EUROCONTROL Guidelines for the provision of Metadata to support the Exchange of Aeronautical Data

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Abstract

This document provides guidance to ensure a common understanding of requirements for the collection and provision of metadata. It is mainly aimed at supporting aeronautical data originators and data providers in the upstream data supply chain.

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The following table identifies the authority who has approved the present issue of this document.

AUTHORITY	NAME AND SIGNATURE	DATE
Director General	 Eamon Brennan	25/11/19

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EXECUTIVE SUMMARY

The collection and exchange of metadata associated with aeronautical data and aeronautical information data sets are required both in EU Regulation 73/2010 (ADQ) and in ICAO Annex 15 and PANS-AIM Doc 10066. The need for a harmonised approach to handle metadata associated with aeronautical data and aeronautical information data sets is clearly recognised.

The document “EUROCONTROL Guidelines for the provision of Metadata to support the Exchange of Aeronautical Data” has been created to ensure a common understanding of requirements for the collection and provision of metadata.

This document serves as guidance and does not, therefore, provide normative requirements. It is mainly aimed at supporting data originators and data providers in the “upstream data supply chain”.

These guidelines have been created in the context of the AIM/SWIM Team working arrangments, in particular the Aeronautical Information Regulations Implementation Sub-Group (AIRI SG), considering initial preparatory work done through the ADQ Implementation working group.

1 Introduction

This document analyses a series of statements from ICAO Annex 15 [RD 1] and ICAO Doc 10066 [RD 2] related with the provision of metadata to support the exchange of digital data. ANNEX B lists the statements considered.

For each statement in ANNEX B, this document identifies potential metadata elements to be exchanged together with the data sets. Each potential metadata element has been assessed to determine if it falls within the scope of this document.

The list of metadata elements that was considered to be within the scope of this document is specified in Chapter 3 in the form of Specific Requirements, together with the guidelines for encoding.

In order to establish a generic framework of the provision of metadata, Chapter 2 Generic Requirements includes high-level Generic Requirements which were adopted within this document.

1.1. Purpose of the document

The main purpose of this document is to identify the metadata elements that shall be considered (even if it recognises that it is possible to decide, through the formal agreements, not to transmit them) and to harmonise its encoding. It does not intend to provide guidance on the use of the metadata.

This document is not normative and should be considered as guidelines to promote the automatic treatment of the metadata.

The objective of this document is:

- For the data originators and data providers:
  - To support data originators and data providers to consider which metadata elements should be provided when exchanging data between themselves or when sending data to the AIS.
  - To promote the harmonisation of the encoding of the metadata elements both in AIXM 5.1 and in a CSV or XLS file.
  - To propose basic principles to be followed when exchanging metadata.
- For the AIS:
  - To support AIS personnel to consider which metadata elements should be submitted together with the data received from data originators and data providers.
  - To support the harmonised handling of the metadata elements received from the data originators and data providers.
- For the developers of systems in support of the AIS:
  - To provide guidance for the integration of modules for automatic treatment of metadata in systems in support of the AIS.

This document distinguishes two types of metadata requirements associated with the exchange of aeronautical data:

- the requirements to be satisfied in the data exchange points upstream to the AIS (i.e. originators or data providers exchanging data sets between themselves and/or when sending data sets to the AIS);

- the requirements to be satisfied in the data exchange points downstream from the AIS (i.e. AIS providing ICAO data sets to the Next Intended User or the handling of the metadata by the Next Intended User).

This document only addresses the requirements to be satisfied by the data originators or data providers exchanging data sets between themselves and/or when sending data sets to the AIS.

The requirements to be satisfied by the AIS when providing ICAO data sets to the Next Intended User are addressed in the AIXM Encoding Guidelines:
https://ext.eurocontrol.int/aixm_confluence/display/ACGAIP/Minimal+Metadata+Requirements

The statements considered in this document (ANNEX B) are based on an analysis of ICAO Annex 15 [RD 1], ICAO Doc 10066 [RD 2] and suggestions from the AIM community. At the time of writing, Part AIS of Regulation 2017/373 [RD 4] was not yet published and was not considered. Nevertheless, it is expected that the metadata requirements that will be included in this Regulation will not deviate from the requirements already published in ICAO Annex 15 and Doc 10066.

This document also provides guidance on how to encode the metadata elements. For this purpose, it considers two distinct situations:

- the data originator or the data provider sending the data set to the AIS formatted in AIXM 5.1; or
- the data originator or the data provider sending the data set to the AIS using another specific agreed format (e.g. CSV, XLS…).

For the first situation, this document maps the requirements to the metadata elements found in ISO 19115 [RD 5] and gives examples encoded using ISO 19139 [RD 6] which is an XML Schema implementation of ISO 19115.

Note: A newer version of ISO 19115 is now available (2014). This does not change the mapping applied here.

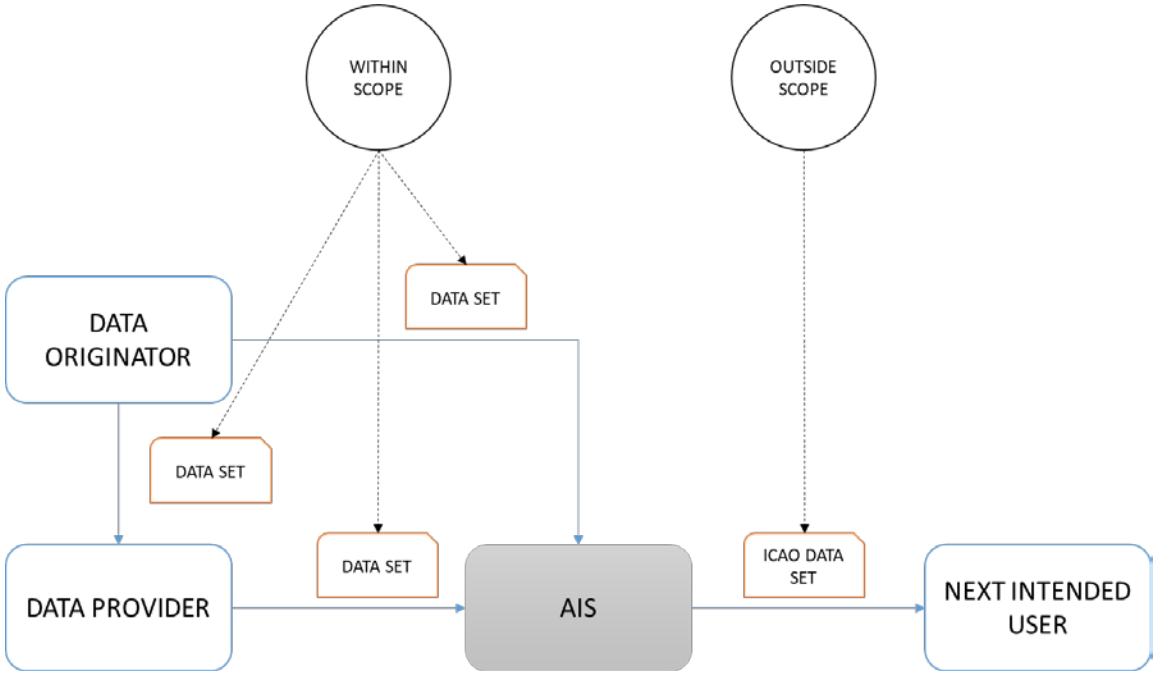
For the second situation, the same mapping to the metadata elements found in ISO 19115 is used and the names of these elements are used to tag the metadata within the file.

Finally, this document provides recommendations on how to complete the mandatory elements in ISO 19115. Although these elements are not specifically required for aeronautical data (i.e. not required in Annex 15 or Doc 10066), they must be provided so that metadata are valid against ISO 19115.

1.2. Scope

This document covers the minimum metadata requirements on data sets from the data originator or data provider to the AIS. These are supplemented by the need to use the ISO 19100 series as the reference framework and also other requirements considered as good practice by the AIS community.

Figure 1 summarises the different types of data exchanges and indicates which ones are within the scope of this document.



Note: Even if the AIS does not provide to the Next Intended User the metadata received from the data originators and/or data providers, it shall have a process in place to store metadata for traceability purposes.

This document does not:

- consider how the AIS handle the metadata received from the data originator in order to incorporate it in the ICAO data sets that are distributed to the Next Intended User;
- consider the metadata to be provided by an information service (as described in the ICAO SWIM Concept); or
- prohibit the addition of additional metadata by AIS.

1.3. Target Audience

The target audience for this document includes, but is not limited to:

- data originators sending data to the AIS;
- AIS personnel responsible for the collection of data from the data originators or data providers;
- developers of systems in support of the AIS and/or data originators.

1.4. Metadata - Common Understanding

The Common Understanding (CU) 06/2014 [RD 8] of the ADQ Regulators Working Group (ARWG) concerning the provisions of Regulation (EU) 73/2010[1] [RD 3] for Metadata sets the context. Whilst the CU defers the definition of specific case-by-case metadata items, to be/not be transmitted to AIS, to the Formal Arrangements (FA), it is recognised that a harmonised approach would be beneficial. Therefore, from an AISP point of view, when establishing FA, it is recommended that metadata include, at the minimum, the following elements:

[1] …foreseen to be repealed by amending EU Regulation 2017/373, Part-AIS/AIM.

- Identification of the entity providing the data: this would allow to ensure that the data came from an authorised source and will provide a point of contact for traceability as to what happened through the previous interactions/modifications.
- Information about data quality requirements: whilst it is recognised that information concerning specific data quality requirements (accuracy, resolution, etc.) should be provided at the data level (i.e. not as metadata but as part of the dataset and for each individual data item), it is recommended that metadata include a statement specifying the level of compliance with mandatory data quality requirements (e.g. compliance with ICAO Data Catalogue requirements, compliance with specific Regulations, etc.).

All entities should endeavour to minimise the amount of unnecessary metadata passed through the data chain whilst assuring traceability is maintained throughout every stage. Therefore, all entities involved in the data chain should ensure that they can keep and maintain all the metadata that is provided to them in accordance with the formal arrangements they have established, without the need to necessarily pass on the full “history” to the Next Intended Users.

1.5. Metadata in the context of the EAD

When exchanging aeronautical data with the European AIS Database (EAD), states shall ensure that the metadata requirements (ICAO Annex 15 [RD 1] and proposed Part-AIS [RD 4]) are applied. This document should be used as general guidance for individual organisations setting up the respective processes which will be used to handle metadata during data exchanges with the EAD. Exact details of those processes should be discussed bilaterally with the EAD.

EAD will store the metadata in a separate file, which will then be associated with the specific data received. Providing the metadata in a structured format in accordance with this document will facilitate the process used by EAD to handle metadata.

1.6. EUROCONTROL Guidelines

EUROCONTROL guidelines, as defined in EUROCONTROL Regulatory and Advisory Framework (ERAF) are advisory material specifying that:
“EUROCONTROL Guidelines may be used, inter alia, to support implementation and operation of ATM systems and services, and to:

- complement EUROCONTROL Rules and Specifications;
- complement ICAO Recommended Practices and Procedures;
- complement EC legislation;
- indicate harmonisation targets for ATM Procedures;
- encourage the application of best practice; and to
- provide detailed procedural information.”

Therefore, the application of EUROCONTROL guidelines document is not mandatory.

These EUROCONTROL Guidelines have been developed under the EUROCONTROL Standards Development Process and the document will be maintained by EUROCONTROL accordingly.

1.7. Structure of the document

The main document structure is as follows:

Chapter 1 - Introduction

Chapter 2 - Generic Requirements

Chapter 3 - Specific Requirements

ANNEX A: UML Diagrams

ANNEX B: List of Statements and Analysis

ANNEX C: List of Tags for Metadata Elements for CSV or XLS Files

1.8. Conventions

EUROCONTROL Guidelines are of informative character with the objective to enable harmonisation.

Guidelines using the term “should” are recommended, whereas Guidelines using the term “may” are optional.

The term “shall” is used where appropriate in the context of ICAO SARPs or European regulatory references. However, “shall” in this context also indicates that certain GM requirements are important to enable achieving metadata requirements contained in other source documents and, therefore, need to be implemented consistently.

