Network Manager
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EUROCONTROL

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AIXM 5.1 XML Schema

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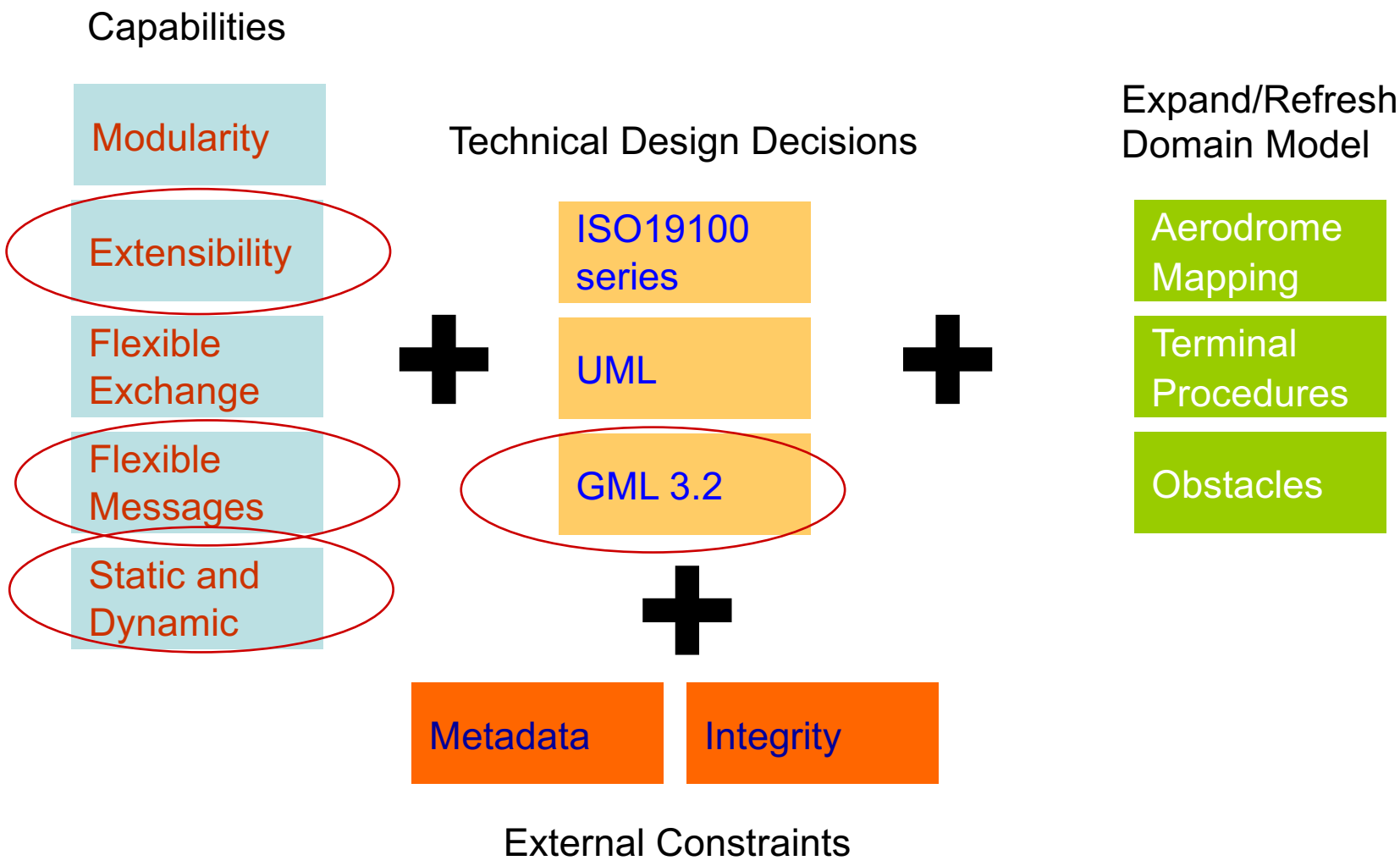
AIXM 5 – Design Objectives



