

The IALA Domain administrator shall ensure the following IHO acceptance criteria have been satisfied:

- S-100 is used as the underlying standard (organizations are encouraged to populate Feature Catalogues, either using existing entities registered in the GI Registry or proposing new ones where appropriate);

- any identification number of a plain language title used does not infer that it is an IHO standard or that it has received any endorsement or approval of the IHO; and

- the content description is in plain language.

After submission the Domain administrator shall:

- serve as the point of contact and negotiate with IHO regarding any changes required to a proposal; and

- inform the product specification developer of the results of each proposal.

If the proposal is accepted by the IHO registry manager, the IALA Domain administrator informs the product developer and the field manager about the acceptance. If a proposal is not accepted by the IHO registry manager, the Domain Administrator shall:

- inform the product specification developer of the 30 working day deadline for appealing the decision of the IHO registry manager and

- make the results of the approval process available to the product specification developer.

6.4.3   Appeals

A product specification developer may appeal to the IALA deputy SG if it disagrees with the decision of the Domain administrator to reject a proposal for the inclusion of a Product Specification in the Register. An appeal shall contain at a minimum a description of the situation, a justification for the appeal, and a statement of the impact if the appeal is not successful.

The Submitting Organization shall submit its appeal to the Domain administrator.

The Domain administrator shall:

- forward the appeal to IALA Deputy Secretary-General as appropriate; and

- inform the appellant of the decision.

6.4.4   Withdrawal of Proposals

Product Specification developers may decide to withdraw a proposal at any time during the approval process.

The Domain administrator shall then:

- change the proposal management disposition to 'withdrawn' and the value for *date Disposed* to the current date; and

- keep track of the proposal and report the withdrawal in the next periodic report.

6.5   Procedures for Feature Concept, Portrayal and Metadata Registers

In the development process of a product specification it can be necessary to register new features or amend existing features. Also the registration of items in the metadata and portrayal registers can be relevant. In the following chapters a procedure to do so is described. This procedure is derived from IHO Publication S-99.

6.5.1   Introduction

Submitting Organizations may submit proposals for new items, or for clarification, supersession, or retirement of registered items. Proposals are to be submitted by using appendix 2 of the guideline *On Producing an IALA S-100 Product Specification*. After approval the IALA domain administrator will submit the proposal using the mechanisms provided in the Registry web interface.

6.5.2   Addition of registered Items

Addition is the insertion into a Register of an item that describes a concept not adequately described by an item already in the Register.

6.5.3   Clarification of Registered Items

Clarification corrects errors in spelling, punctuation, grammar or improvements to content or wording. A clarification shall not cause any substantive semantic change to a registered item. The three characteristics that can be clarified are definition, other references, and remarks.

6.5.4   Supersession of Registered Items

Supersession of an item means any proposal that would result in a substantive semantic change to an existing item. Supersession shall be accomplished by including one or more new items in the appropriate Register with new identifiers and a more recent date. The original item shall remain in the Register but shall include the date at which it was superseded, and a reference to the items that superseded it.

6.5.5   Retirement of Registered Items

Retirement shall be effected by leaving an item in the Register, but by marking it as "*retired*", and including the date of retirement.

6.5.6   Development of Proposals

The IALA Domain administrator shall manage the development of proposals for entries or amendments to the Feature Concept, Portrayal and Metadata Registers from within their respective Working Groups, communities or organizations.

6.5.7   Submission of Proposals

The process for submitting proposals for the registration of items in the Feature Concept, Portrayal and Metadata Registers is illustrated in Figure 5.

IALA Domain administrators shall:
a)   receive proposals for the registration of items from proposers within their respective Fields, Working Groups, communities or organizations;
b)   ensure that all proposals are logical and complete and are consistent with other features, attributes and enumerated values; and
c)   submit proposals to the appropriate Register and domain.

A Register Manager shall:
a)   receive proposals from Submitting Organizations,
b)   review proposals for completeness,
c)   return proposals to the IALA Domain administrator. if incomplete, and
d)   update the item management record, with the status set to '*pending*'.

A Register Manager shall use the following criteria to determine if a proposal is complete:
a)   the proposal is from a recognized Submitting Organization,
b)   the proposed item falls within the scope of the Register or domain, and
c)   a registered item (or similar) to the proposed item does not already exist.