1.9. Definitions

- ***Aeronautical data***

  A representation of aeronautical facts, concepts or instructions in a formalized manner suitable for communication, interpretation or processing. [ICAO Annex 15]

- ***Aeronautical information***

  Information resulting from the assembly, analysis and formatting of aeronautical data. [ICAO Annex 15]

- ***Aeronautical Information Publication (AIP)***

  A publication issued by or with the authority of a State and containing aeronautical information of a lasting character essential to air navigation. [ICAO Annex 15]

- ***AIRAC***

  An acronym (aeronautical information regulation and control) signifying a system aimed at advanced notification, based on common effective dates, of circumstances that necessitate significant changes in operating practices. [ICAO Annex 15]

- ***Data accuracy***

  A degree of conformance between the estimated or measured value and the true value. [ICAO Annex 15]

- ***Data product***

  Data set or data set series that conforms to a data product specification (ISO 19131). [ICAO Annex 15]

- ***Data product specification***

  Detailed description of a data set or data set series together with additional information that will enable it to be created, supplied to and used by another party (ISO 19131).

Note.— A data product specification provides a description of the universe of discourse and a specification for mapping the universe of discourse to a data set. It may be used for production, sales, end-use or other purpose. [ICAO Annex 15]

- ***Data set***

  Identifiable collection of data (ISO 19101). [ICAO Annex 15]

- ***ICAO data set***

  A data set as defined by ICAO Annex 15. [ICAO Annex 15]

- ***Data set series***

  Collection of data sets sharing the same product specification (ISO 19115). [ICAO Annex 15]

- ***Data traceability***

  The degree that a system or a data product can provide a record of the changes made to that product and thereby enable an audit trail to be followed from the end-user to the originator. [ICAO Annex 15]

- ***Metadata***

  Data about data (ISO 19115).

  Note.— A structured description of the content, quality, condition or other characteristics of data. [ICAO Annex 15]

- ***Originator***

  An entity that is accountable for data or information origination and/or from which the AIS organization receives aeronautical data and aeronautical information. [ICAO Annex 15]

- ***Data manipulation***

  includes any action of validation, verification, conversion or transformation of the data.

- ***Data origination***

  The creation of the value associated with new data or information or the modification of the value of existing data or information. [ICAO Annex 15]

- ***Temporal reference system***

  Reference system against which time is measured. [ISO 19115]

- ***Traceability***

  Ability to trace the history, application or location of that which is under consideration (ISO 9000).

  Note.

  — When considering product, traceability can relate to:

  — the origin of materials and parts;

  — the processing history; and

— the distribution and location of the product after delivery. [ICAO Annex 15]

1.10. Abbreviations

Note: The list of Tags for Metadata elements is provided at Annex C.

ADQ (IR)	Aeronautical Data Quality (Implementing Rule)
ARWG	ADQ Regulators Working Group
AIRI SG	Aeronautical Information Regulations Implementation Sub-Group
AIS	Aeronautical Information Service(s)
AISP	Aeronautical Information Service Provider
AIM	Aeronautical Information Management
AIXM	Aeronautical Information Exchange Model
ATM	Air Traffic Management
CSV	Comma Separated Value (file format)
CU	Common Understanding
EAD	European AIS Database
ERAF	EUROCONTROL Regulatory and Advisory Framework
FA	Formal Arrangements
GDPR	EU General Data Protection Regulation
GM	Guidance Material or Guidance or Guidelines
ICAO	International Civil Aviation Organisation
SARPs	(ICAO) Standards And Recommended Practices
ISO	International Organization for Standardization
MD	Metadata
PANS-AIM	Procedures for Air Navigation Services - Aeronautical Information Management
Part-AIS	New EU rules for AIS Providers (proposed to amend EU Regulation 2017/373)
REQU	Requirement
RD	Reference Document
SDP	EUROCONTROL Standards Development Process
SWIM	System Wide Information Management
TOD	Terrain and Obstable Data
UML	Unified Modeling Language
XLS	Microsoft Excel (file format)
XML	eXtensible Markup Language (file format)

1.11. Reference Documents

[RD 1] ICAO Annex 15 – Sixteenth Edition, July 2018

[RD 2] ICAO Doc 10066 (PANS-AIM) – First Edition, 2018

[RD 3] Commission Regulation (EU) No 73/2010 of 26 January 2010 laying down requirements on the quality of aeronautical data and aeronautical information for the single European sky as amended by Commission Implementing Regulation (EU) No 1029/2014 of 26 September 2014

[RD 4] Proposed Part-AIS, based on EASA Opinion No 02/2018, proposing amendments to the Regulation (EU) 2017/373 covering, *inter alia*, specific requirements for providers of aeronautical information services/aeronautical information management

[RD 5] ISO 19115:2003 - Geographic information -- Metadata

[RD 6] ISO/TS 19139:2007 - Geographic information -- Metadata -- XML

[RD 7] ISO/TS 19103:2005 - Geographic information -- Conceptual schema language

[RD 8] CU 06/2014 Common Understanding of the ADQ Regulators Working Group (ARWG) concerning Metadata provisions contained in Regulation (EU) 73/2010

2 Generic Requirements

This chapter provides a list of the general requirements that where considered to be within the scope of this document:

a. The specific metadata items that shall be included with the transfer of each data set **shall** be defined in the formal arrangements established between the relevant parties[2].

b. If the formal arrangement does not include the exchange of mandatory metadata elements, these elements **shall** nevertheless be readily available in the data originator/data provider to be provided on request.

c. The metadata elements **shall** be encoded according to the metadata elements defined in ISO 19115 [RD 5].

d. In AIXM metadata **may** be provided at:
   i. the Message level: metadata is considered to be applicable to all data items,
   ii. at the Feature level: metadata is considered to be applicable to all attributes of the Feature within all Time Slices or
   iii. at the TimeSlice level: metadata is considered to be applicable to all attributes of the Feature within the given Time Slice.

e. In another specific agreed format (e.g. CSV, XLS…) the metadata **may** be provided as
   i. a file heading (i.e. in the first rows of the file): metadata is considered to be applicable to all data items,
   ii. at the row level: metadata is considered to be applicable to all attributes in a given row,
   iii. at the attribute level: metadata is considered to be applicable only to a specific attribute in a given row.

Note: This document does not address rules or recommendations on how the metadata should be provided (Message level, Feature level or TimeSlice level for AIXM and heading, row or attribute level for the specific agreed format) as this is considered to be dependent of specific implementation considerations.

Note: This document does not address the rules or recommendations for the repackaging of the metadata received (i.e. how the metadata received is handled, which elements are stored and which elements are exchanged in the next exchange point) as this is considered to be dependent of specific implementation considerations.

f. The metadata related with the documentation of the interactions with the data **shall** be documented using the ISO 19115 <DQ_DataQuality>.<LI_Lineage> element.

g. The metadata related with the compliance with data quality requirements **shall** be documented using the ISO 19115 <DQ_DataQuality>.<DQ_Element> element.

[2] This statement is supported by the ADQ Regulators Working Group (ARWG) Common Understanding 06/2014 Provisions of Commission Regulation (EU) 73/2010 for Metadata

Note: The ISO 19115 <DQ_DataQuality> element has an attribute <scope> marked as mandatory.

h. Both for <LI_Lineage> and <DQ_Element> (as in f. and g. above), when the metadata is provided at Message level, Feature level or TimeSlice level for AIXM and heading level for another specific agreed format, the attribute <scope> of the <DQ_DataQuality> element **shall** be used to give an unambiguous indication to which data items the metadata does apply, i.e. it should be a clear indication if the metadata applies:
    i. To all data items within the dataset
    ii. To all instances of a specific feature type
    iii. To all instances of a specific attribute type
    iv. To all attributes of a specified feature
    v. To a specified attribute of a specified feature

    i. For metadata provided at the row level (for another specific agreed format not AIXM) the metadata elements **shall** be provided after the last attribute of the data item and shall be considered as applicable to all attributes within that row.
    j. For metadata provided at the attribute level (for another specific agreed format not AIXM) the metadata **shall** be provided next to the designated attribute and shall be preceded by the name of the attribute and separated by a [.] (e.g. Attribute1.organisationName).

k. The metadata **may** be provided in the same file as the data or in a separate file

Note: This document does not address rules or recommendations for the method (i.e. same file or different file) used to provide the metadata as this is considered to be dependent of specific implementation considerations. Nevertheless, in case the metadata is provided in a separate file, it is recommended that the data originator/provider shall ensure that the correspondence between data and metadata files is established through a file naming convention.

l. In an AIXM file, the metadata element **shall** be encoded using ISO 19139.
m. In a specific agreed format file (i.e. other than AIXM), the tags (i.e. the titles of the columns or rows) for the metadata elements **shall** follow the names of the elements from ISO 19115. Annex 4 gives the list of the tags that shall be used for each metadata element identified in the Requirements from Chapter 3.

Example with metadata in the heading (i.e. applicable to all data elements within the data set)

MD_Metadata				
citation.title	[...]			
citation.date	[...]			
citation.dateType	[...]			
language	[...]			
topicCategory	[...]			
abstract	[...]			
contact	[...]			
dateStamp	[...]			
/MD_Metadata				
Data Item	Attribute1	Attribute2	Attribute3	[...]
[...]	[...]	[...]	[...]	[...]

Example with both metadata in the heading (i.e. applicable to all data elements within the data set) and metadata in the row (i.e. applicable only to the data elements in the same row)

MD_Metadata							
citation.title	[…]						
citation.date	[…]						
citation.dateType	[…]						
language	[…]						
topicCategory	[…]						
abstract	[…]						
contact	[…]						
dateStamp	[…]						
/MD_Metadata							
Data Item	Attribute1	Attribute2	Attribute3	[…]	organisationName	electronicMailAddress	role
[…]	[…]	[…]	[…]	[…]			

Example with metadata in the heading (i.e. applicable to all data elements within the data set) and metadata at the attribute level (i.e. applicable only to the specific attribute)

MD_Metadata						
citation.title	[…]					
citation.date	[…]					
citation.dateType	[…]					
language	[…]					
topicCategory	[…]					
abstract	[…]					
contact	[…]					
dateStamp	[…]					
/MD_Metadata						
Data Item	Attribute1	Attribute1.organisationName	Attribute1.electronicMailAddress	Attribute1.role	Attribute2	Attribute3
[…]	[…]	[…]	[…]	[…]		

3 Specific Requirements

This chapter provides a list of the specific requirements which were considered to be within the scope of this document:

- Interactions with the data: This is specifically required in ICAO Annex 15 [RD 1] (see Chapter 3.1).
- Temporal Reference System: This is required in specific conditions (see Chapter 3.2).
- Area of Coverage: This is a recommendation from the AIS/AIM community[3] to be provided with all data sets (it is mandatory, according to ICAO Annex 15, for terrain and obstacle data sets) (see Chapter 3.3).
- Compliance with data quality requirements: Whilst the values of the data quality measures (accuracy, resolution and integrity levels) are provided not as metadata but as data items, a statement on the compliance with acceptable conformance levels may be useful. This is also the case for the annotation of compliance with specific Regulations (e.g. 73/2010 [RD 3] or in the proposed 2017/373 [RD 4]) (see Chapter 3.4).
- Compliance with ISO 19115 [RD 5]: To be compliant with ISO 19115, the metadata shall include specific mandatory elements (see Chapter 3.5).

3.1. Interactions with DATA

3.1.1 Requirements

REQUIREMENT 01

Each data set **shall** include information on each organisation or entity that performed any action of originating, transmitting or manipulating the data within the data set.

The identification of each organisation or entity **shall** include, as a minimum:

- The name of the organisation or entity; and
- The email address of the organisation or entity. In the case where the organisation or entity does not have an email address, this shall be replaced by another element that could be used to contact the organisation or entity (e.g. telephone number).

Note: This requirement does not exclude the possibility to include other elements related with the identification of the organisation or entity (e.g. telephone number, postal address…).

Note: Whatever elements are provided, it shall be ensured the compliance with the requirements of the EU General Data Protection Regulation[4] (GDPR) and/or any other relevant national legislation for the protection of personal data.

REQUIREMENT 02

Each data set **shall** include information giving the description of the actions performed on the data.

[3] AIM Community is a term used by the AIXM Encoding Focus Group metadata guidelines and is maintained for consistency refering to outcome of their discussions, as relevant.
[4] Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data.

REQUIREMENT 03

Each data set **shall** include information giving the date and time of the actions performed on the data.

REQUIREMENT 04

The information documenting each interaction (as documented per REQUIREMENT 01, REQUIREMENT 02 and REQUIREMENT 03) **shall** be supported by information indicating the scope of the interaction (i.e. if the interaction applies to all data items within the data set or only to specific data items).