Special aspects

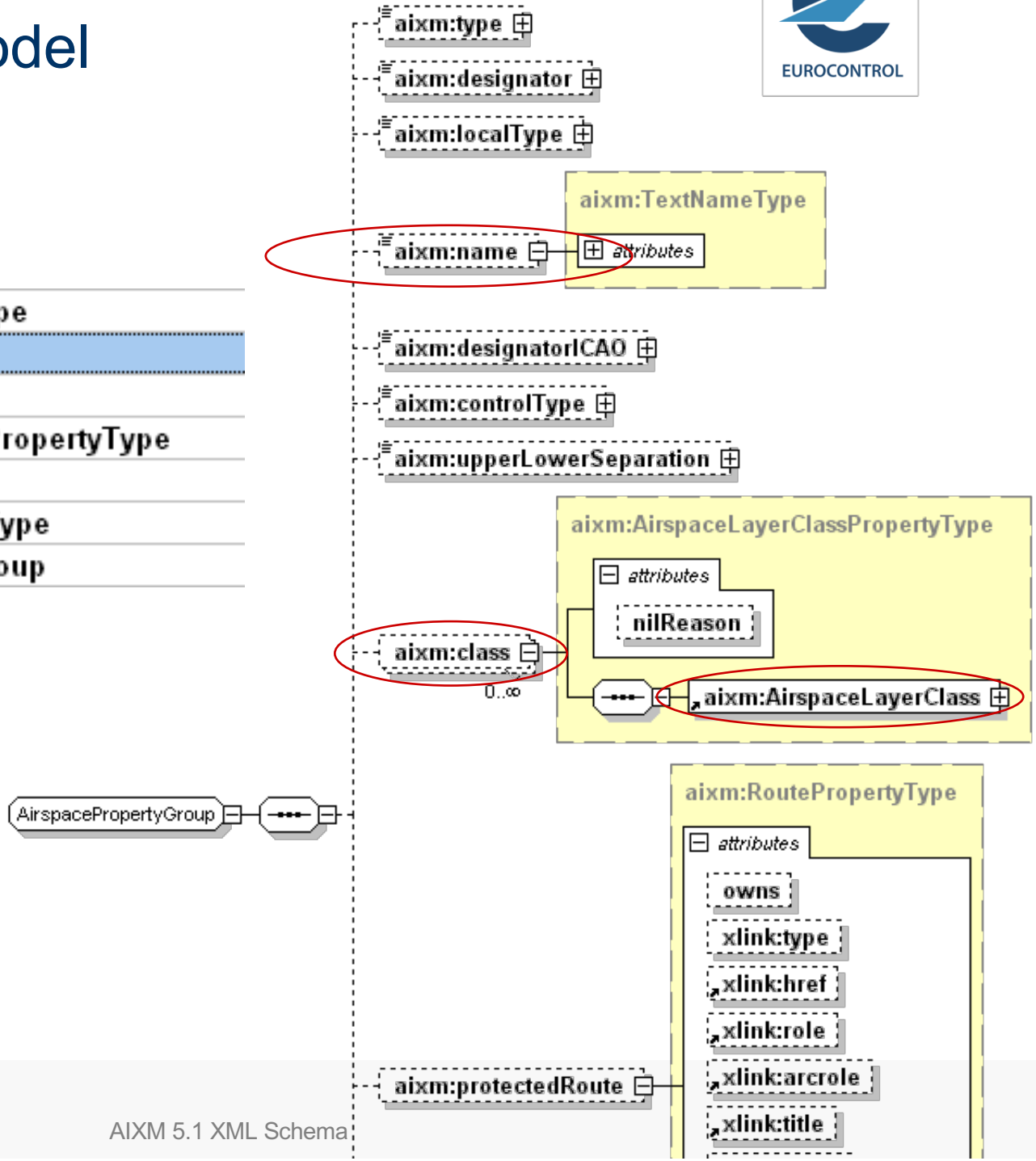
- Namespaces
  - aixm:, gml:, etc.
- Object/property model
- Data Types
- Use of XML attributes
  - uom
  - nilReason
- Feature identification and association
  - gml:identifier
  - Xlink:href
- Extensibility
  - Enumerations -> OTHER:…
  - Feature/Object
- Temporality
  - Just covered in session 04

Namespaces

- **aixm:**
  - version 5.1
    - xmlns:aixm="http://www.aixm.aero/schema/5.1/index.html"
- **gml:**
  - <import namespace="http://www.opengis.net/gml/3.2" schemaLocation="./ISO_19136_Schemas/gml.xsd"/>
- **xlink:**
  - <import namespace="http://www.w3.org/1999/xlink" schemaLocation="./xlink/xlinks.xsd"/>

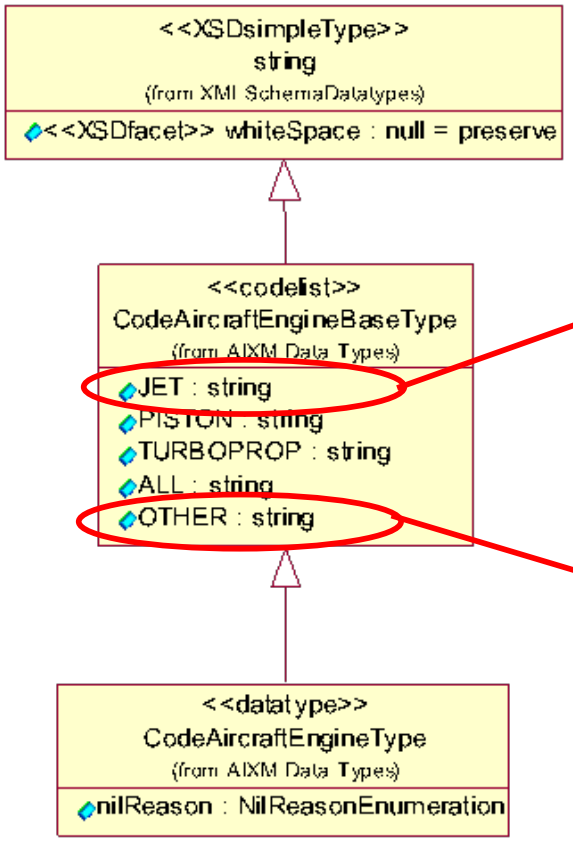
Object/property model

complexType	AirspacePropertyType
element	Airspace
complexType	AirspaceType
complexType	AirspaceTimeSlicePropertyType
element	AirspaceTimeSlice
complexType	AirspaceTimeSliceType
group	AirspacePropertyGroup