The Register Manager shall then submit the proposal to the Domain Control Body[2] in accordance with the following submission process.

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2 The Domain Control Body (DCB) shall consist of a representative of each of the domains recognized in each Register type.

Submission Process - Feature Concept, Portrayal and Metadata Registers		
Proposer	IALA Domain admin.	Register Manager
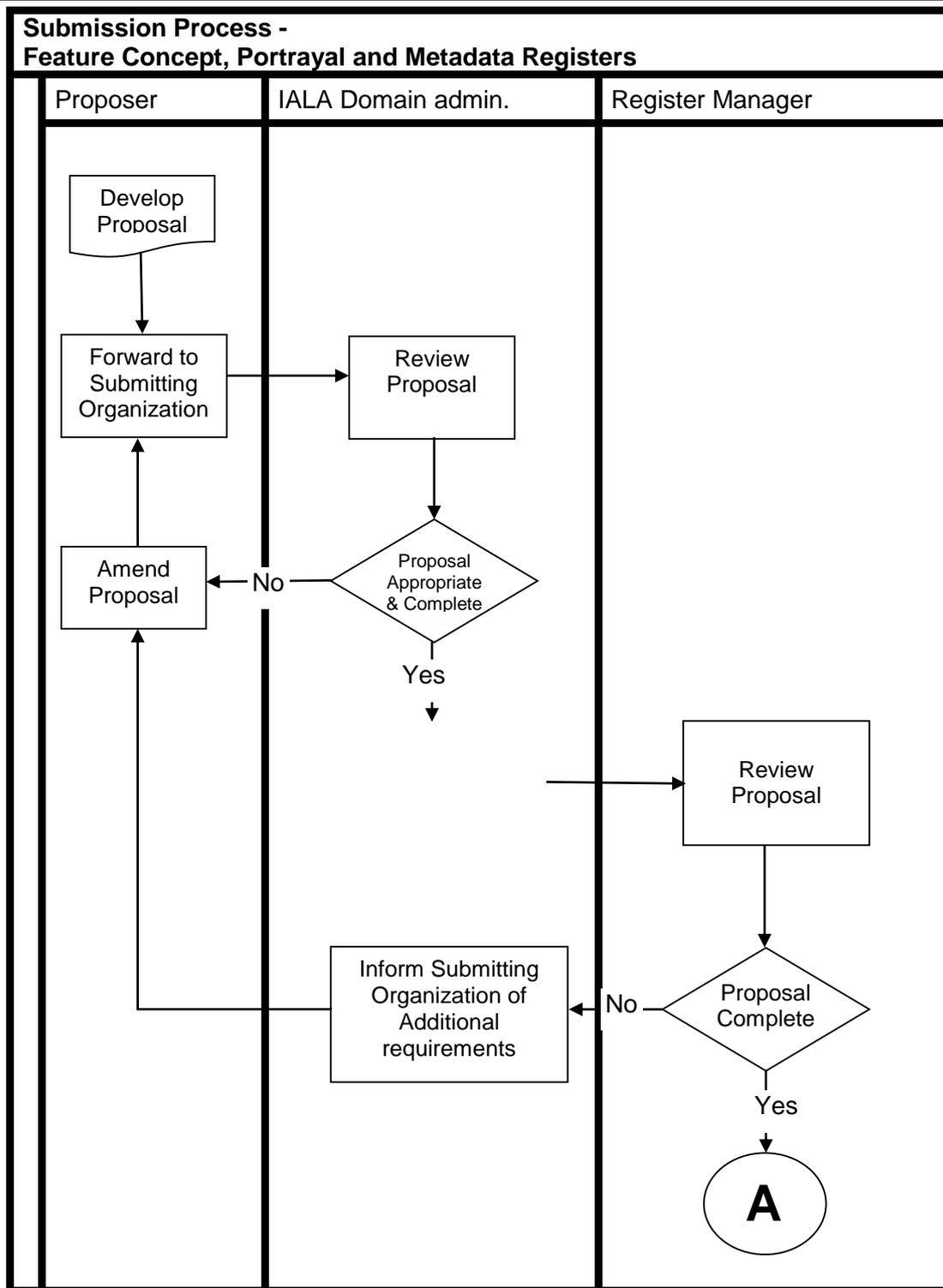
Figure 5   Processing of Proposals

6.5.8   Approval Process

The process for determining the acceptability of proposals is illustrated in Figure 6. The approval process shall normally be completed within a time period of 60 days. In the case of appeal this period shall be extended to 90 days.