3.1.2 Encoding the requirements

The following ISO 19115 [RD 5] elements shall be used to encode the requirements:

Note: For the UML diagram of the ISO 19115 elements used to encode the interactions with the data, see ANNEX A.

Requirement	Reference	REQUIREMENT 01
	Element Name	Identification of organisation
	Obligation / Condition	Mandatory
	Multiplicity	1..*
ISO 19115 (2003)	Number	90
	Name	Processor
	Definition	identification of, and means of communication with, person(s) and organization(s) associated with the process step
	XPath	gmd:MD_Metadata/gmd:dataQualityInfo/ gmd:DQ_DataQuality/gmd:lineage/ gmd:LI_Lineage/gmd:processStep/ gmd:LI_ProcessStep/gmd:processor
	Data type	Class
	Domain	CI_ResponsibleParty
	Example	MyOrganisation operator@myorgansiation.com processor
Implementing Instructions Class CI_ResponsibleParty **shall** include the following elements:		

- gmd:CI_ResponsibleParty/gmd:organisationName

the domain for gmd:organisationName is CharacterString/Free text

- gmd:CI_ResponsibleParty/gmd:contactInfo

the domain for gmd:contactInfo is CI_Contact

  - the email address shall be encoded in the element gmd:CI_Contact/gmd:address/gmd:CI_Address/ gmd:electronicMailAddress

- gmd:CI_ResponsibleParty/role

the domain for gmd:role is CI_RoleCode and **shall** take one of its allowable values:

Note: Although, in principle, any of the values of CI_RoleCode may be used, it is recommended to use one of the following:

  - **pointOfContact** > when the organisation is the party who can be contacted for acquiring additional knowledge about the data
  - **originator** > when the organisation is the originator of the data
  - **distributor** > when the organisation is responsible for transmitting the data
  - **processor** > when the organisation has manipulated the data

Requirement	Reference	REQUIREMENT 02
	Element Name	Description of the action
	Obligation / Condition	Mandatory
	Multiplicity	1..*
ISO 19115 (2003)	Number	87
	Name	description
	Definition	description of the event, including related parameters or tolerances
	XPath	gmd:MD_Metadata/gmd:dataQualityInfo/ gmd:DQ_DataQuality/gmd:lineage/ gmd:LI_Lineage/gmd:processStep/ gmd:LI_ProcessStep/gmd:description
	Data type	CharacterString
	Domain	Free text

	Example	Origination of the data
Implementing Instructions		

Requirement	Reference	REQUIREMENT 03
	Element Name	Date Time of the action
	Obligation / Condition	Mandatory
	Multiplicity	1..*
ISO 19115 (2003)	Number	89
	Name	dateTime
	Definition	date and time or range of date and time on or over which the process step occurred
	XPath	gmd:MD_Metadata/gmd:dataQualityInfo/ gmd:DQ_DataQuality/gmd:lineage/ gmd:LI_Lineage/gmd:processStep/ gmd:LI_ProcessStep/gmd:dateTime
	Data type	Class
	Domain	DateTime[5]
	Example	2019-02-24 12:00:00
Implementing Instructions		

Requirement	Reference	REQUIREMENT 04
	Element Name	Scope of the interaction
	Obligation / Condition	Mandatory
	Multiplicity	1 (in each DQ_DataQuality element; it is possible to have multiple DQ_DataQuality elements)
ISO 19115 (2003)	Number	79
	Name	scope
	Definition	the specific data to which the data quality information applies
	XPath	gmd:MD_Metadata/gmd:dataQualityInfo gmd:DQ_DataQuality/gmd:scope

[5] DateTime: combination of a date and a time type (given by an hour, minute and second). Character encoding of a DateTime shall follow ISO 8601. This class is documented in full in ISO/TS 19103 [RD 7].

	Data type	Class
	Domain	DQ_Scope
	Example	Dataset, featureType, attribute

Implementing Instructions

Class DQ_Scope shall include the following elements:

- gmd:DQ_Scope/gmd:level

the domain for gmd:level is MD_ScopeCode and shall take one of the following allowable values:

  - **dataset** > the metadata applies to all data items in the file. gmd:levelDescription is not required.
  - **featureType** > the metadata applies to all instances of a given Feature. gmd:levelDescription shall include the name of the featureType (the name of the feature type shall follow the names of the features from the AIXM 5.1 schema)
  - **attributeType** > the metadata applies to all instances of a given Attribute. gmd:levelDescription shall include the name of the attributeType (the name of the attribute type shall follow the names of the attributes from the AIXM 5.1 schema)
  - **feature** > the metadata applies to all attributes of specific feature. gmd:levelDescription shall include the UUID of the feature
  - **attribute** > the metadata applies to a specific attribute of a specific feature. gmd:levelDescription shall include a concatenation of the UUID of the Feature and the name of the Attribute

- gmd:DQ_Scope/gmd:levelDescription

the domain for gmd:levelDescription is MD_ScopeDescription and shall include the following elements:

  - gmd:other

  the domain for gmd:other is CharacterSet/Free text

Note: Within DQ_Scope the element gmd:level, is used to specify if the metadata applies to all the data items included in the file or only to a specific sub-group. When gmd:level is different from “dataset” the element gmd:levelDescription shall be used to give an unambiguous indication of the data to which the metadata applies.

3.1.3 Examples

Metadata applies to all data items

XML Example

```
<root xmlns:gmd="URI" xmlns:gco="URI">
 <gmd:MD_Metadata>
```

```
<gmd:dataQualityInfo>
 <gmd:DQ_DataQuality>
  <gmd:scope>
   <gmd:DQ_ScopeCode>
    <gmd:level>
     <gmd:DQ_ScopeCode codeList="./resources/Codelist/gmxCodeLists.xml#DQ_ScopeCode" codeListValue="dataset">data
set</gmd:DQ_ScopeCode>
    </gmd:level>
   </gmd:DQ_ScopeCode>
  </gmd:scope>
  <gmd:lineage>
   <gmd:LI_Lineage>
    <gmd:processStep>
     <gmd:LI_ProcessStep>
      <gmd:description>
       <gco:CharacterString>origination of the data</gco:CharacterString>
      </gmd:description>
      <gmd:dateTime>
       <gco:DateTime>2010-11-01T12:00:00Z</gco:DateTime>
      </gmd:dateTime>
      <gmd:processor>
       <gmd:CI_ResponsibleParty>
        <gmd:organisationName>
         <gco:CharacterString>myOrganisation</gco:CharacterString>
        </gmd:organisationName>
        <gmd:contactInfo>
         <gmd:CI_Contact>
          <gmd:address>
           <gmd:CI_Address>
            <gmd:electronicMailAddress>
             <gco:CharacterString>operator@myorganisation.org</gco:CharacterString>
            </gmd:electronicMailAddress>
           </gmd:CI_Address>
          </gmd:address>
         </gmd:CI_Contact>
        </gmd:contactInfo>
```

```
            <gmd:role>
             <gmd:CI_RoleCode codeList="./resources/Codelist/gmxCodeLists.xml#CI_RoleCode" codeListValue="originator">originator</gmd:CI_RoleCode>
            </gmd:role>
           </gmd:CI_ResponsibleParty>
          </gmd:processor>
         </gmd:LI_ProcessStep>
        </gmd:processStep>
       </gmd:LI_Lineage>
      </gmd:lineage>
     </gmd:DQ_DataQuality>
   </gmd:dataQualityInfo>
 </gmd:MD_Metadata>
</root>
```

XLS Example

MD_Metadata				
[...]				
DQ_Scope.level	dataset			
LI_ProcessStep.dateTime	2010-11-01T12:00:00Z			
LI_ProcessStep.description	Origination of the data			
LI_ProcessStep.organisationName	myOrganisation			
LI_ProcessStep.electronicMailAddress	operator@myorganisation.com			
LI_ProcessStep.role	originator			
[...]				
/MD_Metadata				
Data Item ID	Attribute1	Attribute2	Attribute3	[...]
#1	[...]	[...]	[...]	[...]
#2	[...]	[...]	[...]	[...]
[...]	[...]	[...]	[...]	[...]

Metadata applies to all instances of a given FeatureType

XML Example

```
<root xmlns:gmd="URI" xmlns:gco="URI">
 <gmd:MD_Metadata>
  <gmd:dataQualityInfo>
   <gmd:DQ_DataQuality>
```

```
    <gmd:scope>
     <gmd:DQ_ScopeCode>
      <gmd:level>
       <gmd:DQ_ScopeCode codeList="./resources/Codelist/gmxCodeLists.xml#DQ_ScopeCode" codeListValue="featureType"
>featureType</gmd:DQ_ScopeCode>
      </gmd:level>
      <gmd:levelDescription>
       <gmd:MD_ScopeDescription>
        <gmd:other>
         <gco:CharacterString>AirportHeliport</gco:CharacterString>
        </gmd:other>
       </gmd:MD_ScopeDescription>
      </gmd:levelDescription>
     </gmd:DQ_ScopeCode>
    </gmd:scope>
    <gmd:lineage>
     <gmd:LI_Lineage>
      <gmd:processStep>
       <gmd:LI_ProcessStep>
        <gmd:description>
         <gco:CharacterString>geographical coordinates were converted from ETRS89 to WGS84</gco:CharacterString>
        </gmd:description>
        <gmd:dateTime>
         <gco:DateTime>2010-11-01T12:00:00Z</gco:DateTime>
        </gmd:dateTime>
        <gmd:processor>
         <gmd:CI_ResponsibleParty>
          <gmd:organisationName>
           <gco:CharacterString>myOrganisation</gco:CharacterString>
          </gmd:organisationName>
          <gmd:contactInfo>
           <gmd:CI_Contact>
            <gmd:address>
             <gmd:CI_Address>
              <gmd:electronicMailAddress>
               <gco:CharacterString>operator@myorganisation.org</gco:CharacterString>
```

```
                    </gmd:electronicMailAddress>
                   </gmd:CI_Address>
                  </gmd:address>
                 </gmd:CI_Contact>
                </gmd:contactInfo>
                <gmd:role>
                 <gmd:CI_RoleCode codeList="./resources/Codelist/gmxCodeLists.xml#CI_RoleCode" codeListValue="processor">pr
ocessor</gmd:CI_RoleCode>
                </gmd:role>
               </gmd:CI_ResponsibleParty>
              </gmd:processor>
             </gmd:LI_ProcessStep>
            </gmd:processStep>
           </gmd:LI_Lineage>
          </gmd:lineage>
         </gmd:DQ_DataQuality>
        </gmd:dataQualityInfo>
       </gmd:MD_Metadata>
</root>
```

XLS Example

MD_Metadata				
[...]				
DQ_Scope.level	featureType			
DQ_Scope.levelDescription	AirportHeliport			
LI_ProcessStep.dateTime	2010-11-01T12:00:00Z			
LI_ProcessStep.description	geographical coordinates were converted from ETRS89 to WGS84			
LI_ProcessStep.organisationName	myOrganisation			
LI_ProcessStep.electronicMailAddress	operator@myorganisation.com			
LI_ProcessStep.role	processor			
[...]				
/MD_Metadata				
Data Item ID	Attribute1	Attribute2	Attribute3	[...]
#1	[...]	[...]	[...]	[...]
#2	[...]	[...]	[...]	[...]
[...]	[...]	[...]	[...]	[...]

NOTE: If the same metadata applies to more than one featureType, one line with DQ_Scope.levelDescription shall be inserted for each featureType.