AIXM 5.1 Mapping Rules - Datatypes

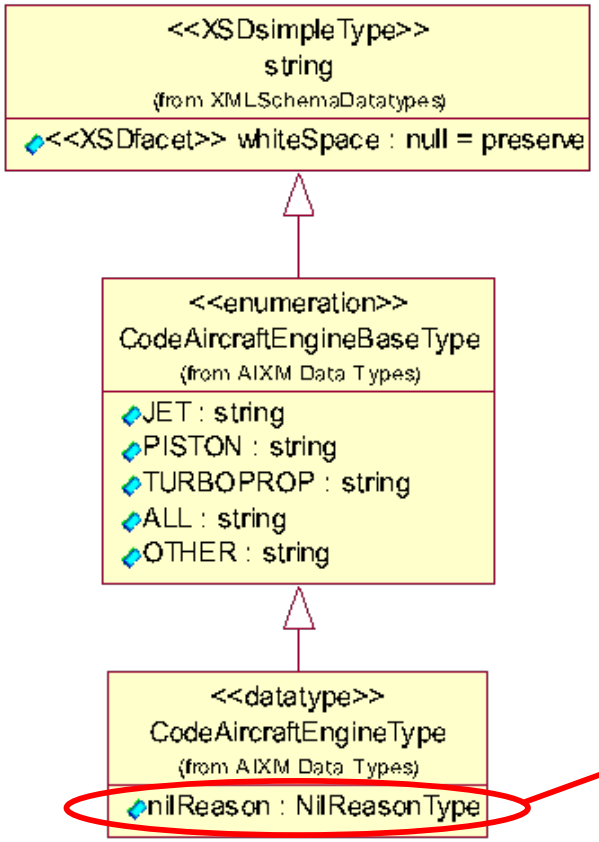
- Mapping <<codelist>>




```
<simpleType name="CodeAircraftEngineBaseType">
  <union>
    <simpleType>
      <restriction base="xsd:string">
        <enumeration value="JET">
          <annotation>
            <documentation/>
          </annotation>
        </enumeration>
        <enumeration value="PISTON"/>
        <enumeration value="TURBOPROP"/>
        <enumeration value="ALL"/>
      </restriction>
    </simpleType>
    <simpleType>
      <restriction base="string">
        <pattern value="OTHER:\w{2,58}"/>
      </restriction>
    </simpleType>
  </union>
</simpleType>
```

AIXM 5.1 Mapping Rules - NilReason

- Mapping nilReason

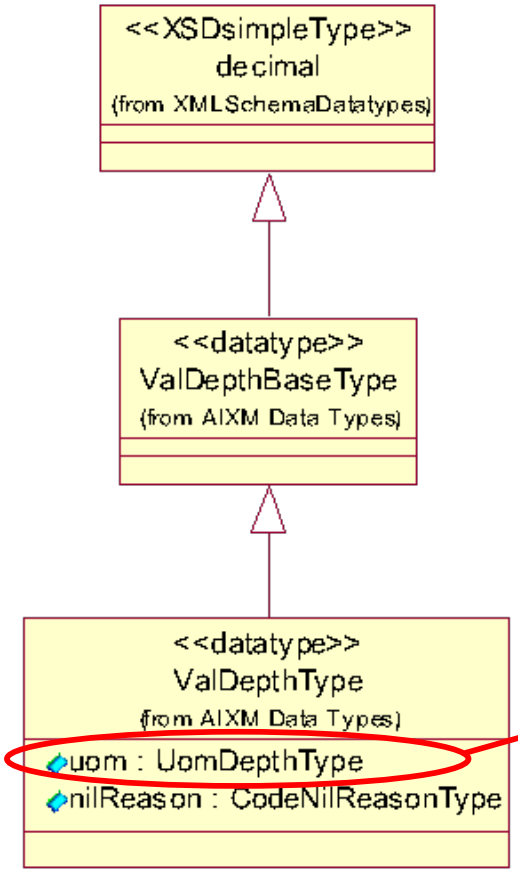



```
<simpleType name="CodeAircraftEngineBaseType">
   <union>
      <simpleType>
         <restriction base="xsd:string">
            <enumeration value="JET">
            ……..
         </restriction>
      </simpleType>
      <simpleType>
          <restriction base="string">
              <pattern value="OTHER:\w{2,58}"/>
          </restriction>
      </simpleType>
   </union>
</simpleType>
```

```
<complexType name="CodeAircraftEngineType">
   <simpleContent>
      <extension base="aixm:CodeAircraftEngineBaseType">
        <attribute name="nilReason“ type="aixm:NilReasonType"/>
      </extension>
   </simpleContent>
</complexType>
```

