

## Paper for consideration by TSMAD29/DIPWG7

## ISO 19115 Updates to S-100

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<b>Executive Summary:</b>	ISO 19115 was updated in April 2014 and since S-100 uses it as a basis for metadata, it is necessary to determine what effects the revisions have on S-100. This paper describes how S-100 Edition 2.0.0 should change consequent on the revisions to ISO 19115.
<b>Related Documents:</b>	(1) S-100 Ed. 2.0.0
<b>Related Projects:</b>	(1) S-100

## 1 Introduction

Metadata for geographic datasets is described by ISO 19115. The first edition was published in 2003, with a corrigendum published in 2006. In 2014, ISO 19115 was withdrawn and replaced by ISO 19115-1. Metadata for imagery and gridded data is described by a separate Part, ISO 19115-2, published in 2009.

The various "ISO 19115" standards are abstract and do not include encodings of metadata. The encodings are described in "ISO 19139" standards. The XML schema implementation of the original ISO 19115 standard was published as ISO 19139 in 2007. The XML schema implementation of Part 2 is described by ISO 19139-2, published in 2012.

Since S-100 depends on ISO 19115 and 19139 for several metadata concepts, specifications, and XML encoding implementations, a review of S-100 is needed to decide what revisions are needed due to the revisions to ISO 19115 and 19139.

## 2 References

ISO 19115:2003: Geographic Information – Metadata (2003). Corrected by Technical Corrigendum 1 (2006).  
 ISO 19115-1: Geographic Information – Metadata – Part 1: Fundamentals (2014).  
 ISO 19115-2: Geographic Information – Metadata – Part 2: Extensions for Imagery and gridded data (2006).  
 ISO 19139:2007: Geographic Information – Metadata – XML Schema implementation (2007).  
 ISO 19139-2: Geographic Information – Metadata – XML Schema implementation – Part 2: Extensions for Imagery and Gridded Data (2012).

## 3 Discussion

### 3.1 Summary of revisions in ISO 19115

Added in ISO 19115-1: Multilingual text information (e.g., language and character sets - moved from ISO 19139) Language and character set localization information; service metadata information. Ability to reference or include a feature catalogue. A new class MD\_AttributeGroup was added which contains "contentType" moved from MD\_CoverageDescription, which allows content types to be part of groups of attributes;

Removed: Data quality information (moved to ISO 19157).

Model revisions: Identification, scoping, date stamps, localization (language, character set). Constraints, distribution, lineage, maintenance, spatial information (descriptions for gridded data); references; citations.

Revision of ISO 19115-2 is planned. Release dates are uncertain as TC 211 has just started the process.

### 3.2 Suggested revisions to S-100 Edition 2

[I can turn this into a formal change proposal using the S-100 maintenance form, but Part 3 has not yet been published and that might need more revisions or somehow affect the revisions needed.]