The Register Manager shall ensure the following:

a)   if the proposal is for clarification or retirement of a Register item, forward the proposal to the Domain Control Body; or

b)   if the proposal is for registration of a new item or supersession of an existing Register item:
1)   assign an *item Identifier* to the new or superseding item,
2)   set the *status* of the item to '*not Valid*'; and
3)   inform the Domain Control Body of the new proposal within five working days.

The Domain Control Body can decide to:
a)   accept the proposal without change,
b)   accept the proposal subject to changes negotiated with the IALA Domain administrator, or
c)   not accept the proposal.

Criteria for not accepting a proposal include:
a)   the specification of the item is incomplete or incomprehensible,
b)   an identical or very similar item already exists in the Register or in another Register of the Registry,
c)   the proposed item does not belong to an item class included in this Register,
d)   the proposed item does not fall within the scope of an appropriate Register, or
e)   the justification for the proposal is inadequate.

Each Domain Control Body member shall inform the Register Manager of their working group / organization's decision, and the rationale for that decision, within 30 days of receipt of the proposal. Nil returns will be taken as acceptance of the proposal.

The Register Manager shall:
a)   serve as the point of contact if there is a need for negotiations between a Submitting Organization and a Domain Control Body regarding any changes required to a proposal that may be specified by the Control Body as a condition of acceptance; and
b)   inform the IALA Domain admin of the results of processing a proposal.

If the decision of the control body is positive, the Register Manager shall in accordance with policies for the Register:
a)   complete the proposal management record with status set to '*final*', disposition set to '*accepted*', and *date Disposed* to the date of the Domain Control Body's decision,
b)   make approved changes to the content of the Register item,
c)   set the Register item status to '*valid*', '*superseded*', or '*retired*', as appropriate.

If the decision of the control body is negative:
a)   update the proposal management record by setting status to 'tentative', disposition to 'not Accepted', and date Disposed to the date of the Domain Control Body's decision,
b)   inform the IALA Domain admin. of the 30 working day deadline for appealing the decision of the Domain Control Body, and
c)   make the results of the approval process available to all interested parties.