AIXM 5.1 Mapping Rules - UOM

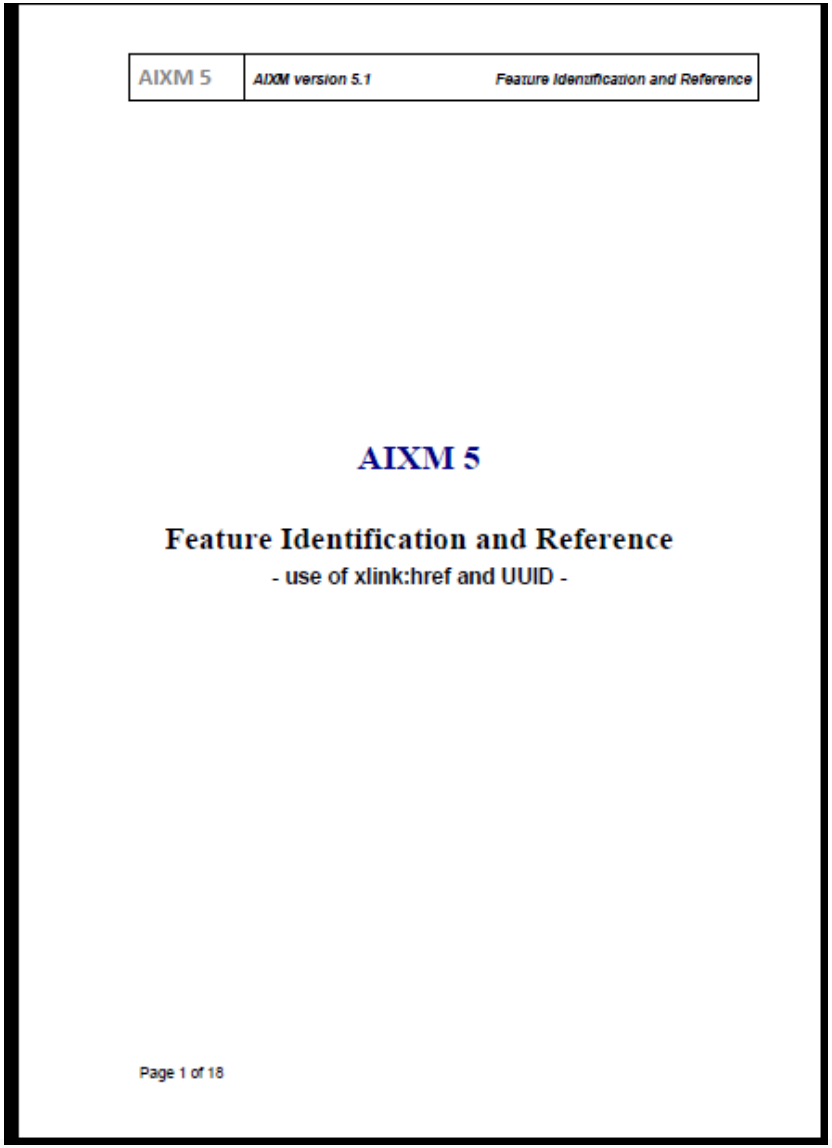
- Mapping Units of Measurement




```
<simpleType name="ValDepthBaseType">
   <restriction base="xsd:decimal">
   </restriction>
</simpleType>
```

```
<complexType name="ValDepthType">
   <simpleContent>
      <extension base="aixm:ValDepthBaseType">
         <attribute name="nilReason" type="aixm:NilReasonType"/>
         <attribute name="uom" type="aixm:UomDepthType" use="required"/>
      </extension>
   </simpleContent>
</complexType>
```

Feature identification and reference



AIXM 5 | AIXM version 5.1 | Feature Identification and Reference

AIXM 5

Feature Identification and Reference

- use of xlink:href and UUID -

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Feature identification

```
<gml:identifier
     codeSpace="urn:uuid:">a82b3fc9-4aa4-4e67-8def-
aaea1ac595j</gml:identifier>
```

version 4 UUID based on random number generation, is recommended

```
<aixm:Airspace gml:id="uuid.a82b3fc9-4aa4-4e67-8def-aaea1ac595j">
  <gml:identifier codeSpace="urn:uuid:">a82b3fc9-4aa4-4e67-8def-
aaea1ac595j</gml:identifier>
  <aixm:timeSlice>
    <aixm:AirspaceTimeSlice gml:id="ID00001">
```

Feature reference

- 3.2 Concrete local references within a message

```
…
<aixm:AirTrafficControlService gml:id="uuid.d4d33081-
  54ad-4c1a-9519-b5b67de561ae">
…
<aixm:clientAirspace xlink:href="#uuid.a82b3fc9-4aa4-
  4e67-8def-aaea1ac595j"/>
…
```

Feature reference

- 3.3 Concrete external references

```
<aixm:clientAirspace
xlink:href="http://aim.faa.gov/services/AirspaceService#
uuid.a82b3fc9-4aa4-4e67-8def-aaea1ac595j"/>
```

```
<aixm:clientAirspace
xlink:href="http://aim.faa.gov/services/AirspaceService?
get=a82b3fc9-4aa4-4e67-8def-
aaea1ac595j#xmlns(ns1=http://www.opengis.net/gml/3.2)xml
ns(ns2=http://www.aixm.aero/schema/5.1)xpointer(//ns2:Ai
rspace[ns1:identifier='a82b3fc9-4aa4-4e67-8def-
aaea1ac595j'])"/>
```

Feature references

- 3.4 Abstract references
  - Using UUID

```
… <aixm:clientAirspace xlink:href="urn:uuid:a82b3fc9-4aa4-4e67-8def-aaea1ac595j"/>…
```

  - Using natural keys

```
… <aixm:clientAirspace
xlink:href="urn:aixm:Airspace(gml:timePosition=2010-04-07T09:00;aixm:type=D;aixm:designator=EBD25A)"/>…
```

