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OWS-8 AIXM Metadata Guidelines Engineering Report

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Preface

This OGC® Engineering Report provides guidelines for ISO metadata usage in AIXM 5.1 conformant to the requirements of OGC 10-195 (Requirements for Aviation Metadata) and the recommendations of OGC 10-196r1 (Guidance on the Aviation Metadata Profile), with the exception of non-ISO metadata elements listed in these documents.

Contents

Page

OWS-8 AIXM Metadata Guidelines Engineering Report

1 Introduction

1.1 Scope

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1.2 Document contributor contact points

All questions regarding this document should be directed to the editor or the contributors:

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1.3 Revision history

Date	Release	Editor	Primary clauses modified	Description
11-05-2011	0.1	David Burggraf	All	First draft
17-07-2011	0.2	David Burggraf	1, 3, 5, 6, 7	Changes based on feedback by Johannes Echterhoff

1.4 Future work

The following list of subclauses summarizes items/issues that should be considered for future work related to AIXM metadata.

1.4.1 Formal Abstract Test Suite

All OGC implementation standards including encoding standards such as GML, CityGML must have an Abstract Test Suite (ATS) consisting of a formal text description of all conformance rules (typically contained in Annex A of the standard). A mature standard may also have an Executable Test Suite (ETS), consisting of executable code that enforces the ATS. A handful of ETSs have been funded and developed under the OGC CITE program in past OWS initiatives. Sample ETS developments for encoding standards under CITE have been the GML 2.1.1 validator and GML GeoRSS validator. The OGC KML validator is another example ETS developed externally from OGC. AIXM although not formally an OGC standard (but like CityGML is a GML application schema) has business rules and that should be captured by as a formal ATS with corresponding ETS support, whether it be developed under CITE or externally. Some business rules and corresponding executable validation already exists for AIXM as developed by EUROCONTROL and OWS initiatives (LisaSoft), which can be captured as OGC conformance clauses in an ATS with CITE or external ETS. Further additions to the such conformance clauses are also anticipated, e.g. the business rule for metadata described in Section 7.

1.5 Forward

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Recipients of this document are requested to submit, with their comments, notification of any relevant patent claims or other intellectual property rights of which they may be aware that might be infringed by any implementation of the standard set forth in this document, and to provide supporting documentation.

2 References

The following documents are referenced in this document. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. For undated references, the latest edition of the normative document referred to applies.

OGC 10-195, *Requirements for Aviation Metadata*

OGC 10-196r1, *Guidance on the Aviation Metadata Profile*

3 Conventions

3.1 Abbreviated terms

AIXM Aeronautical Information (Ex)change Model

ATS	Abstract Test Suite
CITE	Compliance and Interoperability Test Initiative
GML	Geography Markup Language
ETS	Executable Test Suite
ISO	International Organization for Standardization
OGC	Open Geospatial Consortium
XML	(Ex)tensible Markup Language

4 Metadata Overview

To understand how to handle metadata properties of an AIXM object, we first must distinguish them from data properties, since metadata is data about data. In GML, the values of data properties capture the defining characteristics of an object or feature. For example, the name, description, and physical extent/location are all data properties of an object. The values of metadata properties capture contextual information about the data properties, for example, the *responsible party* that provides and maintains the values of name, description and extent properties or the *location accuracy* of the location data. In a nutshell, metadata properties typically capture the answers to the frequently asked questions: *who, when, where, what, how* about the dataset, for example *who* is the responsible party for the dataset, *when* the data was created, *where* summarizes the extent/limits of the data, *what* topic category does the data fall under, and *how* was the data measured (in particular details of the position accuracy). The specific metadata requirements for AIXM 5.1 are summarized in clause 5.