ISO 19115 revisions	Affected S-100 Parts	Suggested revisions to S-100 Edition 2.0.0
Data Quality information package moved to ISO 19157	4c 8	Obviously references to ISO 19115 need to be updated and UML diagrams and data quality elements compared to ISO 19157. But before that, Part 4c should be re-evaluated in the light of past IHO DQWG work and future plans. DQWG work on data quality has focused on the end-user aspects and portrayal, while ISO 19115 and 19157 and S-100 Part 4c address the “producer-vendor-OEM-developer” aspects. ISO 19157 (released in 2013) is actually not cited in S-100.
<b>ISO 19115 Package: Metadata about metadata</b>		
<p>identifiers for the metadata and parent metadata were made more specific using a CI_Citation which now includes an on-line resource</p> <p>Instead of identifiers being characterStrings a standard type MD_Identifier is used, its attributes are:</p> <p>authority: CI_Citation [0..1]  code: characterString [1..1]  codespace: characterString [0..1]  version: characterString [0..1]  description: characterString [0..1]</p>	4a 8	<p>Some changes may be unnecessarily elaborate for S-100, e.g., fileIdentifier (type: characterString) was replaced by metadataIdentifier (type MD_Identifier), of which “code” as a replacement for “fileIdentifier” is probably sufficient for S-100 metadata. Still, a revision is needed (in this case, to Tables 4a-1 through 4a-4, fig. 4A-A, B-1) to maintain compatibility.</p> <p>Changes to contact and citation elements result in either minor changes in Part 8 (clauses on metadata for imagery and gridded information), or have consequences for implementations of this Part (metadata processing will have to conform to 19115-1).</p>
<p>The model of scoping has been revised, HierarchyLevel attributes were replaced by an MD_Scope class</p> <p>Optional MD_MetadataScope to qualify metadata as applying to dataset (default), coverage, application, etc., etc.</p>	4a	<p>Minimum metadata for geographic datasets and other resources needs revision.</p> <p>This might be useful for more complex exchange sets or datasets in the future. The concept of scope is being added to data quality especially for nautical information data.</p>
dateStamp was replaced with dateInfo to allow other types of metadata date information to be recorded in addition to creation date	4a 8	<p>dateInfo adds codelist CI_DateTypeCode (creation, publication, revision, etc.), to date stamping of metadata.</p> <p>S-100 uses it in Tables 4a-1 and 4a-2. 4a-5.6.4 refers and would have to be expanded.</p> <p>Table 3 in 8-11.2 also refers, this table maps S-61 metadata to ISO 19115 classes and this table will need minor updates or perhaps a third column for ISO 19115-1.</p> <p>Probably useful since currently S-100 allows metadata to have only a single date stamp and cannot track changes.</p>

Other changes: Element <b>language</b> was changed to defaultLocale to allow the description of the character set as well as the language and optionally the country of the language several other changes to other elements: contact, distribution, etc. added elements: metadataLinkage, reference, lineage	4a	Table 4a-1, 4a-2 Improvements are minor, most important consideration is probably conforming to changes in names and data types.
<b>ISO 19115 Package: Identification Information</b>		
Attributes required by both MD_DataIdentification and SV_ServiceIdentification were moved to MD_Identification to remove duplication and improve functionality;	4a 8(?)	Minor changes to Tables 4a-1 & 4a-2 to track the moves. Part 8 App. 8-D (D-1.1.1) mentions MD_Identification since it is described
MD_KeywordClass was added to allow further categorization of keywords;	8	MD_Keywords is mentioned in Part 8 and MD_Identification is mandatory.
Attributes added for various purposes.	?	None or minor effects on S-100.
<b>ISO 19115 Package: Constraint information</b>		
New attributes added to improve the description of constraints and allow indication of scope: useLimitation: CharacterString [0..*] constraintApplicationScope: M D_Scope [0..1] graphic : MD_BrowseGraphic [0..*] reference: C I_Citation [0..*] releasability : M D_Releasability [0..1] responsibleParty: C I_Responsibility [0..*]	8	19115:2003 had only useLimitation. In Part 8D D.1.1.2 refers. No change recommended in S-100 unless S-100 wishes to restrict use of the new attributes (not recommended). That is, S-100 will allow use of the new attributes after the reference document for metadata is updated to 19115-1.
<b>ISO 19115 Package: Lineage information</b>		
Miscellaneous changes to attribute names and types. New attributes added to improve the description of LI_Source and LI_ProcessStep.	4c 8(?)	Updates needed to the table in 4C-B to track changes. Part 8 will need minor changes if any to Table 3 but in App 8-D references in D.1.1.3 to DQ_DataQuality aggregating LI_Lineage will need to be updated as part of the data quality review suggested in Row 1 anyway.
<b>ISO 19115 Package: Maintenance information</b>		
Attributes were replaced to provide a more flexible and unambiguous description of maintenance dates and scope. date	--	Part 11 uses MD_MaintenanceInformation as the type of the maintenance attribute in data product specification metadata – while no change is needed here, the changes to the type of attributes for date and scope will propagate to product specifications.
<b>ISO 19115 Package: Spatial representation</b>		