Metadata applies to all instances of a given AttributeType

XML Example

```
<root xmlns:gmd="URI" xmlns:gco="URI">
 <gmd:MD_Metadata>
  <gmd:dataQualityInfo>
   <gmd:DQ_DataQuality>
    <gmd:scope>
     <gmd:DQ_ScopeCode>
      <gmd:level>
       <gmd:DQ_ScopeCode codeList="./resources/Codelist/gmxCodeLists.xml#DQ_ScopeCode" codeListValue="attributeType
">attributeType</gmd:DQ_ScopeCode>
      </gmd:level>
      <gmd:levelDescription>
       <gmd:MD_ScopeDescription>
        <gmd:other>
         <gco:CharacterString>magneticVariation</gco:CharacterString>
        </gmd:other>
       </gmd:MD_ScopeDescription>
      </gmd:levelDescription>
     </gmd:DQ_ScopeCode>
    </gmd:scope>
    <gmd:lineage>
     <gmd:LI_Lineage>
      <gmd:processStep>
       <gmd:LI_ProcessStep>
        <gmd:description>
         <gco:CharacterString>validation of magnetic variation</gco:CharacterString>
        </gmd:description>
        <gmd:dateTime>
         <gco:DateTime>2010-11-01T12:00:00Z</gco:DateTime>
        </gmd:dateTime>
        <gmd:processor>
         <gmd:CI_ResponsibleParty>
```

```
            <gmd:organisationName>
              <gco:CharacterString>myOrganisation</gco:CharacterString>
            </gmd:organisationName>
            <gmd:contactInfo>
              <gmd:CI_Contact>
                <gmd:address>
                  <gmd:CI_Address>
                    <gmd:electronicMailAddress>
                      <gco:CharacterString>operator@myorganisation.org</gco:CharacterString>
                    </gmd:electronicMailAddress>
                  </gmd:CI_Address>
                </gmd:address>
              </gmd:CI_Contact>
            </gmd:contactInfo>
            <gmd:role>
              <gmd:CI_RoleCode codeList="./resources/Codelist/gmxCodeLists.xml#CI_RoleCode" codeListValue="processor">pr
ocessor</gmd:CI_RoleCode>
            </gmd:role>
          </gmd:CI_ResponsibleParty>
        </gmd:processor>
      </gmd:LI_ProcessStep>
    </gmd:processStep>
  </gmd:LI_Lineage>
 </gmd:lineage>
</gmd:DQ_DataQuality>
</gmd:dataQualityInfo>
</gmd:MD_Metadata>
</root>
```

XLS Example

MD_Metadata				
[...]				
DQ_Scope.level	attributeType			
DQ_Scope.levelDescription	magneticVariation			
LI_ProcessStep.dateTime	2010-11-01T12:00:00Z			

LI_ProcessStep.description	validation of magnetic variation			
LI_ProcessStep.organisationName	myOrganisation			
LI_ProcessStep.electronicMailAddress	operator@myorganisation.com			
LI_ProcessStep.role	processor			
[...]				
/MD_Metadata				
Data Item ID	Attribute1	Attribute2	Attribute3	[...]
#1	[...]	[...]	[...]	[...]
#2	[...]	[...]	[...]	[...]
[...]	[...]	[...]	[...]	[...]

NOTE: If the same metadata applies to more than one attributeType, one line with DQ_Scope.levelDescription shall be inserted for each attributeType.

Metadata applies to all attributes of a specific identified Feature

XML Example

```
<root xmlns:gmd="URI" xmlns:gco="URI">
 <gmd:MD_Metadata>
  <gmd:dataQualityInfo>
   <gmd:DQ_DataQuality>
    <gmd:scope>
     <gmd:DQ_ScopeCode>
      <gmd:level>
       <gmd:DQ_ScopeCode codeList="./resources/Codelist/gmxCodeLists.xml#DQ_ScopeCode" codeListValue="feature">feat
ure</gmd:DQ_ScopeCode>
      </gmd:level>
      <gmd:levelDescription>
       <gmd:MD_ScopeDescription>
        <gmd:other>
         <gco:CharacterString>uuid.ae23b6f7-cd1a-4138-a2da-aca4f5766852</gco:CharacterString>
        </gmd:other>
       </gmd:MD_ScopeDescription>
      </gmd:levelDescription>
     </gmd:DQ_ScopeCode>
    </gmd:scope>
    <gmd:lineage>
     <gmd:LI_Lineage>
```

```
        <gmd:processStep>
         <gmd:LI_ProcessStep>
          <gmd:description>
           <gco:CharacterString>geographical coordinates were converted from ETRS89 to WGS84</gco:CharacterString>
          </gmd:description>
          <gmd:dateTime>
           <gco:DateTime>2010-11-01T12:00:00Z</gco:DateTime>
          </gmd:dateTime>
          <gmd:processor>
           <gmd:CI_ResponsibleParty>
            <gmd:organisationName>
             <gco:CharacterString>myOrganisation</gco:CharacterString>
            </gmd:organisationName>
            <gmd:contactInfo>
             <gmd:CI_Contact>
              <gmd:address>
               <gmd:CI_Address>
                <gmd:electronicMailAddress>
                 <gco:CharacterString>operator@myorganisation.org</gco:CharacterString>
                </gmd:electronicMailAddress>
               </gmd:CI_Address>
              </gmd:address>
             </gmd:CI_Contact>
            </gmd:contactInfo>
            <gmd:role>
             <gmd:CI_RoleCode codeList="./resources/Codelist/gmxCodeLists.xml#CI_RoleCode" codeListValue="processor">pr
ocessor</gmd:CI_RoleCode>
            </gmd:role>
           </gmd:CI_ResponsibleParty>
          </gmd:processor>
         </gmd:LI_ProcessStep>
        </gmd:processStep>
       </gmd:LI_Lineage>
      </gmd:lineage>
     </gmd:DQ_DataQuality>
    </gmd:dataQualityInfo>
```

```
 </gmd:MD_Metadata>
</root>
```

XLS Example

MD_Metadata				
[...]				
DQ_Scope.level	feature			
DQ_Scope.levelDescription	#2			
LI_ProcessStep.dateTime	2010-11-01T12:00:00Z			
LI_ProcessStep.description	geographical coordinates were converted from ETRS89 to WGS84			
LI_ProcessStep.organisationName	myOrganisation			
LI_ProcessStep.electronicMailAddress	operator@myorganisation.com			
LI_ProcessStep.role	processor			
/MD_Metadata				
Data Item ID	Attribute1	Attribute2	Attribute3	[...]
#1	[...]	[...]	[...]	[...]
#2	[...]	[...]	[...]	[...]
[...]	[...]	[...]	[...]	[...]

Metadata applies to a single specific Attribute of a specific identified Feature

XML Example

```
<root xmlns:gmd="URI" xmlns:gco="URI">
 <gmd:MD_Metadata>
  <gmd:dataQualityInfo>
   <gmd:DQ_DataQuality>
    <gmd:scope>
     <gmd:DQ_ScopeCode>
      <gmd:level>
       <gmd:DQ_ScopeCode codeList="./resources/Codelist/gmxCodeLists.xml#DQ_ScopeCode" codeListValue="attribute">attribute</gmd:DQ_ScopeCode>
      </gmd:level>
      <gmd:levelDescription>
       <gmd:MD_ScopeDescription>
        <gmd:other>
         <gco:CharacterString>uuid.ae23b6f7-cd1a-4138-a2da-aca4f5766852&magneticVariation</gco:CharacterString>
        </gmd:other>
```

```
          </gmd:MD_ScopeDescription>
         </gmd:levelDescription>
        </gmd:DQ_ScopeCode>
       </gmd:scope>
       <gmd:lineage>
        <gmd:LI_Lineage>
         <gmd:processStep>
          <gmd:LI_ProcessStep>
           <gmd:description>
            <gco:CharacterString>validation of magnetic variation</gco:CharacterString>
           </gmd:description>
           <gmd:dateTime>
            <gco:DateTime>2010-11-01T12:00:00Z</gco:DateTime>
           </gmd:dateTime>
           <gmd:processor>
            <gmd:CI_ResponsibleParty>
             <gmd:organisationName>
              <gco:CharacterString>myOrganisation</gco:CharacterString>
             </gmd:organisationName>
             <gmd:contactInfo>
              <gmd:CI_Contact>
               <gmd:address>
                <gmd:CI_Address>
                 <gmd:electronicMailAddress>
                  <gco:CharacterString>operator@myorganisation.org</gco:CharacterString>
                 </gmd:electronicMailAddress>
                </gmd:CI_Address>
               </gmd:address>
              </gmd:CI_Contact>
             </gmd:contactInfo>
             <gmd:role>
              <gmd:CI_RoleCode codeList="./resources/Codelist/gmxCodeLists.xml#CI_RoleCode" codeListValue="processor">pr
ocessor</gmd:CI_RoleCode>
             </gmd:role>
            </gmd:CI_ResponsibleParty>
           </gmd:processor>
```

```
        </gmd:LI_ProcessStep>
       </gmd:processStep>
      </gmd:LI_Lineage>
     </gmd:lineage>
    </gmd:DQ_DataQuality>
   </gmd:dataQualityInfo>
 </gmd:MD_Metadata>
</root>
```

XLS Example

MD_Metadata				
[...]				
DQ_Scope.level	attribute			
DQ_Scope.levelDescription	#2&magneticVariation			
LI_ProcessStep.dateTime	2010-11-01T12:00:00Z			
LI_ProcessStep.description	validation of magnetic variation			
LI_ProcessStep.organisationName	myOrganisation			
LI_ProcessStep.electronicMailAddress	operator@myorganisation.com			
LI_ProcessStep.role	processor			
/MD_Metadata				
Data Item ID	Attribute1	Attribute2	Attribute3	[...]
#1	[...]	[...]	[...]	[...]
#2	[...]	[...]	[...]	[...]
[...]	[...]	[...]	[...]	[...]

3.2. Temporal Reference System

3.2.1 Requirements

REQUIREMENT 05

Each data set **shall**, conditionally, include information giving a description of the temporal reference system used in the file or a citation for a document that describes that temporal reference system when a temporal reference system other than the Gregorian calendar and Coordinated Universal Time (UTC) is used.

3.2.2 Encoding the requirements

The following ISO 19115 elements shall be used to encode the requirements:

Note: For the UML diagram of the ISO 19115 elements used to encode the temporal reference system, see ANNEX A.

Requirement	Reference	REQUIREMENT 05
	Element Name	Temporal reference system
	Obligation / Condition	Mandatory if a reference system other than the Gregorian calendar and Coordinated Universal Time (UTC) is used.
	Multiplicity	0..1
ISO 19115 (2003)	Number	187
	Name	referenceSystemIdentifier
	Definition	Description of the spatial and temporal reference systems used in the dataset
	XPath	gmd:MD_Metadata/ gmd:referenceSystemInfo/ gmd:referenceSystemIdentifier
	Data type	Class
	Domain	RS_Identifier
	Example	Julian Date OGC
Implementing Instructions Class RS_Identifier shall include the following elements: • gmd:RS_Identifier/gmd:code the domain for gmd :code is CharacterString/Free text		

- gmd:RS_Identifier/gmd:codeSpace

the domain for gmd:codeSpace is CharacterString/Free text

3.2.3 Examples

XML Example

```
<root xmlns:gmd="URI" xmlns:gco="URI">
 <gmd:MD_Metadata>
  <gmd:referenceSystemInfo>
   <gmd:MD_ReferenceSystem>
    <gmd:referenceSystemIdentifier>
     <gmd:RS_Identifier>
      <gmd:code>
       <gco:CharacterString>Julian Date</gco:CharacterString>
      </gmd:code>
      <gmd:codeSpace>
       <gco:CharacterString>OGC</gco:CharacterString>
      </gmd:codeSpace>
     </gmd:RS_Identifier>
    </gmd:referenceSystemIdentifier>
   </gmd:MD_ReferenceSystem>
  </gmd:referenceSystemInfo>
 </gmd:MD_Metadata>
</root>
```

XLS Example

MD_Metadata				
[...]				
RS_Identifier.code	8601			
RS_Identifier.codeSpace	ISO			
[...]				
/MD_Metadata				
Data Item ID	Attribute1	Attribute2	Attribute3	[...]
#1	[...]	[...]	[...]	[...]

#2	[...]	[...]	[...]	[...]
[...]	[...]	[...]	[...]	[...]

3.3. Geographic Extent (Area of Coverage)

3.3.1 Requirements

REQUIREMENT 06

Each data set **should** be provided together with metadata giving the geographical extent of the data set. If documented, the geographic extent **shall** be expressed using at least one of the following options:

- Geographic identifier (e.g. name of an aerodrome)
- Geographic bounding box
- Polygon

3.3.2 Encoding the requirements

The following ISO 19115 elements shall be used to encode the requirements:

Note: For the UML diagram of the ISO 19115 elements used to encode the geographic extent, see ANNEX A.