Submitting organizations shall:
a)   negotiate with the Domain Control Body through the Register Manager, regarding any changes to their proposals that are specified by the Domain Control Body as a condition of acceptance; and
b)   make known to the proposer and within their respective communities or organizations the decisions taken on proposals by the Domain Control Body as transmitted to them by the Register Manager.
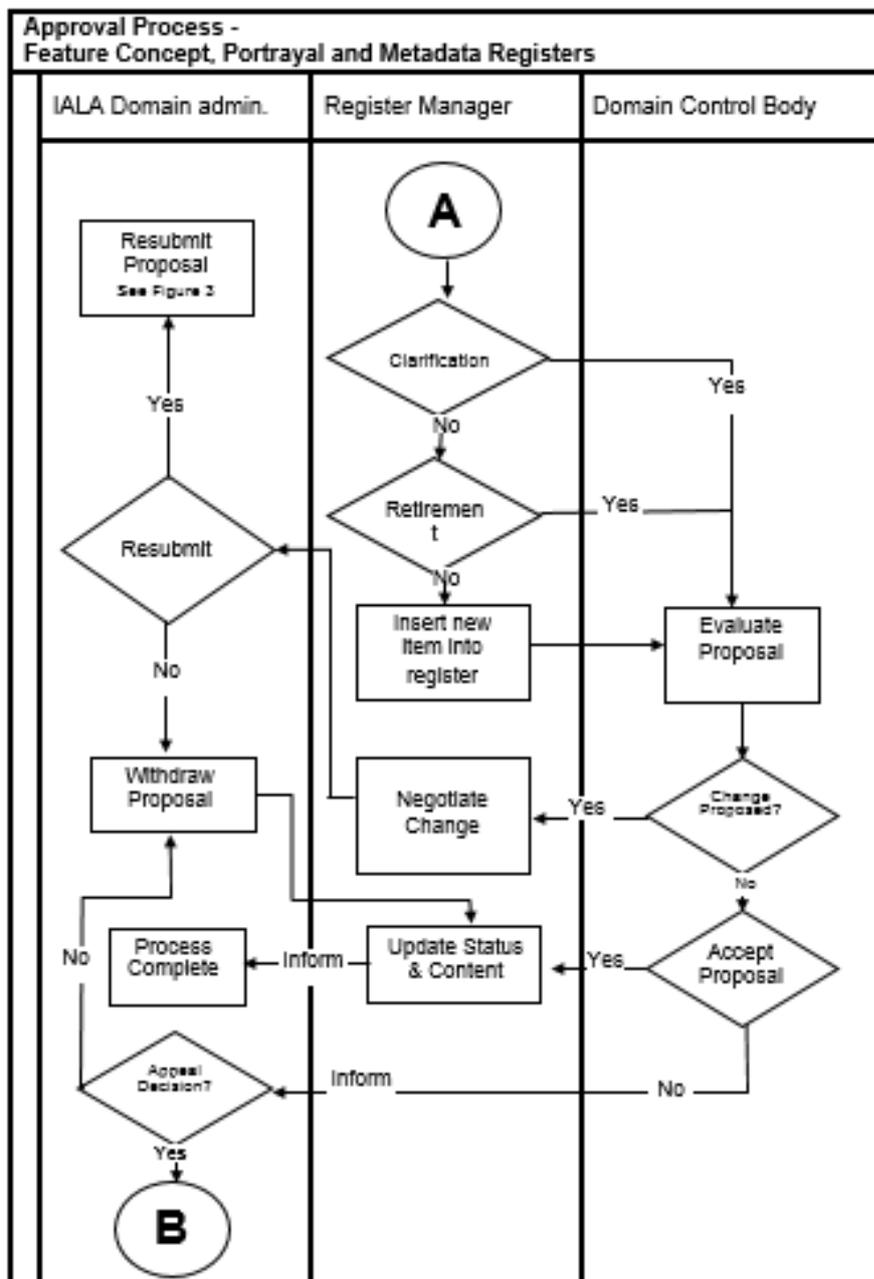
Figure 6   Approval Process

6.5.9   Withdrawal of Proposals

Submitting organizations may decide to withdraw a proposal at any time during the approval process.
The Register Manager shall then:
a)   change the proposal management status from 'pending' to 'final',
b)   change the proposal management disposition to 'withdrawn' and the value for *date Disposed* to the current date, and
c)   keep track of the proposal and report the withdrawal in the next periodic report.

6.5.10 Appeals

A Submitting Organization may appeal to the Executive Control Body if it disagrees with the decision of a Domain Control Body to reject a proposal for addition, clarification, modification, retirement, or supersession of an item in a Register. An appeal shall contain at a minimum a description of the situation, a justification for the appeal, and a statement of the impact if the appeal is not successful. The appeal process is illustrated in Figure 7.

The Registry Manager shall:
a)   determine if the decision regarding a proposal for registration is acceptable; and
b)   if not, submit an appeal to the Register Manager.

The Register Manager shall:
a)   forward the appeal to the Executive Control Body; and
b)   if there is no appeal by the deadline for submitting an appeal, the Register Manager shall change the status of the proposal management record to 'final' and change the *date Disposed* to the current date.

The Executive Control Body shall:
a)   process the appeal in conformance with its established procedures;
b)   decide whether to accept or reject the appeal; and
c)   communicate the decision to the Register Manager.

The Register Manager shall:
a)   update the proposal management record fields disposition and *date Disposed*;
b)   update the Register item status; and
c)   provide the results of the decision to the Domain Control Body and to the IALA Domain administrator