<p>New attributes added to improve the description of the dimension of a gridded spatial representation.</p> <p>dimensionTitle: characterString [0..1] dimensionDescription: characterString [0..1]</p>	<p>--</p>	<p>S-100 does not mention MD_Dimension. It is used by metadata for grid spatial representations. No practical effect on S-100 except that the new attributes will become available when S-100 is updated to use 19115-1:2014 instead of 19115:2003. Current mandatory attributes <b>dimensionName</b> and <b>dimensionSize</b> remain mandatory.</p>
<p><b>ISO 19115 Package: Reference system information</b></p>		
<p>A new attribute and codelist added to provide for the identification of the type of reference system used.</p>	<p>4a 6</p>	<p>Type change for attribute referenceSystemIdentifier in Table 4a-2.</p> <p>6-4.1.2 – RS_Identifier has been removed from 19115-1 – change to MD_Identifier.</p>
<p><b>ISO 19115 Package: Content information</b></p>		
<p>A new class MD_AttributeGroup was added which contains “contentType” moved from MD_CoverageDescription, which allows content types to be part of groups of attributes.</p>	<p>4b</p>	<p>Attributes have been renamed and moved but changes should not be needed.</p>
<p>A new class, MD_SampleDimension, was added and the model reorganized to improve the description of coverages.</p>	<p>8</p>	<p>Description needs to be added.in App. 8-D for completeness since this appendix describes other classes.</p>
<p>The ability to reference or include a feature catalogue was added.</p> <p>Content information can now incorporate a feature catalogue as well as reference it.</p>	<p>8</p>	<p>Unless S-100 wishes to prevent incorporation of a feature catalogue in content information, the only change is a minor change to 8-D D.1.1.7 to add inclusion of a feature catalogue as a possibility.</p>
<p><b>ISO 19115 Package: Distribution information</b></p>		
<p>Attributes and roles added to improve functionality. New model:</p> <p>description: characterString [0..1] Role: distributionFormat -&gt; MD_Format Role: distributor -&gt; MD_Distributor role: transferOptions: MD_TransferOptions</p>	<p>4a</p>	<p>Types have been revised e.g., MD_Distribution, MD_Format, MD_DigitalTransferOptions, MD_Medium, and new roles for custom ordering options have changes so though no change is needed in S-100 there will be consequences for metadata implementations.</p>
<p><b>ISO 19115 Package: Citation and responsible party information</b></p>		
<p>CI_ResponsibleParty restructured and renamed CI_Responsibility.</p> <p>Attributes added to improve functionality CI.Citation.onlineResource: CI_OnlineResource [0..*] CI_Citation.graphic: MD_BrowseGraphic [0..*] CI_Responsibility.extent: EX_Extent [0..1] CI_Contact.contactType: characterString [0..1] CI_Organization.logo : MD_BrowseGraphic [0..*] CI_OnlineResource.protocolRequest: characterString [0..1]</p> <p>MD_ResponsibleParty was refactored to allow flexibility in its use/reuse.</p>	<p>5 2 4a</p>	<p>The feature catalogue schema will need updating since it uses CI_Citation.</p> <p>S100_RE_Reference also uses CI_Citation – the registry would need to be updated.</p>
<p><b>ISO 19115 Package: Multilingual text information</b></p>		