Option 1: Geographic Identifier

Requirement	Reference	REQUIREMENT 06a
	Element Name	Geographical extent of the data set
	Obligation / Condition	Optional. If provided, one of the three options must be used.
	Multiplicity	1..*
ISO 19115 (2003)	Number	349
	Name	geographicIdentifier
	Definition	identifier used to represent a geographic area
	XPath	gmd:MD_Metadata/gmd:identificationInfo/ gmd:MD_DataIdentification/gmd:extent/ gmd:EX_Extent/gmd:geographicElement/ gmd:EX_GeographicDescription/ gmd:MD_Identifier/ gmd:code

	Data type	CharacterString
	Domain	Free Text
	Example	Belgium and Luxembourg
Implementing Instructions		-

XML Example

```
<root xmlns:gmd="URI" xmlns:gco="URI">
 <gmd:MD_Metadata>
  <gmd:identificationInfo>
   <gmd:MD_DataIdentification>
    <gmd:extent>
     <gmd:EX_Extent>
      <gmd:geographicElement>
       <gmd:EX_GeographicDescription>
        <gmd:geographicIdentifier>
         <gmd:MD_Identifier>
          <gmd:code>
           <gco:CharacterString>Belgium and Luxembourg</gco:CharacterString>
          </gmd:code>
         </gmd:MD_Identifier>
        </gmd:geographicIdentifier>
       </gmd:EX_GeographicDescription>
      </gmd:geographicElement>
     </gmd:EX_Extent>
    </gmd:extent>
   </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
 </gmd:MD_Metadata>
</root>
```

XLS Example

MD_Metadata				
[...]				
EX_GeographicDescription	Belgium and Luxembourg			
[...]				

/MD_Metadata				
Data Item ID	Attribute1	Attribute2	Attribute3	[...]
#1	[...]	[...]	[...]	[...]
#2	[...]	[...]	[...]	[...]
[...]	[...]	[...]	[...]	[...]

Option 2: Geographic bounding box

Requirement	Reference	REQUIREMENT 06b
	Element Name	Geographical extent of the data set
	Obligation / Condition	Optional. If provided one of the three options must be used.
	Multiplicity	1..*
ISO 19115 (2003)	Number	344
	Name	westBoundLongitude
	Definition	Western-most coordinate of the limit of the dataset extent, expressed in longitude in decimal degrees (positive east)
	XPath	gmd:MD_Metadata/gmd:identificationInfo/ gmd:MD_DataIdentification/gmd:extent/ gmd:EX_Extent/ gmd:geographicElement/ gmd:EX_GeographicBoundingBox/ gmd:westBoundLongitude
	Data type	Decimal
	Domain	-180.00 <= West Bounding Longitude Value <= 180.00
	Example	3.93
ISO 19115 (2003)	Number	345
	Name	eastBoundLongitude
	Definition	Eastern-most coordinate of the limit of the dataset extent, expressed in longitude in decimal degrees (positive east)
	XPath	gmd:MD_Metadata/gmd:identificationInfo/ gmd:MD_DataIdentification/gmd:extent/ gmd:EX_Extent/

		gmd:geographicElement/ gmd:EX_GeographicBoundingBox/ gmd: eastBoundLongitude
	Data type	Decimal
	Domain	-180.00 <= East Bounding Longitude Value <= 180.00
	Example	7.57
ISO 19115 (2003)	Number	346
	Name	southBoundLatitude
	Definition	Southern-most coordinate of the limit of the dataset extent, expressed in latitude in decimal degrees (positive north)
	XPath	gmd:MD_Metadata/gmd:identificationInfo/ gmd:MD_DataIdentification/gmd:extent/ gmd:EX_Extent/ gmd:geographicElement/ gmd:EX_GeographicBoundingBox/ gmd: southBoundLatitude
	Data type	Decimal
	Domain	-90.00 <= South Bounding Latitude Value <= North Bounding Latitude Value
	Example	52.10
ISO 19115 (2003)	Number	347
	Name	northBoundLatitude
	Definition	Northern-most coordinate of the limit of the dataset extent, expressed in latitude in decimal degrees (positive north)
	XPath	gmd:MD_Metadata/gmd:identificationInfo/ gmd:MD_DataIdentification/gmd:extent/ gmd:EX_Extent/ gmd:geographicElement/ gmd:EX_GeographicBoundingBox/ gmd: northBoundLatitude
	Data type	Decimal

	Domain	South Bounding Latitude Value <= North Bounding Latitude Value <= 90.00
	Example	54.10
Implementing Instructions		-

XML Example

```
<root xmlns:gmd="URI" xmlns:gco="URI">
 <gmd:MD_Metadata>
  <gmd:identificationInfo>
   <gmd:MD_DataIdentification>
    <gmd:extent>
     <gmd:EX_Extent>
      <gmd:geographicElement>
       <gmd:EX_GeographicBoundingBox>
        <gmd:westBoundLongitude>
         <gco:Decimal>3.93</gco:Decimal>
        </gmd:westBoundLongitude>
        <gmd:eastBoundLongitude>
         <gco:Decimal>7.57</gco:Decimal>
        </gmd:eastBoundLongitude>
        <gmd:southBoundLatitude>
         <gco:Decimal>52.10</gco:Decimal>
        </gmd:southBoundLatitude>
        <gmd:northBoundLatitude>
         <gco:Decimal>54.10</gco:Decimal>
        </gmd:northBoundLatitude>
       </gmd:EX_GeographicBoundingBox>
      </gmd:geographicElement>
     </gmd:EX_Extent>
    </gmd:extent>
   </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
 </gmd:MD_Metadata>
</root>
```

XLS Example

MD_Metadata				
[...]				
EX_GeographicBoundingBox.westBoundLongitude	3.93			
EX_GeographicBoundingBox.eastBoundLongitude	7.57			
EX_GeographicBoundingBox.southBoundLatitude	52.10			
EX_GeographicBoundingBox.northBoundLatitude	54.10			
[...]				
/MD_Metadata				
Data Item ID	Attribute1	Attribute2	Attribute3	[...]
#1	[...]	[...]	[...]	[...]
#2	[...]	[...]	[...]	[...]
[...]	[...]	[...]	[...]	[...]

Option 3: Polygon

Requirement	Reference	REQUIREMENT 06c
	Element Name	Geographical extent of the data set
	Obligation / Condition	Optional. If provided one of the three options must be used.
	Multiplicity	1..*
ISO 19115 (2003)	Number	342
	Name	polygon
	Definition	set of points defining the bounding polygon
	XPath	gmd:MetaData/gmd:identificationInfo/ gmd:DataIdentification/ gmd:extent/ gmd:EX_Extent/ gmd:geographicElement/ gmd:EX_BoundingPolygon/ gmd:polygon
	Data type	Class
	Domain	GM_Object
	Example	30 30 30 40 60 40 60 30

Implementing Instructions	-

XML Example

```
<root xmlns:gmd="URI" xmlns:gco="URI">
 <gmd:MD_Metadata>
  <gmd:identificationInfo>
   <gmd:DataIdentification>
    <gmd:extent>
     <gmd:geographicElement>
      <gmd:EX_BoundingPolygon>
       <gmd:polygon> - various options exist for completing the polygon. Please refer to the "Guidance and Profile of GML for use with Aviation Data".</gmd:polygon>
      </gmd:EX_BoundingPolygon>
     </gmd:geographicElement>
    </gmd:extent>
   </gmd:DataIdentification>
  </gmd:identificationInfo>
 </gmd:MD_Metadata>
</root>
```

XLS Example

MD_Metadata				
[...]				
EX_BoundingPolygon	various options exist for completing the polygon. Please refer to the "Guidance and Profile of GML for use with Aviation Data"			
[...]				
/MD_Metadata				
Data Item ID	Attribute1	Attribute2	Attribute3	[...]
#1	[...]	[...]	[...]	[...]
#2	[...]	[...]	[...]	[...]
[...]	[...]	[...]	[...]	[...]

3.4. Compliance with Data Quality Requirements

3.4.1 Requirements

REQUIREMENT 07

Each data set **should** be provided together with metadata giving information concerning the compliance of the data items with the data quality requirements found in ICAO Annex 15, PANS-AIM and other relevant regulations.

The following data quality measures should be assessed:

- Accuracy
- Resolution
- Integrity Level
- Confidence Level
- Compliance with Regulation 73/2010

REQUIREMENT 08

Information concerning compliance with the data quality requirements referred in REQUIREMENT 07 **shall** give a reference to the acceptable conformance quality levels and an in indication if these levels are achieved.

REQUIREMENT 09

The information documenting compliance with each data quality requirement (as documented per REQUIREMENT 07 and REQUIREMENT 08) **shall** be supported by information indicating the scope of the compliance (i.e. if the compliance applies to all data items within the data set or only to specific data items)

3.4.2 Encoding the requirements

The following ISO 19115 elements shall be used to encode the requirements:

Note: For the UML diagram of the ISO 19115 elements used to encode the compliance with data quality requirements, see ANNEX A.

Requirement	Reference	REQUIREMENT 07
	Element Name	Data Quality measure
	Obligation / Condition	Optional
	Multiplicity	1..*
ISO 19115 (2003)	Number	100
	Name	nameOfMeasure
	Definition	name of the test applied to the data
	XPath	gmd:MetaData/gmd:dataQaulityInfo

		gmd:DQ_DataQuality/gmd:DQ_Element/ gmd:nameOfMeasure
	Data type	CharacterString
	Domain	Free text
	Example	

Implementing Instructions

For the names of the data quality measures in gmd:nameOfMeasure, the following standards should be used:

- Compliance with the accuracy values: “accuracy”
- Compliance with the resolution values: “resolution”
- Compliance with the confidence level values: “confidenceLevel”
- Compliance with the integrity level values: “integrityLevel”
- Compliance with Regulation 73/2010: “Regulation 73/2010”

Other compliance statements may be documented using the same principle. In these cases the metadata element gmd:explanation should be used to describe the data quality measure.

Note: DQ_Element can be specified as DQ_Completeness, DQ_LogicalConsistency, DQ_PositionalAccuracy, DQ_ThematicAccuracy and DQ_TemporalAccuracy. Those five entities represent Elements of data quality and can be further subclassed to the sub-Elements of data quality. In this document all data quality measures are encoded using the DQ_QuantitativeAttributeAccuracy sub-element of DQ_ThematicAccuracy.

Requirement	Reference	REQUIREMENT 08
	Element Name	Compliance with data quality requirements
	Obligation / Condition	Mandatory (If REQUIREMENT 07 applied)
	Multiplicity	1..*
ISO 19115 (2003)	Number	107
	Name	result
	Definition	value (or set of values) obtained from applying a data quality measure or the outcome of evaluating the obtained value (or set of values) against a specified acceptable conformance quality level
	XPath	gmd:MetaData/gmd:dataQaulityInfo/ gmd:DQ_DataQuality/gmd:DQ_Element/ gmd:result/

	Data type	Class
	Domain	DQ_Result
	Example	

Implementing Instructions

DQ_Result shall include the following elements

- gmd:explanation

the domain for gmd:explanation is CharacterString/Free text

- gmd:specification

The domain for gmd:specification is CI_Citation and shall include the following elements:

- gmd:CI_Citation/gmd:title

  The domain for gmd:title is CharacterString/Free Text

- gmd :CI_Citation/gmd :date

  The domain for gmd:date is CI_Date and shall include the following elements:

  - Gmd:CI_Date/gmd:date

    The domain for gmd :date is Class Date

  - Gmd:CI_Date/gmd:dateType

    The domain for gmd:dateType is CodeList gmd:CI_DateTypeCode and shall use the value "publication"

Note: The element gmd:specification shall be used to indicate the reference for the acceptable conformance quality level

- gmd:pass

The domain for gmd:DQ_Result/gmd:pass is Boolean [1 = yes, 0 = no]

Requirement	Reference	REQUIREMENT 09
	Element Name	Scope of the compliance statement
	Obligation / Condition	Mandatory

	Multiplicity	1 (for each DQ_DataQuality element; it is possible to have multiple DQ_DataQuality elements)
ISO 19115 (2003)	Number	79
	Name	scope
	Definition	the specific data to which the data quality information applies
	XPath	gmd:MD_Metadata/gmd:DQ_DataQuality/gmd:scope
	Data type	Class
	Domain	DQ_Scope
	Example	

Implementing Instructions

Class DQ_Scope shall include the following elements:

- gmd:DQ_Scope/gmd:level

the domain for gmd:level is MD_ScopeCode and shall take one of the following allowable values:

  - **dataset** > the metadata applies to all data items in the file. gmd:levelDescription is not required.
  - **featureType** > the metadata applies to all instances of a given Feature. gmd:levelDescription shall include the name of the Feature (the name of the feature type shall follow the names of the features from the AIXM 5.1 schema)
  - **attributeType** > the metadata applies to all instances of a given Attribute. gmd:levelDescription shall include the name of the attribute (the name of the attribute type shall follow the names of the attributes from the AIXM 5.1 schema)
  - **feature** > the metadata applies to all attributes of specific feature. gmd:levelDescription shall include the UUID of the feature
  - **attribute** > the metadata applies to a specific attribute of a specific feature. gmd:levelDescription shall include a concatenation of the UUID of the Feature and the name of the Attribute

- gmd:DQ_Scope/gmd:levelDescription

the domain for gmd:levelDescription is MD_ScopeDescription and shall include the following elements:

  - gmd:other

  the domain for gmd:other is CharacterSet/Free text

Note: Within DQ_Scope the element gmd:level, is used to specify if the metadata applies to all the data items included in the file or only to a specific sub-group. When gmd:level is different form “dataset” the element

gmd:levelDescription shall be used to give an unambiguous indication of the data to which the metadata applies.