Feature references

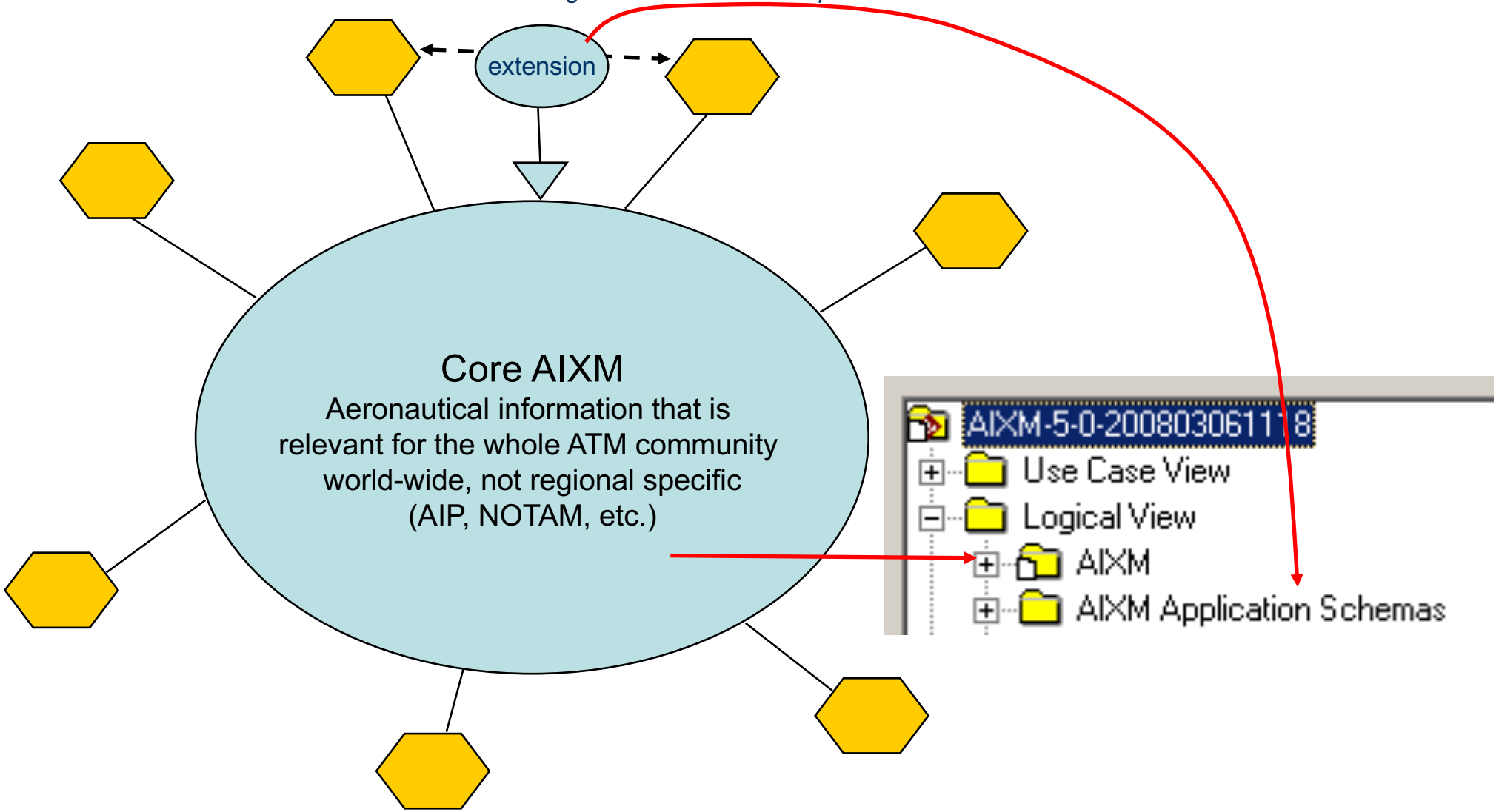
- 3.5 Use of xlink:title
  - human-friendly name of the feature for display purposes
  - not for feature identification in automatic processing!

```
… <aixm:clientAirspace xlink:href="urn:uuid:a82b3fc9-
4aa4-4e67-8def-aaea1ac595j" xlink:title=”Gabbs North
MOA”/>…
```

Highly recommended for debugging

AIXM 5.1 extensions

Additional information exchanged between selected partners



Extensions – feature/object

AIXM

AIXM Application Schema Generation

AIXM 5 | AIXM version 5.1 | AIXM Application Schema

2 Extending AIXM Features / Objects

2.1 UML Package for Extensions

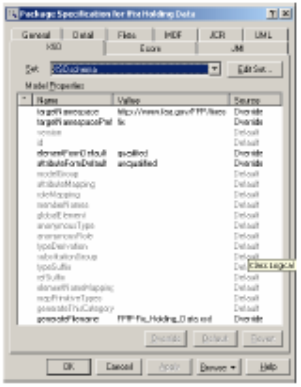
To extend AIXM, a new package must be created under the AIXM Application Schemas package. This package will contain all the information you need for your extension.

2.1.1 Package Structure

Different types of sub-packages are used to control the generation of appropriate XML schemas (XSD). The Extension sub-package contains the extensions to AIXM Core features and objects. If the extension requires new data types, then a second sub-package, the Extension Data Types, is created containing any new data types and codelists needed. The final sub-packages that are needed are the message packages. Multiple packages may be required based on the number of different message schemas needed. Most Application Schema Packages will have at least one request package and one response package.