5 Metadata requirements

The metadata requirements for AIXM 5.1 conform to the requirements of the more broadly scoped document OGC 10-195 (Requirements for Aviation Metadata). The mandatory metadata elements listed in OGC 10-195 are also mandatory for AIXM 5.1, except non-ISO metadata elements which are out of scope in this document. On the other hand, the conditional metadata elements listed in OGC 10-195 may not be conditional in AIXM 5.1 (e.g. Spatial Reference System is not required at all in AIXM 5.1 as it is required to be part of the data). The required AIXM 5.1 metadata elements are summarized in the last column of the following table (adapted from the table provided in OGC 10-196r1, 4.1)

Table 1 — ISO Metadata Elements at Message, Feature and TimeSlice Levels

ISO 19115 Metadata Element (M/O/C)	Aviation Metadata Element (M/O/C)	Corresponding ISO 19139 metadata element in AIXM 5.1	AIXM Scope: Message, Feature, and/or TimeSlice

M = Mandatory O = Optional C = Conditional	M=Mandatory O=Optional C=Conditional		Level (Multiplicity)
Dataset Title (M)	Resource Title (M)	gmd:MD_Metadata/gmd:identification/ gmd:MD_DataIdentification/gmd:citation/ gmd:CI_Citation/gmd:title	Message (1) Feature (1) TimeSlice (1)
Dataset reference date (M)	Temporal Reference (C)	**At least one** of the following: gmd:MD_Metadata/gmd:identificationInfo/ gmd:MD_DataIdentification/gmd:extent/ gmd:EX_Extent/gmd:temporalElement/ gmd:EX_TemporalExtent/gmd:extent/ gml:TimePeriod gmd:MD_Metadata/gmd:identificationInfo/ gmd:MD_DataIdentification/gmd:citation/ gmd:CI_Citation/gmd:date/gco:Date gmd:MD_Metadata/gmd:identificationInfo/ gmd:MD_DataIdentification/gmd:citation/ gmd:CI_Citation/gmd:date/gco:DateTime	"At least one" of condition in adjacent cell to the left applies to each of the following (if present): Message (0..1) Feature (0..1) TimeSlice (0..1)
Dataset Responsible Party (O)	Responsible Party (M)	gmd:MD_Metadata/gmd:identificationInfo/ gmd:MD_DataIdentification/gmd:pointOfContact/ gmd:CI_ResponsibleParty	Message (1..*) Feature (1..*) TimeSlice (0..*)
Geographic location of the dataset (by four coordinates or by geographic identifier) (C)	Geographic Bounding Box (M)	gmd:MD_Metadata/gmd:identificationInfo/ gmd:MD_DataIdentification/gmd:extent/ gmd:EX_Extent/gmd:geographicElement/ gmd:EX_GeographicBoundingBox	Feature (1..*) TimeSlice (0..*)
Dataset language (M)	Resource Language (C)	gmd:MD_Metadata/gmd:identification/ gmd:MD_DataIdentification/gmd:language/ gmd:LanguageCode	Message (1..*) Feature (1..*) TimeSlice (1..*)
Dataset character set (C)		Not required in AIXM 5.1 – the character set encoding is specified by the xml header for example: <?xml version="1.0" encoding="utf-8"?>	
Dataset topic	Topic	gmd:MD_Metadata/gmd:identification/ gmd:MD_DataIdentification/gmd:topicCatego	Message (1) Feature (1)

category (M)	Category (M)	ry/ gmd:MD_TopicCategoryCode	TimeSlice (1)
Spatial resolution of the dataset (O)	Spatial Reference System (C)	gmd:MD_Metadata/gmd:referenceSystemInfo (0..1)	Feature (0..1) TimeSlice (0..1)
Abstract describing the dataset (M)	Resource Abstract (M)	gmd:MD_Metadata/gmd:identification/ gmd:MD_DataIdentification/gmd:abstract	Message (1) Feature (1) TimeSlice (1)
Distribution format (O)		(0) Not required in AIXM 5.1 – the distribution format is always XML/GML	
Additional extent information for the dataset (vertical and temporal) (O)		(0) Not required in AIXM 5.1 – vertical extent is specified in the GML Envelope and temporal extent is specified in the GML EnvelopeWithTimePeriod	
Spatial representation type (O)		(0) Not required in AIXM 5.1 – the spatial representation type is specified by the Geometry primitives	
Reference system (O)	Responsible Party Role (M)	gmd:MD_Metadata/gmd:identificationInfo/ gmd:MD_DataIdentification/gmd:pointOfContact/ gmd:CI_ResponsibleParty/gmd:role	Message (1) Feature (1) TimeSlice (0..1)
Lineage (O)	Lineage (M)	gmd:MD_Metadata/gmd:dataQualityInfo/ gmd:DQ_DataQuality/gmd:lineage	Message (0..1) Feature (1) TimeSlice (1)
On-line resource (O)		(0) Not required in AIXM 5.1 – xlink:href is used by (meta)data property elements to reference resources online	
Metadata file identifier (O)		gmd:MD_Metadata/@id or gmd:MD_Metadata/@uuid or gmd:MD_Metadata/fileIdentifier	Message (0..1) Feature (0..1) TimeSlice (0..1)
Metadata standard name (O)		(0) Not required in AIXM 5.1 – the metadata standard name and version is: ISO 19139:2005	