3.4.3 Examples

XML Example

NOTE: This example uses scope = “dataset”. For other examples using different scopes the encoding of the element DQ_ScopeCode would be similar to the examples in Chapter 9.3

```
<root xmlns:gmd="URI" xmlns:gco="URI">
 <gmd:MD_Metadata>
  <gmd:dataQualityInfo>
   <gmd:DQ_DataQuality>
    <gmd:scope>
     <gmd:DQ_ScopeCode>
      <gmd:level>
       <gmd:MD_ScopeCode codeList="./resources/Codelist/gmxCodeLists.xml#DQ_ScopeCode" codeListValue="dataset">dataset</gmd:MD_ScopeCode>
      </gmd:level>
     </gmd:DQ_ScopeCode>
    </gmd:scope>
    <gmd:report>
     <gmd:DQ_QuantitativeAttributeAccuracy>
      <gmd:nameOfMeasure>
       <gco:CharacterString>accuracy</gco:CharacterString>
      </gmd:nameOfMeasure>
      <gmd:result>
       <gmd:DQ_ConformanceResult>
        <gmd:specification>
         <gmd:CI_Citation>
          <gmd:title>
           <gco:CharacterString>ICAO Data Catalogue</gco:CharacterString>
          </gmd:title>
          <gmd:date>
           <gmd:CI_Date>
            <gmd:date>
             <gco:Date>2010-11-01</gco:Date>
```

```
                </gmd:date>
                <gmd:dateType>
                  <gmd:CI_DateTypeCode codeList="./resources/Codelist/gmxCodeLists.xml#CI_DateTypeCode" codeListValue="publication">publication</gmd:CI_DateTypeCode>
                </gmd:dateType>
              </gmd:CI_Date>
            </gmd:date>
          </gmd:CI_Citation>
        </gmd:specification>
        <gmd:explanation>
          <gco:CharacterString>all accuracy values are compliant with the ICAO Data Catalogue</gco:CharacterString>
        </gmd:explanation>
        <gmd:pass>
          <gco:Boolean> 1 </gco:Boolean>
        </gmd:pass>
      </gmd:DQ_ConformanceResult>
    </gmd:result>
  </gmd:DQ_QuantitativeAttributeAccuracy>
 </gmd:report>
</gmd:DQ_DataQuality>
</gmd:dataQualityInfo>
</gmd:MD_Metadata>
</root>
```

XLS Example

MD_Metadata				
[...]				
DQ_Scope.level	dataset			
DQ_Element.nameOfMeasure	accuracy			
DQ_Result.explanation	Assessment of compliance with the ICAO Data Catalogue			
DQ_Result.pass	1			
DQ_Result.title	ICAO Data Catalogue			
DQ_Result.date	01-11-2010			
DQ_Result.dateType	publication			
[...]				
/MD_Metadata				

Data Item ID	Attribute1	Attribute2	Attribute3	[...]
#1	[...]	[...]	[...]	[...]
#2	[...]	[...]	[...]	[...]
[...]	[...]	[...]	[...]	[...]

3.5. Compliance with ISO 19115

3.5.1 Requirements

REQUIREMENT 10

Each data set **should** be provided together with metadata giving information to cover the core elements that are mandatory in ISO 19115 [RD 5].

The list of mandatory ISO 19115 core elements include:

a) Dataset title
b) Dataset reference date
c) Dataset language
d) Dataset topic category
e) Abstract describing the dataset
f) Metadata point of contact
g) Metadata date stamp

3.5.2 Encoding the requirements

The following ISO 19115 elements shall be used to encode the requirements:

Note: For the UML diagram of the ISO 19115 elements used to encode the compliance with ISO 19115, see ANNEX A.

Requirement	Reference	REQUIREMENT 10a and 10b
	Element Name	Dataset title and reference date
	Obligation / Condition	Mandatory
	Multiplicity	1
ISO 19115 (2003)	Number	24
	Name	citation
	Definition	citation data for the resource(s)
	XPath	gmd:MD_Metadata/gmd:MD_DataIdentification/ gmd:citation/gmd:CI_Citation/gmd:title

	Data type	Class
	Domain	CI_Citation
	Example	
Implementing Instructions The domain for gmd:citation is CI_Citation and shall include the following elements: • Gmd:CI_Citation/gmd:title The domain for gmd :title is CharacterString/Free Text • Gmd :CI_Citation/gmd :date The domain for gmd:date is CI_Date and shall include the following elements: o Gmd:CI_Date/gmd:date The domain for gmd :date is Class Date o Gmd:CI_Date/gmd:dateType The domain for gmd:dateType is CodeList gmd:CI_DateTypeCode and shall use the value "publication"		

Requirement	Reference	REQUIREMENT 10c
	Element Name	Dataset language
	Obligation / Condition	Mandatory. One of the three options must be provided.
	Multiplicity	1..*
ISO 19115 (2003)	Number	39
	Name	language
	Definition	language(s) used within the dataset
	XPath	gmd:MD_Metadata/gmd:MD_DataIdentification /gmd:language
	Data type	CharacterString
	Domain	ISO 639-2, other parts may be used
	Example	
Implementing Instructions		

This **should** use the codelist value "eng".

Requirement	Reference	REQUIREMENT 10d
	Element Name	Dataset topic category
	Obligation / Condition	Mandatory
	Multiplicity	1..*
ISO 19115 (2003)	Number	41
	Name	topicCategory
	Definition	main theme(s) of the dataset
	XPath	gmd:MD_Metadata/gmd:MD_DataIdentification /gmd:topicCategory
	Data type	Class
	Domain	MD_TopicCategoryCode
	Example	
Implementing Instructions The domain for gmd:topicCategory is enumeration MD_TopicCategoryCode and should use the value “transportation”		

Requirement	Reference	REQUIREMENT 10e
	Element Name	Abstract describing the dataset
	Obligation / Condition	Mandatory
	Multiplicity	1
ISO 19115 (2003)	Number	25
	Name	abstract
	Definition	brief narrative summary of the content of the resource(s)
	XPath	gmd:MD_Metadata/gmd:MD_DataIdentification /gmd:abstract
	Data type	CharacterString

	Domain	Free text
	Example	
Implementing Instructions -		

Requirement	Reference	REQUIREMENT 10f
	Element Name	Metadata point of contact
	Obligation / Condition	Mandatory
	Multiplicity	1..*
ISO 19115 (2003)	Number	8
	Name	contact
	Definition	party responsible for the metadata information
	XPath	gmd:MD_Metadata/gmd:contact
	Data type	Class
	Domain	CI_ResponsibleParty
	Example	
Implementing Instructions In this document the metadata point of contact is considered to be the organisations interacting with the data. This element shall be marked as “not applicable”		

Requirement	Reference	REQUIREMENT 10g
	Element Name	Metadata date stamp
	Obligation / Condition	Mandatory
	Multiplicity	1
ISO 19115 (2003)	Number	9
	Name	dateStamp
	Definition	date that the metadata was created
	XPath	gmd:MD_Metadata/gmd:dateStamp
	Data type	Class

	Domain	Date
	Example	
Implementing Instructions In this document the metadata date stamp is considered to be the dates of the interactions with the data. This element shall be marked as “not applicable”		

3.5.3 Examples

XML Example

```
<root xmlns:gmd="URI" xmlns:gco="URI">
 <gmd:MD_Metadata>
  <gmd:dateStamp>NOT APPLICABLE</gmd:dateStamp>
  <gmd:contact>NOT APPLICABLE</gmd:contact>
  <gmd:identificationInfo>
   <gmd:MD_DataIdentification>
    <gmd:citation>
     <gmd:CI_Citation>
      <gmd:title>
       <gco:CharacterString>LPPT Obstacles Area 2</gco:CharacterString>
      </gmd:title>
      <gmd:date>
       <gmd:CI_Date>
        <gmd:date>
         <gco:Date>2010-11-01</gco:Date>
        </gmd:date>
        <gmd:dateType>
         <gmd:CI_DateTypeCode codeList="./resources/Codelist/gmxCodeLists.xml#CI_DateTypeCode" codeListValue="publica
tion">publication</gmd:CI_DateTypeCode>
        </gmd:dateType>
       </gmd:CI_Date>
      </gmd:date>
     </gmd:CI_Citation>
    </gmd:citation>
    <gmd:abstract>
```

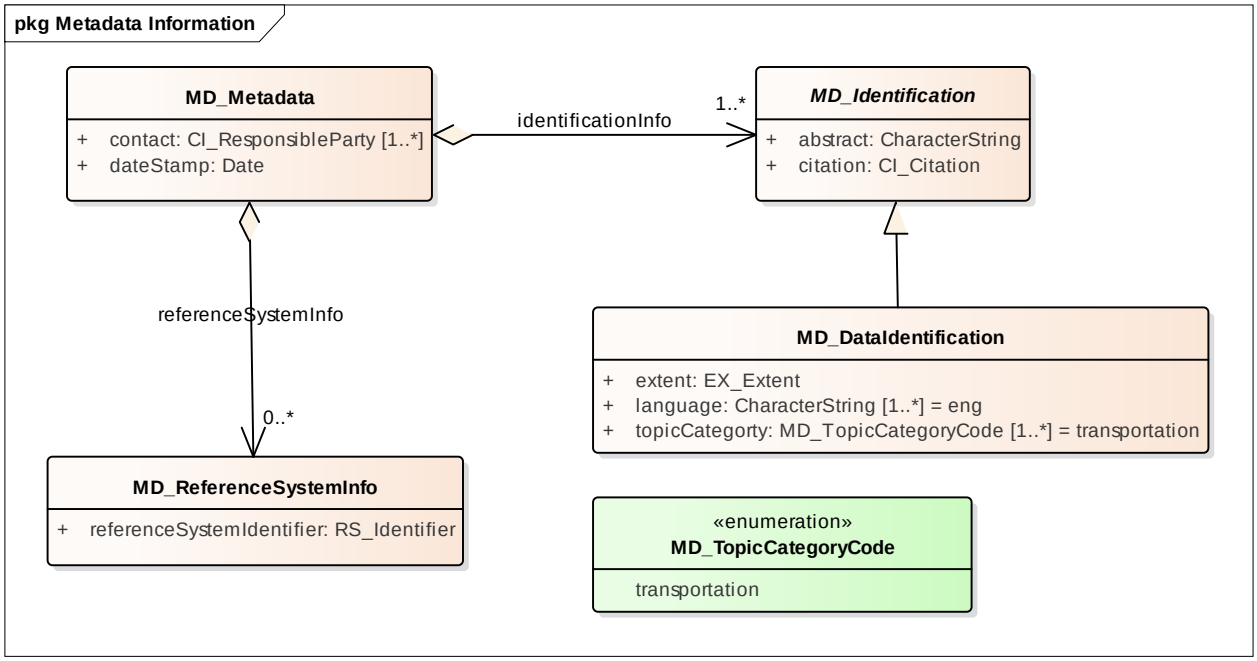
```
      <gco:CharacterString>This data set includes all obstacles for LPPT Area 2a, 2b, 2c and 2d. All obstacle data for each area co
nform to the applicable numerical requirements contained in ICAO Annex 15 Appendix 1</gco:CharacterString>
    </gmd:abstract>
    <gmd:language>
     <gco:CharacterString>eng</gco:CharacterString>
    </gmd:language>
    <gmd:topicCategory>
      <gmd:MD_TopicCategoryCode codeList="./resources/Codelist/gmxCodeLists.xml#MD_TopicCategoryCode" codeListValue
="transportation">transportation</gmd:MD_TopicCategoryCode>
    </gmd:topicCategory>
   </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
 </gmd:MD_Metadata>
```