2.1.2 Package Specifications and Namespaces

The extension package must have the appropriate XSD tool attributes set so the script can generate the namespaces correctly. Below is an example of how these attributes are set for the Fix Holding Data sub-package.



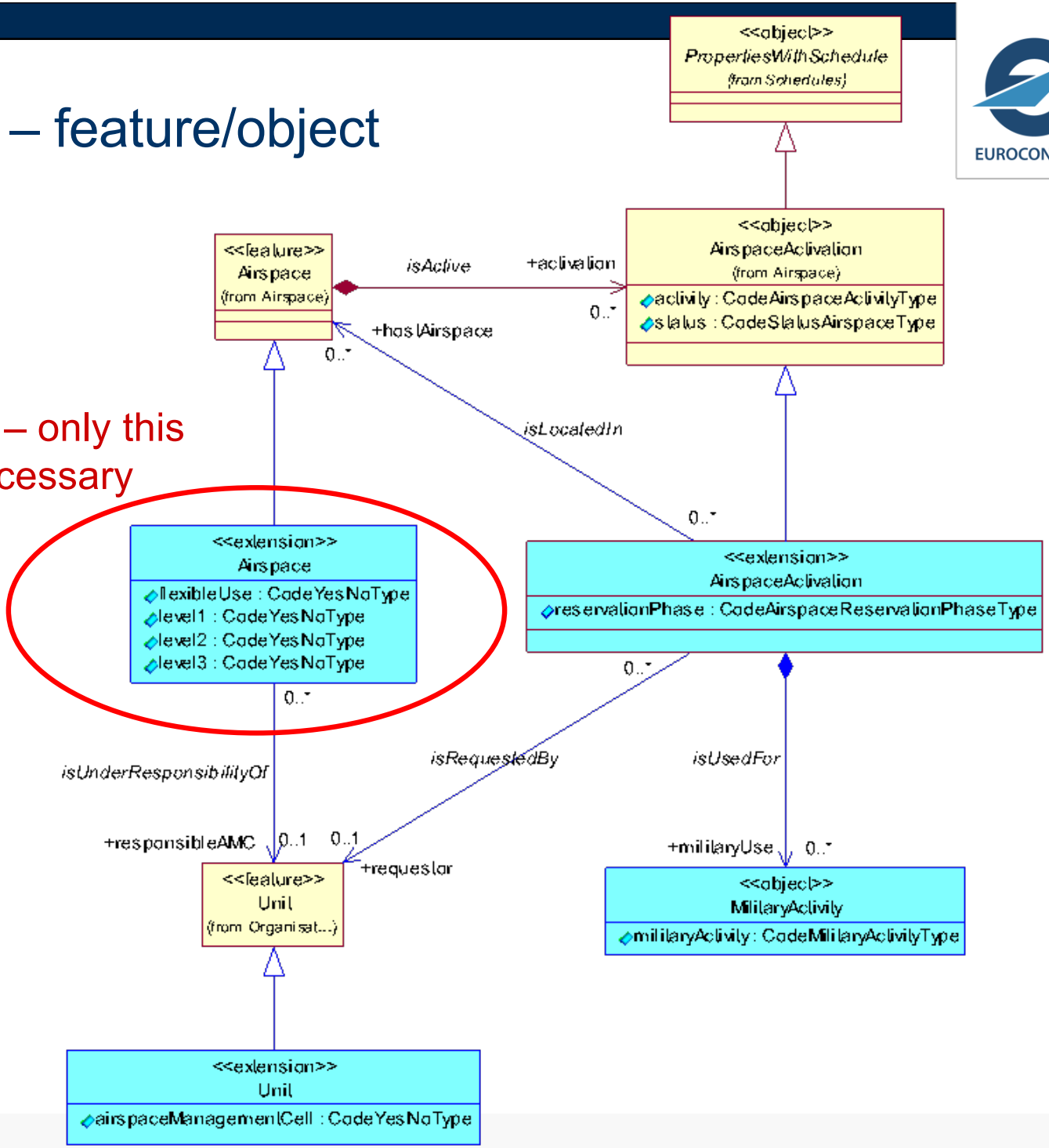
There are five properties that are needed for each new Application Schema package being used to generate XML Schemas. These properties are highlighted below with the Source as 'Override'.

To modify the value of these properties, open the Package Specification and navigate to the XSD tab. The targetNamespace and targetNamespacePrefix property values are determined by the COI and used in accordance with other related schemas and will determine if an external import is included or imported.