This package was added unchanged from ISO/TS 19139. It defines PT_FreeText, LocalisedCharacterString, PT_Locale, PT_LocaleContainer.	--	No change needed. PT_Locale is the only class named in S-100 but its source is not indicated.
<b>ISO 19115 Package: Service Information</b>		
Differences are between ISO 19119:2005/Amd 1:2008 and 19115-1.  Attributes and roles added for refining descriptions of services.	4a	Minor changes only.  Table 4a-1 refers but the only required change is updating the name MD_ServiceIdentification to SV_ServiceIdentification.  The attribute serviceType of SV_ServiceIdentification is mandatory for service metadata and should be included. Note 2 about hierarchylevel = service should be revised to account for its replacement by resourceScope.
<b>ISO 19115 Package: Extent Information</b>		
Optional attribute verticalExtent added to class EX_SpatialTemporalExtent  verticalExtent: EX_VerticalExtent [0..1]	--	S-100 does not use EX_SpatialTemporalExtent which is aggregates EX_GeographicExtent and adds attributes for temporality.
<b>ISO 19115 Package: Metadata extension information</b>		
MD_ExtendedElementInformation attributes shortName and domainCode were deleted	--	No change

### 3.3 XML schema implementation

The XML schema implementation of [ISO 19115-1](#) will be a new Technical Specification (19115 Part 3) scheduled for publication in January 2015. 19115-3 defines five artefacts that support the use of ISO 19115-1 compliant metadata and migration from ISO19115 to ISO19115-1. These include:

- XML schema implementing ISO 19115-1;
- Schematron rules for validation constraints included in the ISO 19115-1 UML model that are not specified by the XML schema;
- Schematron rules that identify content in documents encoded using the XML schema defined in ISO 19115-1 that will not translate to ISO 19115 metadata encoded using the ISO 19139 XML schema;
- XSLT templates for transformations between ISO 19115 and 19115-1 XML documents, respectively using the ISO 19139 and 19115-3 XML schema implementations;

The future status of ISO 19139 & 19139-2 is not clear at present. The current release of 19139 defines encodings/XML vocabularies of some XML namespaces which are used for metadata encoding but not strictly metadata. The ISO/TC 211 programme of work mentions a revision and gives target dates for the revision process of June 2015 (Committee Draft) through June 2017 (Technical Specification). Since some of the encodings described in 19139 will move to the impending 19115-3, the status should become clearer after 19115-3 is available.

## 4 Summary

Most of the revisions needed to S-100 are in Part 4a – 4c. Part 8 will also need some editorial revisions. Parts 2 and 6 need one or two revisions.

ISO 19115 is cited in other Parts as well: 0, 1, 3, 5, 10b, 11. These references will have to be updated. References to ISO 19139 should be updated at the same time.

The feature catalogue schema and registry also need to be updated since they use elements defined in ISO 19115 which have been revised, specifically citation information and reference sources. Changes to the feature catalogue schema should be straightforward. Changes to the registry should involve limited modifications to the registry database and UI, primarily citations and references.

## **5 Recommendations**

Proceed to a detailed change proposal for the parts of S-100 which need to be changed (listed above).

The change proposal should include changes due to the artefacts in ISO 19115-3, which should be released shortly before the February TSMAD WG meeting.

Plan for a review of S-101 metadata based on updates to S-100 and ISO 19115-1 and 19115-3, including revisions which are transparent to S-100 (e.g., because it does not go into detail) but might affect implementations. Differences including the “transparent” ones are expected to be documented in the forthcoming Part 3.

## **6 Impacts**

- A new revision of S-100 Edition 2.0.0.
- A new revision of the feature catalogue XML schema.
- An update to the GI registry.
- Review of the metadata sections of S-101 and other product specifications developed currently under development.

## **7 Conclusion**

The revisions are largely incremental improvements, but conformance to ISO 19115-1 can be attained major upheavals and should be addressed earlier rather than later especially since the prior version has been withdrawn.

## **8 Actions Requested**

TSMAD is requested to:

- Agree to update S-100 based on ISO 19115-1 and 19115-3.
- Plan for review of metadata sections of S-101 and other product specifications after the revision of S-100.
- Plan for updates to the GI registry based on ISO 19115-1 and 19115-3.