XLS Example

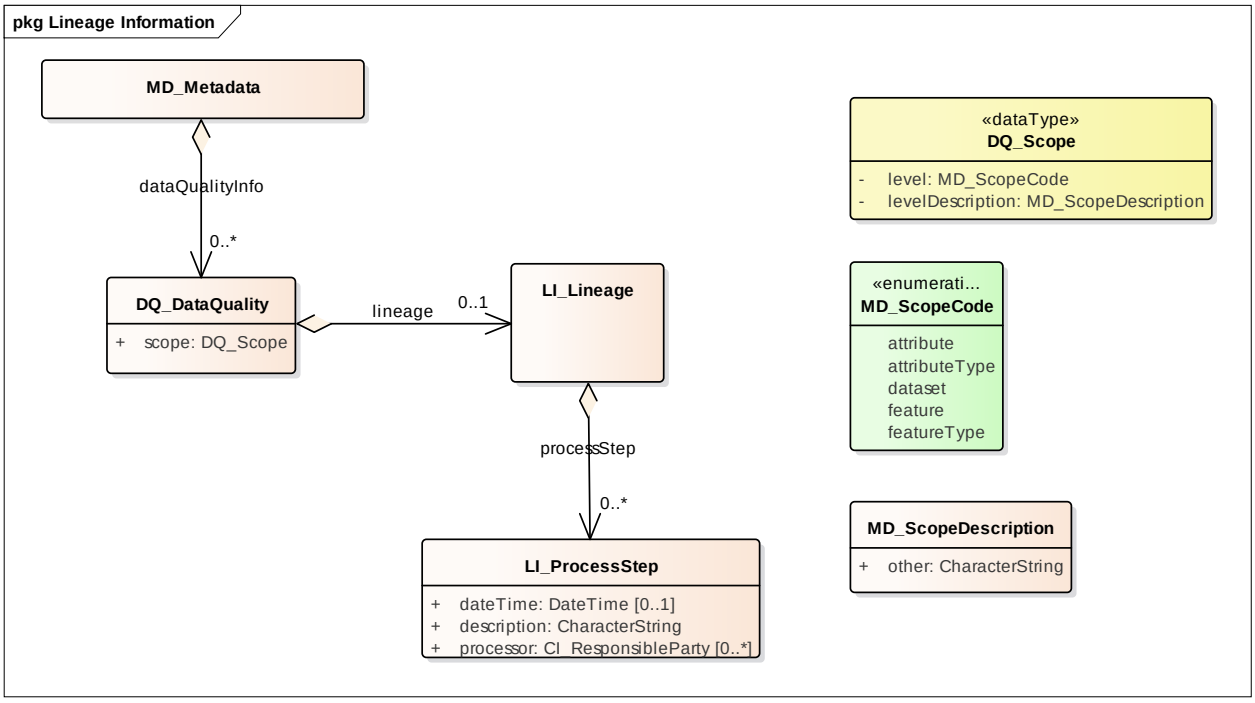
MD_Metadata				
title	LPPT Obstacles Area 2			
date	01-11-2010			
dateType	publication			
language	eng			
topicCategory	transportation			
abstract	This data set includes all obstacles for LPPT Area 2a, 2b, 2c and 2d. All obstacle data for each area conform to the applicable numerical requirements contained in ICAO Annex 15 Appendix 1			
pointOfContact	NOT APPLICABLE			
dateStamp	NOT APPLICABLE			
[...]				
/MD_Metadata				
Data Item ID	Attribute1	Attribute2	Attribute3	[...]
#1	[...]	[...]	[...]	[...]
#2	[...]	[...]	[...]	[...]
[...]	[...]	[...]	[...]	[...]

ANNEX A: UML Diagrams

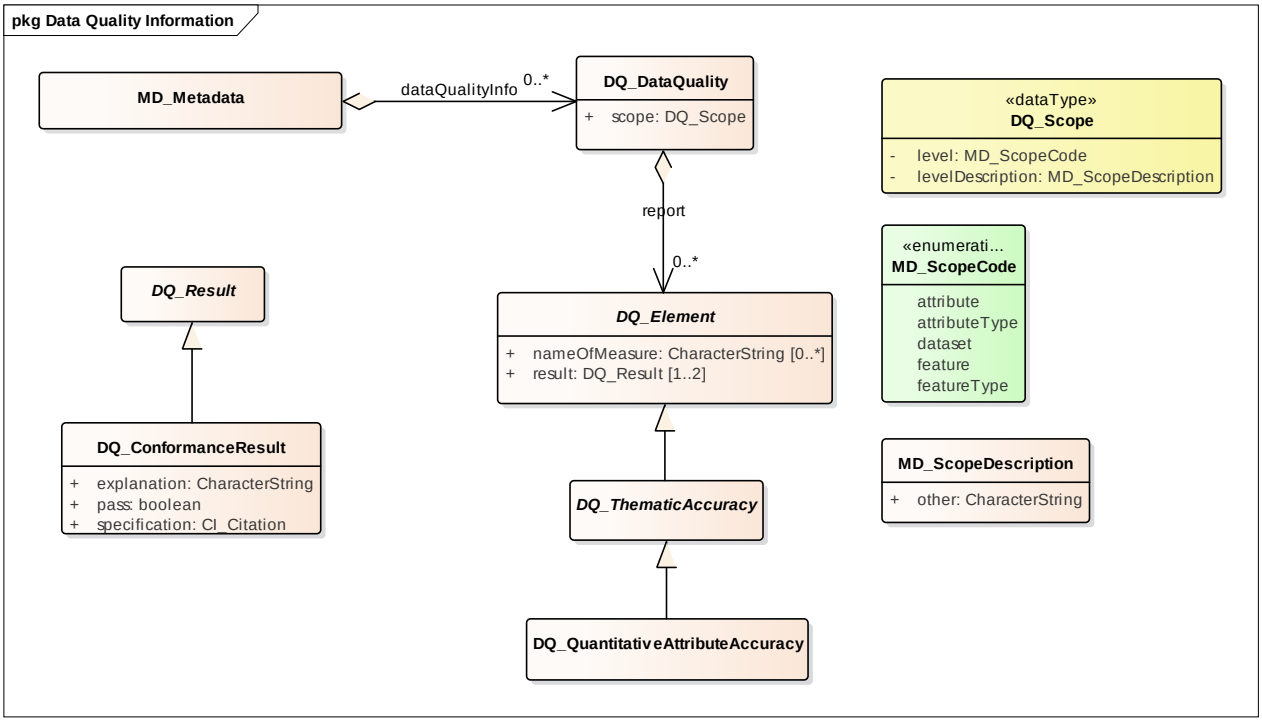
A.1. Metadata Information



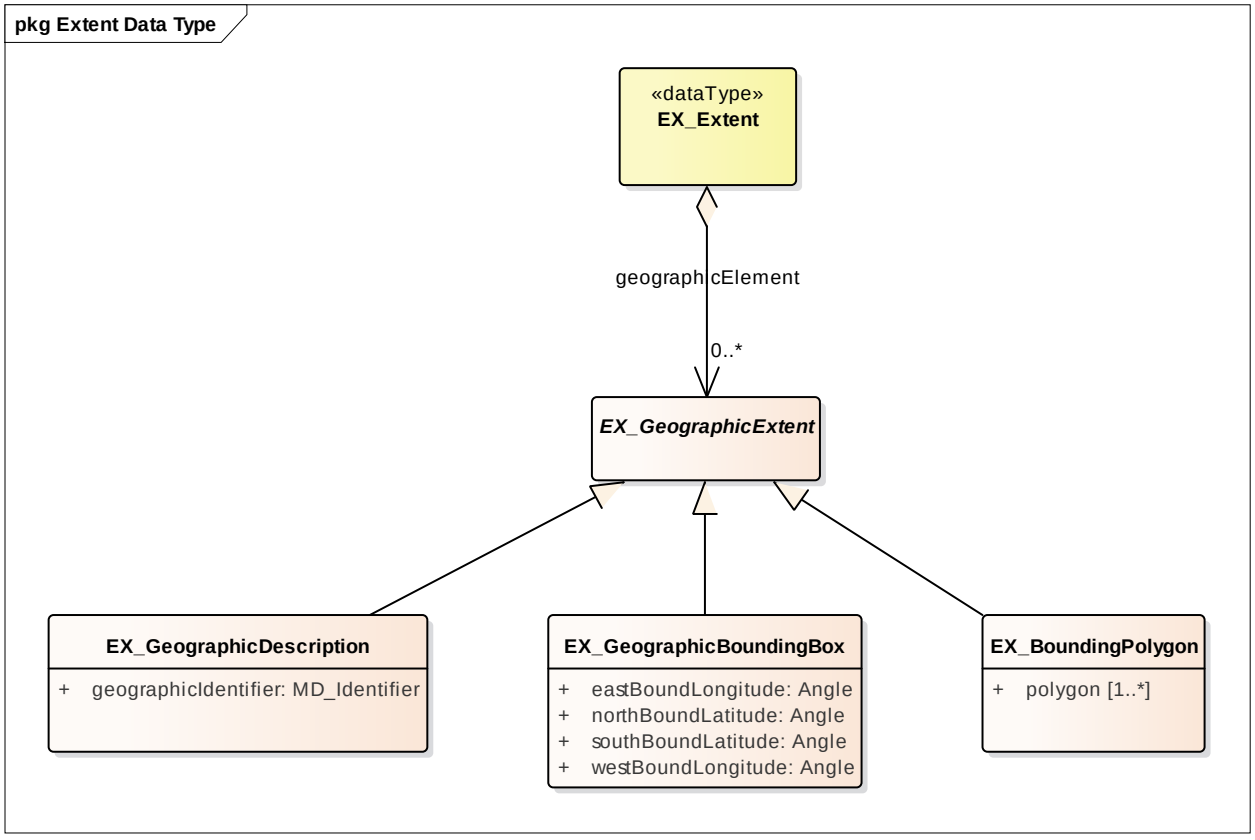
A.2. Lineage Information



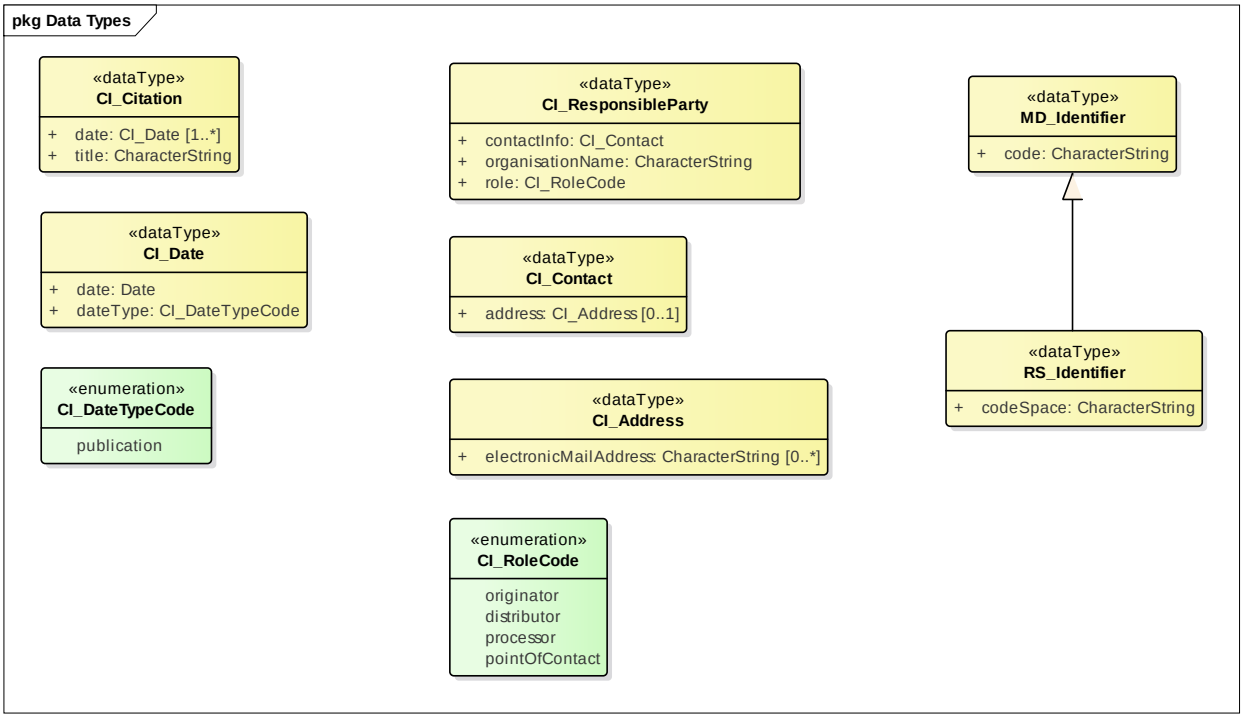
A.3. Data Quality Compliance Information



A.4. Extent Information



A.5. Data Types Information



ANNEX B: List of Statements and Analysis

This ANNEX lists the source statements, which were considered to elaborate the Requirements to be satisfied by the data originators or data providers when manipulating aeronautical data sets intended to be the exchanged with the AIS. The column "Analysis" then indicates how this document addresses those statements.