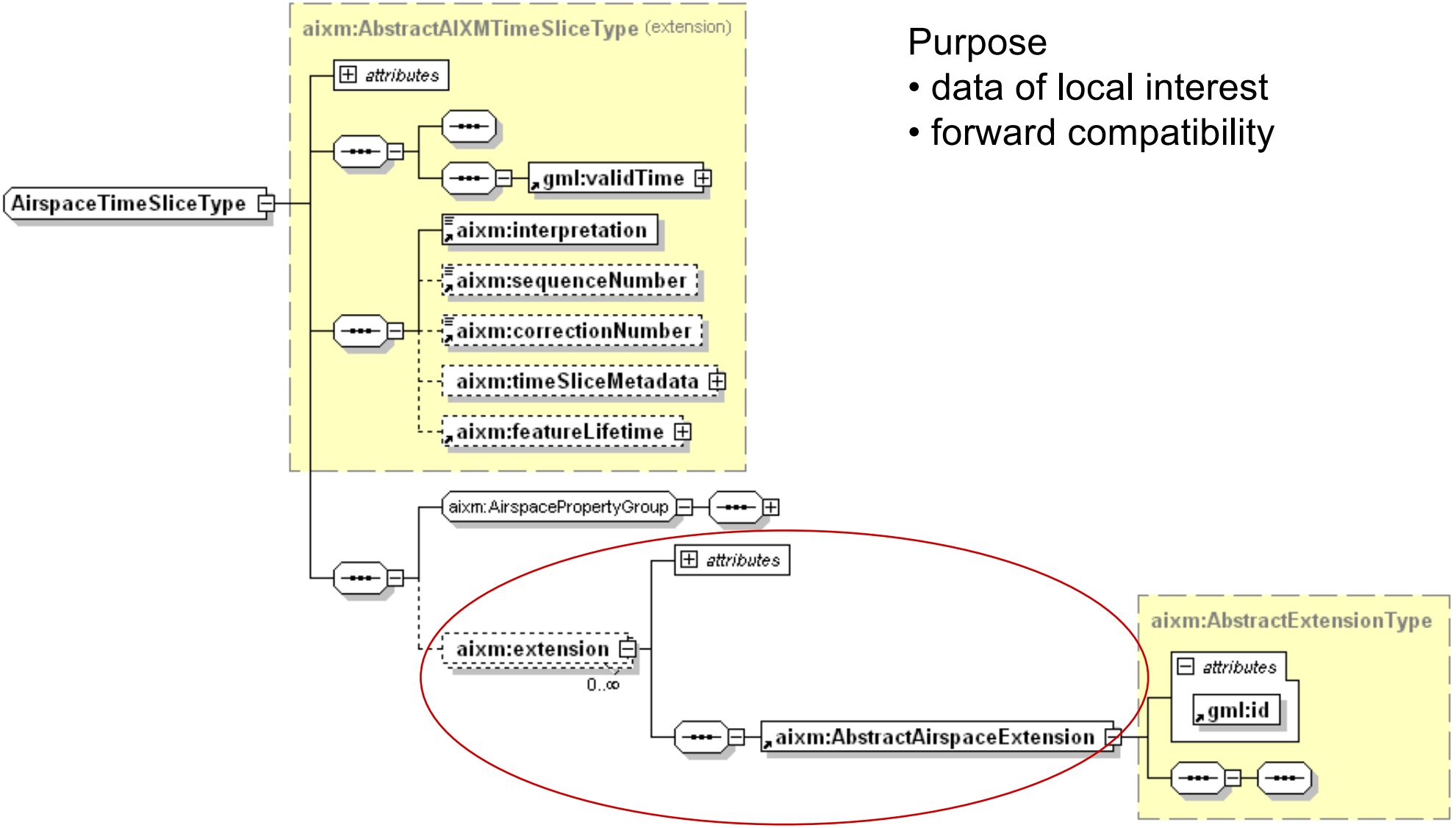
Additionally, denote the generateFilename property as applicable so the schema is named consistently each time it is generated with the UML to XSD scripts.