Metadata standard version (O)			
Metadata language (C)	Metadata Language (M)	gmd:MD_Metadata/gmd:language	Message (1) Feature (1) TimeSlice (1)
Metadata character set (C)		(0) Not required in AIXM 5.1 – the character set encoding is specified by the xml header for example: <?xml version="1.0" encoding="utf-8"?>	
Metadata point of contact (M)	Metadata Point of Contact (M)	gmd:MD_Metadata/gmd:contact	Message (1..*) Feature (1..*) TimeSlice (1..*)
Metadata date stamp (M)	Metadata Date (M)	gmd:MD_Metadata/gmd:dateStamp	Message (1) Feature (1) TimeSlice (1)

6 Message vs. Feature vs. TimeSlice Level Metadata

Metadata can be placed at three different levels in AIXM – on the Message level, Feature level and/or the TimeSlice level. The following sub-clauses provide guidelines for which level metadata should be encoded at for each of the metadata elements in scope for AIXM 5.1 as summarized in Clause 5. The applicability of the metadata elements at each of the three levels is indicated in the last column of the table in Clause 5, including the multiplicity constraints for each level.

6.1 Message Level

Metadata at the Message level should be specific to the Message level only (not the Feature and TimeSlice levels). The rationale is that when the AIXM 5.1 data is inserted/updated to a WFS, the Message level metadata will be removed leaving only the Feature and TimeSlice level metadata, so there should be no dependencies at the Feature and TimeSlice levels on the Message level metadata.