Statement Identifier	Statement text	Statement Source	Analysis
#1	Metadata shall be collected for aeronautical data processes and exchange points.	ICAO Annex 15 – Sixteenth Edition, 4.2.1	This is covered in REQUIREMENT 01, REQU 02 and REQU 03 by recording any action of originating, transmitting or manipulating the data. This document does not cover the distribution to the next intended user by AIS.
#2	Metadata collection shall be applied throughout the aeronautical information data chain, from origination to distribution to the next intended user. *Note. — Detailed specifications concerning metadata are contained in the PANS-AIM (Doc 10066).*	ICAO Annex 15 – Sixteenth Edition, 4.2.2	Covered in REQU 01, REQU 02 and REQU 03 by recording any action of originating, transmitting or manipulating the data. *Note: This document does not cover the distribution to the next intended user by AIS - refer to chapter 1.2.*
#3	When a different temporal reference system is used for some applications, the feature catalogue, or the metadata associated with an application schema or a data set, as appropriate, shall include either a description of that system or a citation for a document that describes that temporal reference system. *Note.— ISO Standard 19108, Annex D, describes some aspects of calendars that may have to be considered in such a description.*	ICAO Annex 15 – Sixteenth Edition, 1.2.3.2	Covered in REQU 05
#4	The metadata to be collected shall include, as a minimum: a) the names of the organizations or entities performing any action of originating, transmitting or manipulating the data; b) the action performed; and	ICAO Doc 10066 (PANS-AIM) – First Edition, 4.2	Covered in REQU 01 Covered in REQU 02 Covered in REQU 03

	c) the date and time the action was performed. *Note.— ISO Standard 19115 specifies requirements for geographic information metadata.*		
#5	A record of data originators should be maintained. *Note.— Metadata requirements in Chapter 4 specify which information is to be recorded for each originator.*	ICAO Doc 10066 (PANS-AIM) – First Edition, 2.1.1.2	Considered part of the AIS quality management system and it is not covered in this document.
#6	In an obstacle data set, all defined obstacle feature types shall be provided and each of them shall be described according to the list of mandatory attributes provided in Appendix 6, Table A6-2. (1) Area of coverage (2) Data originator identifier (3) Data source identifier (4) Obstacle identifier (5) Horizontal accuracy (6) Horizontal confidence level (7) Horizontal position (8) Horizontal resolution (9) Horizontal extent (10) Horizontal reference system (11) Elevation (12) Height (Optional) (13) Vertical accuracy (14) Vertical confidence level (15) Vertical resolution (16) Vertical reference system (17) Obstacle type (18) Geometry type (19) Integrity (20) Date and time stamp (21) Unit of measurement used (22) Operations (Optional) (23) Effectivity (Optional) (24) Lighting	ICAO Doc 10066 (PANS-AIM) – First Edition, 5.3.3.2.2.2	Covered in REQU 06 Covered in REQU 01, 02 Covered in REQU 01, 02 (4-24) not considered metadata and should be provided at the record level as data

	Note.— By definition, obstacles can be fixed (permanent or temporary) or mobile. Specific attributes associated with mobile (feature operations) and temporary types of obstacles are annotated in Appendix 6, Table A6-2 as optional attributes. If these types of obstacles are to be provided in the data set, appropriate attributes describing such obstacles are also required.		
#7	Collected data shall be verified and validated for compliance with data quality requirements. *Note 1.— Appendix 1 contains aeronautical data attributes and quality requirements (accuracy, resolution and integrity).*	ICAO Doc 10066 (PANS-AIM) – First Edition, 2.1.2.1	Details of verification and validation procedures are considered part of the AIS QMS and are not covered in this document. In this document only a Boolean value indicating compliance or non-compliance with the data quality requirements are addressed in REQU 07, 08
#8	Obstacle data for each area shall conform to the applicable numerical requirements contained in Appendix 1.	ICAO Doc 10066 (PANS-AIM) – First Edition, 5.3.3.2.2.3	The details of the verification and validation procedures are considered part of the AIS QMS and are not covered in this document. In this document only a Boolean value indicating compliance or non-compliance with the data quality requirements are addressed in REQU 07, 08
#9	*Note 7.(7) Accuracy requirements for aeronautical data are based on a 95 per cent confidence level. For those fixes and points that are serving a dual purpose, e.g. holding point and missed approach point, the higher accuracy applies. Accuracy requirements for obstacle and terrain data are based on a 90 per cent confidence level.*	ICAO Doc 10066 (PANS-AIM) – First Edition, 5.3.3.2.2.3	Individual value for confidence level not considered metadata and should be provided at record level as data. In this document only a Boolean value indicating compliance or non-compliance with the data quality requirements are addressed in REQU 07, 08

#10	Each data set shall be provided to the next intended user together with at least the minimum set of metadata that ensures traceability. *Note.— Detailed specifications concerning metadata are contained in the PANS-AIM (Doc 10066).*	ICAO Annex 15 – Sixteenth Edition, 5.3.1.2	This is out of the scope of this document. This document does not address the distribution of ICAO data sets to the next intended user by the AIS.
#11	Each data set shall include the following minimum set of metadata: a) the names of the organization or entities providing the data set; b) the date and time when the data set was provided; c) period of validity of the data set; and d) any limitations with regard to the use of the data set. *Note.— ISO Standard 19115 specifies requirements for geographic information metadata.*	ICAO Doc 10066 (PANS-AIM) – First Edition, 5.3.2	This is out of the scope of this document. This document does not address the distribution of ICAO data sets to the next intended user by the AIS.
#12	Each quality management system shall include the necessary policies, processes and procedures, including those for the use of metadata, to ensure and verify that aeronautical data is traceable throughout the aeronautical information data chain so as to allow any data anomalies or errors detected in use to be identified by root cause, corrected and communicated to affected users.	ICAO Annex 15 – Sixteenth Edition, 3.6.5	There are no specific metadata elements in this requirement. The traceability is covered in REQU 01, 02 and 03 by recording any action of originating, transmitting or manipulating the data.
#13	A description of available digital data sets shall be provided in the form of data product specifications on which basis air navigation users will be able to evaluate the products and determine whether they fulfil the requirements for their intended use (application). *Note.— ISO Standard 19131 outlines the specifications for geographic data products. This may include an overview, specification scope, data product identification, data content and structure, reference system, data quality, data capture, data maintenance, data portrayal, data product delivery, additional information and metadata.*	ICAO Doc 10066 (PANS-AIM) – First Edition, 5.3.1.2	This is out of the scope of this document. This document does not address the distribution of ICAO data sets to the next intended user by the AIS.
#14	The aeronautical information model used should: […] c) include provisions for metadata as specified in 4.2 and 5.3.2;	ICAO Doc 10066 (PANS-AIM) – First Edition, 5.3.1.5	This document provides guidance to encode the metadata elements in AIXM 5.1.
#15	*Note 4.— Metadata elements applicable to aerodrome mapping data are contained in RTCA DO-291B/EUROCAE ED-119B — Interchange Standards for Terrain, Obstacle, and Aerodrome Mapping Data.*	ICAO Doc 10066 (PANS-AIM) – First Edition, 5.3.3.3	Not considered.

#16	To facilitate and support the use of exchange of digital data sets between data providers and data users, the ISO 19100 series of standards for geographic information should be used as a reference framework. *Note.— Guidance material concerning the use of the ISO 19100 series of standards is contained in Doc 8126.*	ICAO Doc 10066 (PANS-AIM) – First Edition, 5.3.1.1	This document uses the metadata elements from ISO 19115.
#17	In order to ensure personal data privacy, the metadata exchanged should not allow an individual to be identified. The preference is therefore to exchange organisation and role names.	AIM community	This is covered in REQU 01.
#18	The metadata should include statement on the accuracy, resolution and integrity of the data. *Note: After analysis it was decided **not** to include requirements for the provision of the metadata with regards to the accuracy, resolution and integrity of the data. The measurement of these is part of the "verification of data collected" and is not metadata to be included at the dataset level.*	AIM community	Accuracy, resolution and integrity of the data are not considered metadata and shall be provided at the record level. In this document only a Boolean value indicating compliance or non-compliance with the data quality requirements are addressed in REQU 07, 08.
#19	The start of validity of a data set shall be clearly indicated through metadata.	AIM community	This is out of the scope of this document. This document does not address the distribution of ICAO data sets to the next intended user.
#20	Geographical extent of the data	AIM Community	This is covered in REQU 06
#21	Dataset title	ISO 19115 chapter 6.5	This is covered in REQU 10
#21	Dataset reference date	ISO 19115 chapter 6.5	This is covered in REQU 10
#21	Dataset language	ISO 19115 chapter 6.5	This is covered in REQU 10
#21	Dataset topic category	ISO 19115 chapter 6.5	This is covered in REQU 10
#21	Abstract describing the dataset	ISO 19115 chapter 6.5	This is covered in REQU 10

#21	Metadata point of contact	ISO 19115 chapter 6.5	This is covered in REQU 10
#21	Metadata date stamp	ISO 19115 chapter 6.5	This is covered in REQU 10

ANNEX C: List of Tags for Metadata Elements for CSV or XLS Files

REQUIREMENT REF	METADATA ELEMENT	TAG TO BE USED
00	Start of metadata information	MD_Metadata
00	End of metadata information	/MD_Metadata
01	Name of the organisation	LI_ProcessStep.organisationName
01	Email address of the organisation	LI_ProcessStep.electronicMailAddress
01	Role of the organisation	LI_ProcessStep.role
02	Description of the action	LI_ProcessStep.description
03	Date Time of the action	LI_ProcessStep.dateTime
04	Scope of the action	DQ_Scope.level
04	Description of the scope of the action	DQ_Scope.levelDescription
05	Temporal reference system	RS_Identifier.code
05	Temporal reference system	RS_Identifier.codeSpace
06	Geographic extent of the data set with geographic code	EX_GeographicIdentifier
06	Geographic extent of the data set with geographic bounding box	EX_GeographicBoundingBox.westBoundLongitude
06	Geographic extent of the data set with geographic bounding box	EX_GeographicBoundingBox.eastBoundLongitude
06	Geographic extent of the data set with geographic bounding box	EX_GeographicBoundingBox.southBoundLatitude
06	Geographic extent of the data set with geographic bounding box	EX_GeographicBoundingBox.northBoundLatitude
06	Geographic extent of the data set with geographic polygon	EX_BoundingPolygon
07	Name of the data quality measure	DQ_Element.nameOfMeasure
08	Explanation of the data quality assessment	DQ_Result.explanation
08	Result of the data quality assessment	DQ_Result.pass
08	Title of the reference for compliance values	DQ_Result.title

08	Date of the reference for compliance values	DQ_Result.date
08	Type of the date for the reference for compliance values	DQ_Result.dateType
09	Scope of the data quality measure	DQ_Scope.level
09	Description of the scope of the data quality measure	DQ_Scope.levelDescription
10a	Title of the data set	title
10b	Date of the data set	date
10c	Language of the data set	language
10d	Topic category of the data set	topicCategory
10e	Abstract describing the data set	abstract
10f	Metadata point of contact	pointOfContact
10g	Metadata reference date	dateStamp

- End of document -

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