The IALA Domain administrator shall:
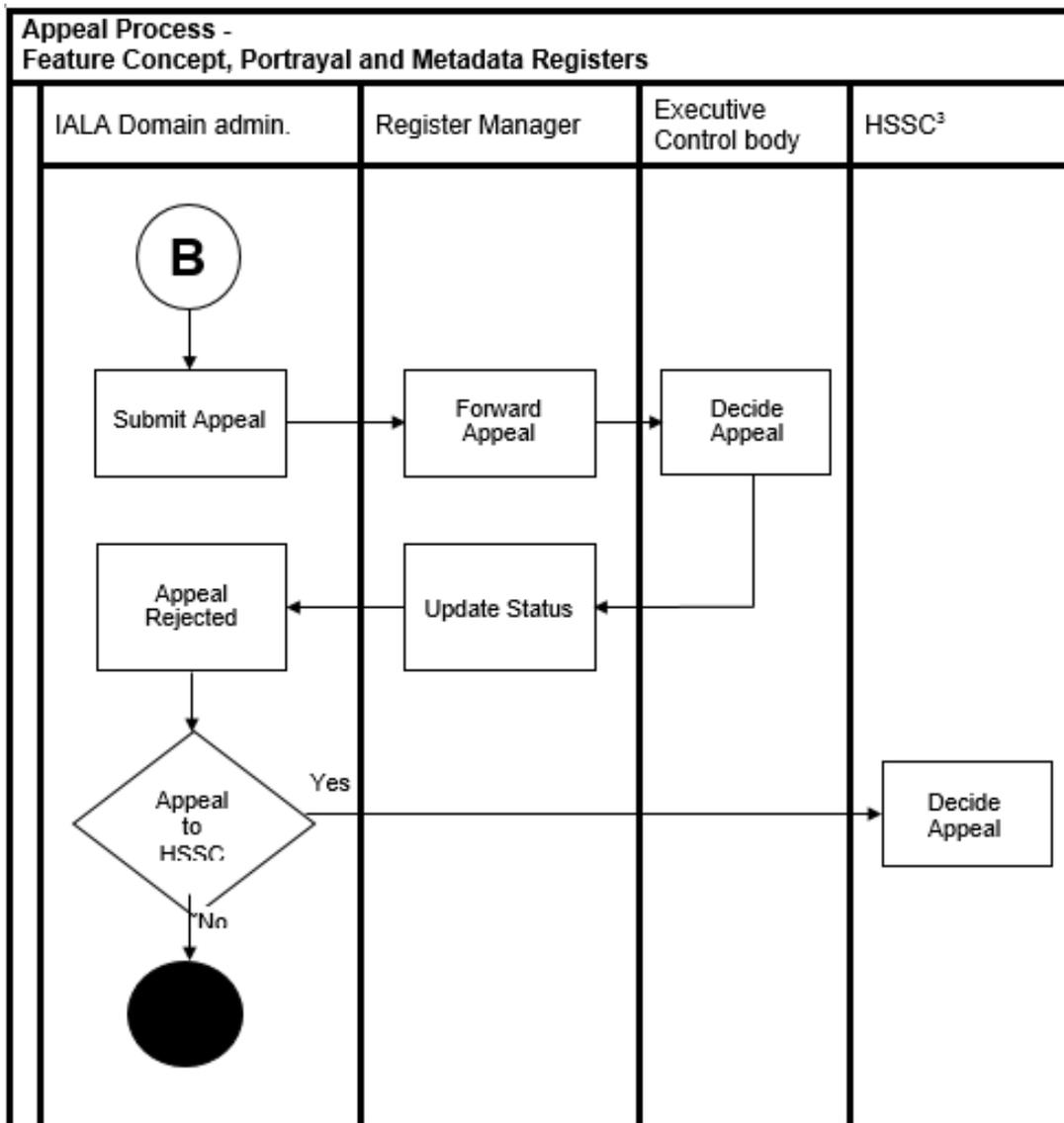a)   make the results of the appeal known within their Working Group, community or organization.

Appeal Process -
Feature Concept, Portrayal and Metadata Registers

IALA Domain admin.	Register Manager	Executive Control body	HSSC[3]

Figure 7   Appeal process

7   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.

7.1   Glossary / Definitions

- Registry: The IHO maintains the IHO Registry based on S-100 on a dedicated server.

- Registers: The Registry consists of five types of Register:
    - Product Specification Register;
    - Feature Concept Dictionary Register;
    - Portrayal Register;
    - Metadata Register;
    - Data Producer Code Register.

It is likely that IALA will come with a request for change to add registers, such as a User requirements register.

- The **Feature Concept Dictionary Register, Portrayal and Metadata Registers** are managed lists of items. Selections from these three 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.

7.2 Acronyms

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
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

8 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] IALA Guideline *On Producing an IALA S-100 Product Specification.*

ANNEX A   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.