6.1.1 Example 1 – Inline Metadata

In the following sample excerpt, the elements in bold are mandatory

```
<AIXMBasicMessage gml:id="BM0001">
```

```
  …
 <messageMetadata>
  <gmd:MD_Metadata id="MMD0001">
   <gmd:language>
    <gmd:LanguageCode codeList="./resources/codeList.xml#LanguageCode"
codeListValue="eng"
     >eng</gmd:LanguageCode>
   </gmd:language>
   <gmd:contact>
    <gmd:CI_ResponsibleParty id="MRP0001">
     <gmd:organisationName>
      <gco:CharacterString>EAD</gco:CharacterString>
     </gmd:organisationName>
     <gmd:contactInfo>
      <gmd:CI_Contact id="MCntct0001">
       <gmd:address>
        <gmd:CI_Address id="MADR0001">
         <gmd:electronicMailAddress>
          <gco:CharacterString> operator@organisation.org</gco:CharacterString>
         </gmd:electronicMailAddress>
        </gmd:CI_Address>
       </gmd:address>
      </gmd:CI_Contact>
     </gmd:contactInfo>
     <gmd:role>
      <gmd:CI_RoleCode
codeList="../ISO_19139_Schemas/resources/codeList.xml#CI_RoleCode"
       codeListValue="pointOfContact">pointOfContact </gmd:CI_RoleCode>
     </gmd:role>
    </gmd:CI_ResponsibleParty>
   </gmd:contact>
   <gmd:dateStamp>
    <gco:Date>2010-11-08</gco:Date>
   </gmd:dateStamp>
   <gmd:referenceSystemInfo>
    <gmd:MD_ReferenceSystem id="MRS0001">
     <gmd:referenceSystemIdentifier>
      <gmd:RS_Identifier>
       <gmd:code>
        <gco:CharacterString>4326</gco:CharacterString>
       </gmd:code>
       <gmd:codeSpace>
        <gco:CharacterString>EPSG</gco:CharacterString>
       </gmd:codeSpace>
      </gmd:RS_Identifier>
     </gmd:referenceSystemIdentifier>
```

```
  </gmd:MD_ReferenceSystem>
 </gmd:referenceSystemInfo>
 <gmd:referenceSystemInfo>
  <gmd:MD_ReferenceSystem id="MRS0002">
   <gmd:referenceSystemIdentifier>
    <gmd:RS_Identifier>
     <gmd:code>
      <gco:CharacterString>8601</gco:CharacterString>
     </gmd:code>
     <gmd:codeSpace>
      <gco:CharacterString>ISO</gco:CharacterString>
     </gmd:codeSpace>
    </gmd:RS_Identifier>
   </gmd:referenceSystemIdentifier>
  </gmd:MD_ReferenceSystem>
 </gmd:referenceSystemInfo>
 <gmd:identificationInfo>
  <gmd:MD_DataIdentification id="MDI0001">
   <gmd:citation>
    <gmd:CI_Citation id="MCTN0001">
     <gmd:title>
      <gco:CharacterString>SDO Update 27</gco:CharacterString>
     </gmd:title>
     <gmd:date>
      <gmd:CI_Date id="MDT0001">
       <gmd:date>
        <gco:Date>2010-11-01</gco:Date>
       </gmd:date>
       <gmd:dateType>
        <gmd:CI_DateTypeCode
         codeList="../ISO_19139_Schemas/resources/codeList.xml#CI_DateTypeCode"
         codeListValue="creation">creation</gmd:CI_DateTypeCode>
       </gmd:dateType>
      </gmd:CI_Date>
     </gmd:date>
     <gmd:date>
      <gmd:CI_Date id="MDT0002">
       <gmd:date>
        <gco:DateTime>2010-11-01T12:00:00</gco:DateTime>
       </gmd:date>
       <gmd:dateType>
        <gmd:CI_DateTypeCode
         codeList="../ISO_19139_Schemas/resources/codeList.xml#CI_DateTypeCode"
         codeListValue="publication">publication</gmd:CI_DateTypeCode>
       </gmd:dateType>
      </gmd:CI_Date>
```

```
          </gmd:date>
          <gmd:date>
           <gmd:CI_Date id="MDT0003">
            <gmd:date>
             <gco:Date>2010-11-01</gco:Date>
            </gmd:date>
            <gmd:dateType>
             <gmd:CI_DateTypeCode
              codeList="../ISO_19139_Schemas/resources/codeList.xml#CI_DateTypeCode"
              codeListValue="revision">revision</gmd:CI_DateTypeCode>
            </gmd:dateType>
           </gmd:CI_Date>
          </gmd:date>
         </gmd:CI_Citation>
        </gmd:citation>
        <gmd:abstract>
         <gco:CharacterString>Updates to the following Airport:
EBBR,EBBT</gco:CharacterString>
        </gmd:abstract>
        <gmd:pointOfContact>
         <gmd:CI_ResponsibleParty id="MRP0002">
          <gmd:organisationName>
           <gco:CharacterString>EAD</gco:CharacterString>
          </gmd:organisationName>
          <gmd:contactInfo>
           <gmd:CI_Contact>
            <gmd:phone>
             <gmd:CI_Telephone id="MTL0001">
              <gmd:voice>
               <gco:CharacterString>+32 02...</gco:CharacterString>
              </gmd:voice>
             </gmd:CI_Telephone>
            </gmd:phone>
            <gmd:address>
             <gmd:CI_Address id="MAD0002">
              <gmd:deliveryPoint>
               <gco:CharacterString>delivery point 1</gco:CharacterString>
              </gmd:deliveryPoint>
              <gmd:deliveryPoint>
               <gco:CharacterString>delivery point 2</gco:CharacterString>
              </gmd:deliveryPoint>
              <gmd:city>
               <gco:CharacterString>Brussels</gco:CharacterString>
              </gmd:city>
              <gmd:administrativeArea>
               <gco:CharacterString>Brussels</gco:CharacterString>
```

```
                </gmd:administrativeArea>
                <gmd:postalCode>
                  <gco:CharacterString>postal code</gco:CharacterString>
                </gmd:postalCode>
                <gmd:country>
                  <gco:CharacterString>Belgium</gco:CharacterString>
                </gmd:country>
                <gmd:electronicMailAddress>
                  <gco:CharacterString>operator@organisation.org</gco:CharacterString>
                </gmd:electronicMailAddress>
              </gmd:CI_Address>
            </gmd:address>
          </gmd:CI_Contact>
        </gmd:contactInfo>
        <gmd:role>
          <gmd:CI_RoleCode
codeList="../ISO_19139_Schemas/resources/codeList.xml#CI_RoleCode"
            codeListValue="originator">originator</gmd:CI_RoleCode>
        </gmd:role>
      </gmd:CI_ResponsibleParty>
    </gmd:pointOfContact>
    <gmd:resourceConstraints>
      <gmd:MD_LegalConstraints id="MLC0001">
        <gmd:accessConstraints>
          <gmd:MD_RestrictionCode codeList="./resources/codeList.xml#MD_RestrictionCode"
            codeListValue="license">license</gmd:MD_RestrictionCode>
        </gmd:accessConstraints>
      </gmd:MD_LegalConstraints>
    </gmd:resourceConstraints>
    <gmd:resourceConstraints>
      <gmd:MD_SecurityConstraints id="MSC0001">
        <gmd:classification>
          <gmd:MD_ClassificationCode
codeList="./resources/codeList.xml#MD_ClassificationCode"
            codeListValue="restricted">restricted</gmd:MD_ClassificationCode>
        </gmd:classification>
      </gmd:MD_SecurityConstraints>
    </gmd:resourceConstraints>
    <gmd:resourceConstraints>
      <gmd:MD_Constraints id="MCNST0001">
        <gmd:useLimitation>
          <gco:CharacterString>remember to look at NOTAMS!</gco:CharacterString>
        </gmd:useLimitation>
      </gmd:MD_Constraints>
    </gmd:resourceConstraints>
    <gmd:language>
```



```
        <gmd:LanguageCode codeList="./resources/codeList.xml#LanguageCode"
codeListValue="eng"
          >eng</gmd:LanguageCode>
        </gmd:language>
        <gmd:topicCategory>
          <gmd:MD_TopicCategoryCode> transportation</gmd:MD_TopicCategoryCode>
        </gmd:topicCategory>
        <gmd:extent>
          <gmd:EX_Extent id="MEX0001">
            <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:temporalElement>
              <gmd:EX_TemporalExtent id="MTX0001">
                <gmd:extent>
                  <gml:TimePeriod gml:id="period00001">
                    <gml:beginPosition>2010-11-01T01:00:00</gml:beginPosition>
                    <gml:endPosition>2010-12-24T23:59:59</gml:endPosition>
                  </gml:TimePeriod>
                </gmd:extent>
              </gmd:EX_TemporalExtent>
            </gmd:temporalElement>
          </gmd:EX_Extent>
        </gmd:extent>
      </gmd:MD_DataIdentification>
    </gmd:identificationInfo>
    <gmd:dataQualityInfo>
      <gmd:DQ_DataQuality id="MDQ0001">
        <gmd:scope>
          <gmd:DQ_Scope>
            <gmd:level>
              <gmd:MD_ScopeCode
                codeListValue="../ISO_19139_Schemas/resources/codeList.xml#MD_ScopeCode"
```

```
          codeList="dataset">dataset</gmd:MD_ScopeCode>
       </gmd:level>
      </gmd:DQ_Scope>
     </gmd:scope>
     <gmd:report>
      <gmd:DQ_QuantitativeAttributeAccuracy>
       <gmd:result>
        <gmd:DQ_QuantitativeResult>
         <gmd:valueUnit/>
         <gmd:value>95</gmd:value>
        </gmd:DQ_QuantitativeResult>
       </gmd:result>
      </gmd:DQ_QuantitativeAttributeAccuracy>
     </gmd:report>
    </gmd:DQ_DataQuality>
    <gmd:DQ_DataQuality>
     <gmd:scope>
      <gmd:DQ_Scope id="MSC0001">
       <gmd:level>
        <gmd:MD_ScopeCode
         codeListValue="../ISO_19139_Schemas/resources/codeList.xml#MD_ScopeCode"
         codeList="dataset">dataset</gmd:MD_ScopeCode>
       </gmd:level>
      </gmd:DQ_Scope>
     </gmd:scope>
     <gmd:lineage>
      <gmd:LI_Lineage id="MLIN0001">
       <gmd:processStep>
        <gmd:LI_ProcessStep>
         <gmd:description>
          <gco:CharacterString>captured by surveyor</gco:CharacterString>
         </gmd:description>
         <gmd:dateTime>
          <gco:DateTime>2010-09-11T01:00:00</gco:DateTime>
         </gmd:dateTime>
         <gmd:processor>
          <gmd:CI_ResponsibleParty>
           <gmd:organisationName>
            <gco:CharacterString>SURVEY4U</gco:CharacterString>
           </gmd:organisationName>
           <gmd:contactInfo>
            <gmd:CI_Contact>
             <gmd:address>
              <gmd:CI_Address>
               <gmd:electronicMailAddress>
                <gco:CharacterString>bob@survey4u.be</gco:CharacterString>
```

```
                    </gmd:electronicMailAddress>
                  </gmd:CI_Address>
                </gmd:address>
              </gmd:CI_Contact>
            </gmd:contactInfo>
            <gmd:role>
              <gmd:CI_RoleCode
                codeList="../ISO_19139_Schemas/resources/codeList.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>
</messageMetadata>
  …
</AIXMBasicMessage>
```

6.1.2 Example 2 – Referenced Metadata

```
<AIXMBasicMessage gml:id="BM0001">
  ...
  <messageMetadata xlink:href="
http://regisry.com/query?request=GetRepositoryItem&service=CSW-ebRIM&id=urn:x-
ows8:def:metadata:OWS8::BM0001"/>
  ...
</AIXMBasicMessage>
```

6.2 Feature and TimeSlice Levels

Metadata at the Feature level may or may not be the same as the metadata on its descendent TimeSlices. If a mandatory metadata element at the TimeSlice level has the same value as at the feature level, then an xlink:href reference should be used from the corresponding metadata property on the TimeSlice to the metadata element at the Feature level. If an optional metadata element at the TimeSlice level has the same value as at the feature level, then the metadata element can be omitted and will inherit the value at the Feature level (similar to absent srsName attribute values inheriting srsName values from ancestors in GML). If a metadata element at the TimeSlice level has a different value than at the feature level, then the metadata element value TimeSlice level overrides the

value at the Feature level (similar to srsName values overriding srsName values on ancestors in GML).

6.2.1 Example 1 – Same Values of Mandatory Metadata at Feature and TimeSlice Levels

```
<aixm:AirportHeliport gml:id="AH00001">
  …

 <featureMetadata>
  <gmd:MD_Metadata id="FMD0001">
      …
    <gmd:contact>
     <gmd:CI_ResponsibleParty id="FRP0001">
       …
      <gmd:role>
       <gmd:CI_RoleCode codeList="… "
        codeListValue="pointOfContact">… </gmd:CI_RoleCode>
      </gmd:role>
     </gmd:CI_ResponsibleParty>
    </gmd:contact>
      …
  </gmd:MD_Metadata>
 </featureMetadata>
 <aixm:TimeSlice>
  <aixm:AirportHeliportTimeSlice gml:id="AHTS00001">
   <TimeSliceMetadata>
    <gmd:MD_Metadata id="TMD0001">
      …
     <gmd:contact xlink:href="#FRP0001"/>
      …
    </gmd:MD_Metadata>
   </TimeSliceMetadata>
 </aixm:TimeSlice>
</aixm:AirportHeliport>
```

6.2.2 Example 2 – Same Values of Optional Metadata at Feature and TimeSlice Levels

```
<aixm:AirportHeliport gml:id="AH00001">
  …

 <featureMetadata>
  <gmd:MD_Metadata id="FMD0001">
      …
    <gmd:referenceSystemInfo>
     <gmd:MD_ReferenceSystem id="FRS0001">
      <gmd:referenceSystemIdentifier>
```



```
          <gmd:RS_Identifier>
           <gmd:code>
            <gco:CharacterString>4326</gco:CharacterString>
           </gmd:code>
           <gmd:codeSpace>
            <gco:CharacterString>EPSG</gco:CharacterString>
           </gmd:codeSpace>
          </gmd:RS_Identifier>
        </gmd:referenceSystemIdentifier>
      </gmd:MD_ReferenceSystem>
    </gmd:referenceSystemInfo>
      …
  </gmd:MD_Metadata>
 </featureMetadata>
 <aixm:TimeSlice>
  <aixm:AirportHeliportTimeSlice gml:id="AHTS00001">
   <TimeSliceMetadata>
    <gmd:MD_Metadata id="TMD0001">
        …
     <!--gmd:referenceSystemInfo element omitted so inherits it from Feature -->
        …
      </gmd:MD_Metadata>
   </TimeSliceMetadata>
    …
 </aixm:timeSlice>
</aixm:AirportHeliport>
```

6.2.3 Example 3 – Different Values of Metadata at Feature and TimeSlice Levels

```
<aixm:AirportHeliport gml:id="AH00001">
  …

 <featureMetadata>
  <gmd:MD_Metadata id="FMD0001">
      …
   <gmd:referenceSystemInfo>
    <gmd:MD_ReferenceSystem id="FRS0001">
     <gmd:referenceSystemIdentifier>
      <gmd:RS_Identifier>
       <gmd:code>
        <gco:CharacterString>4326</gco:CharacterString>
       </gmd:code>
       <gmd:codeSpace>
        <gco:CharacterString>EPSG</gco:CharacterString>
       </gmd:codeSpace>
      </gmd:RS_Identifier>
```

```
        </gmd:referenceSystemIdentifier>
       </gmd:MD_ReferenceSystem>
     </gmd:referenceSystemInfo>
      …
   </gmd:MD_Metadata>
 </featureMetadata>
 <aixm:TimeSlice>
  <aixm:AirportHeliportTimeSlice gml:id="AHTS00001">
   <TimeSliceMetadata>
    <gmd:MD_Metadata id="TMD0001">
       …
    <gmd:referenceSystemInfo>
     <gmd:MD_ReferenceSystem id="FRS0001">
      <gmd:referenceSystemIdentifier>
       <gmd:RS_Identifier>
        <gmd:code>
         <gco:CharacterString>CRS84</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>
   </TimeSliceMetadata>
    …
  </aixm:TimeSlice>
</aixm:AirportHeliport>
```

7 Updating Extents in AIXM

If metadata is provided on a Feature or child TimeSlice object, then the metadata spatial and temporal extent shall be recorded, either on the boundedBy property (with a child gml:Envelope or gml:EnvelopeWithTimePeriod object) of the feature or explicitly encoding in the metadata extent on the feature or descendent TimeSlice object.

For example, suppose the geometric or temporal properties of a Feature or TimeSlice changes, e.g. the runway geometry is lengthened and effective time is updated at the TimeSlice level, then the metadata at the same level (if present) must also reflect the change (including of course, the date-time and responsible party who made the change). Furthermore, the corresponding feature metadata extents both spatial (e.g. gmd:EX_GeographicBoundingBox, see Table 1) and temporal (e.g.

gmd:EX_TemporalExtent, see Table 1) have to be updated as they are dependent on the geometric and temporal properties of the TimeSlices (i.e. the union of the TimeSlice Extents). If the feature's boundedBy property is also present, then the gml:Envelope or gml:EnvelopeWithTimePeriod must be updated to reflect the change.