Extensions – feature/object

EAD – only this is necessary

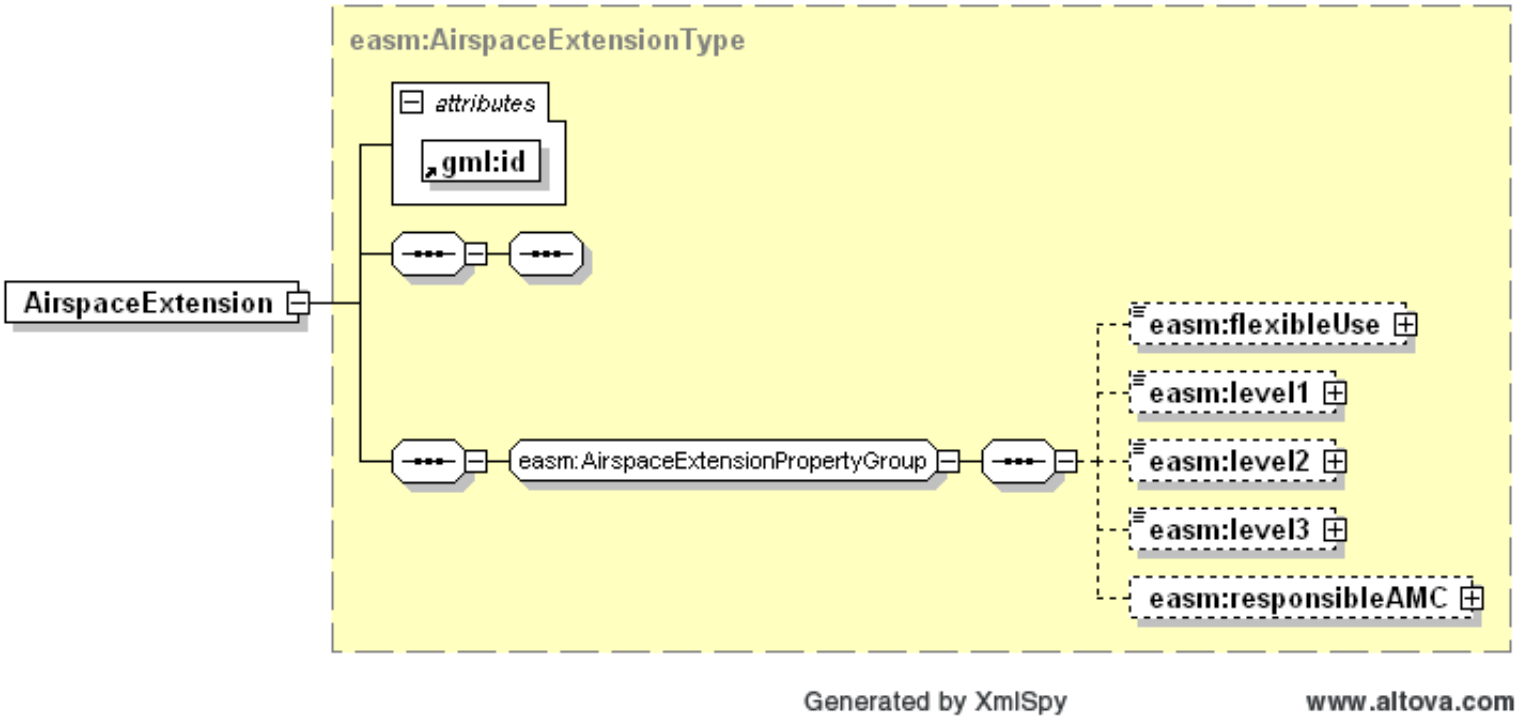


Extensions – feature/object



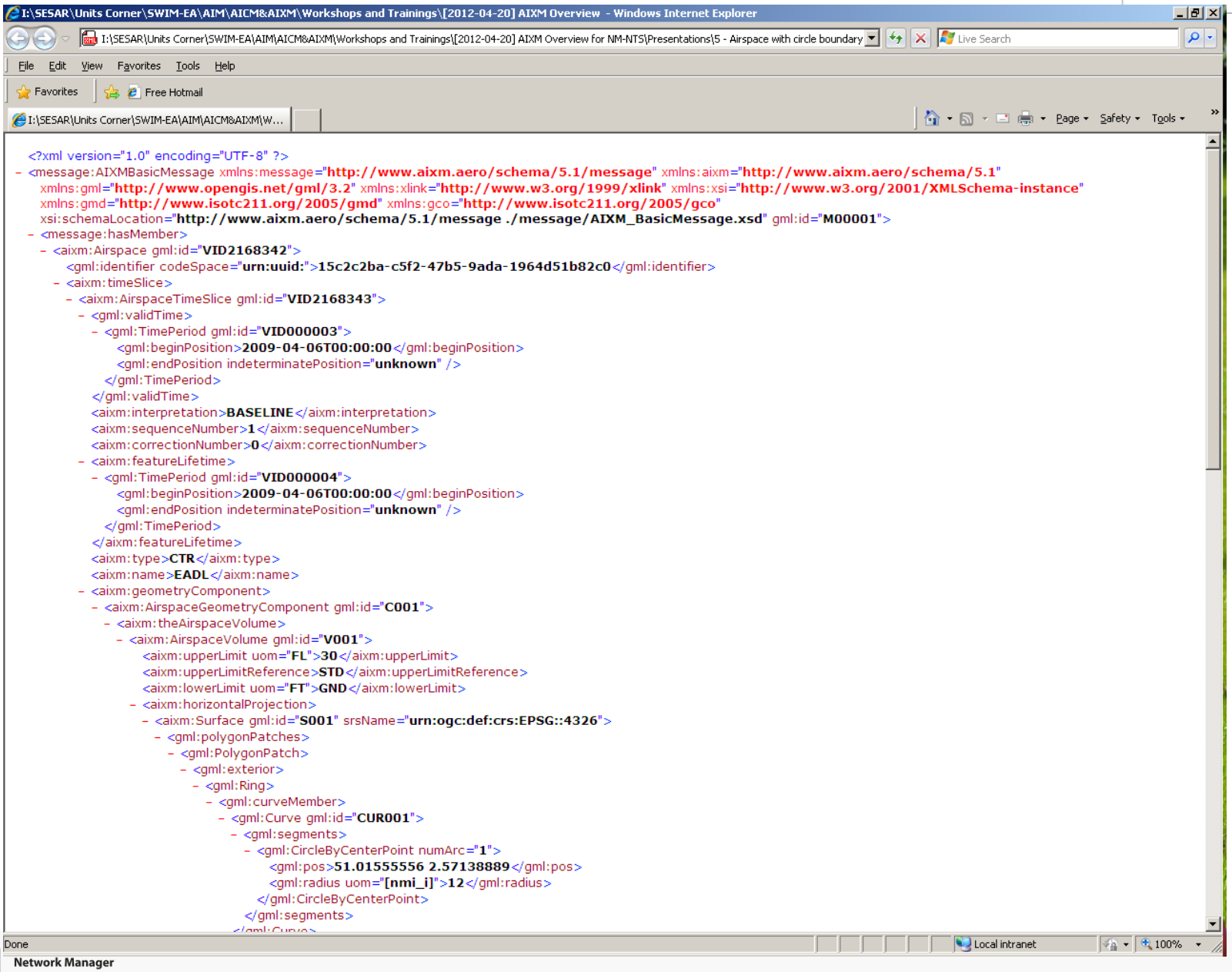
Purpose
- data of local interest
- forward compatibility

Extensions – feature/object

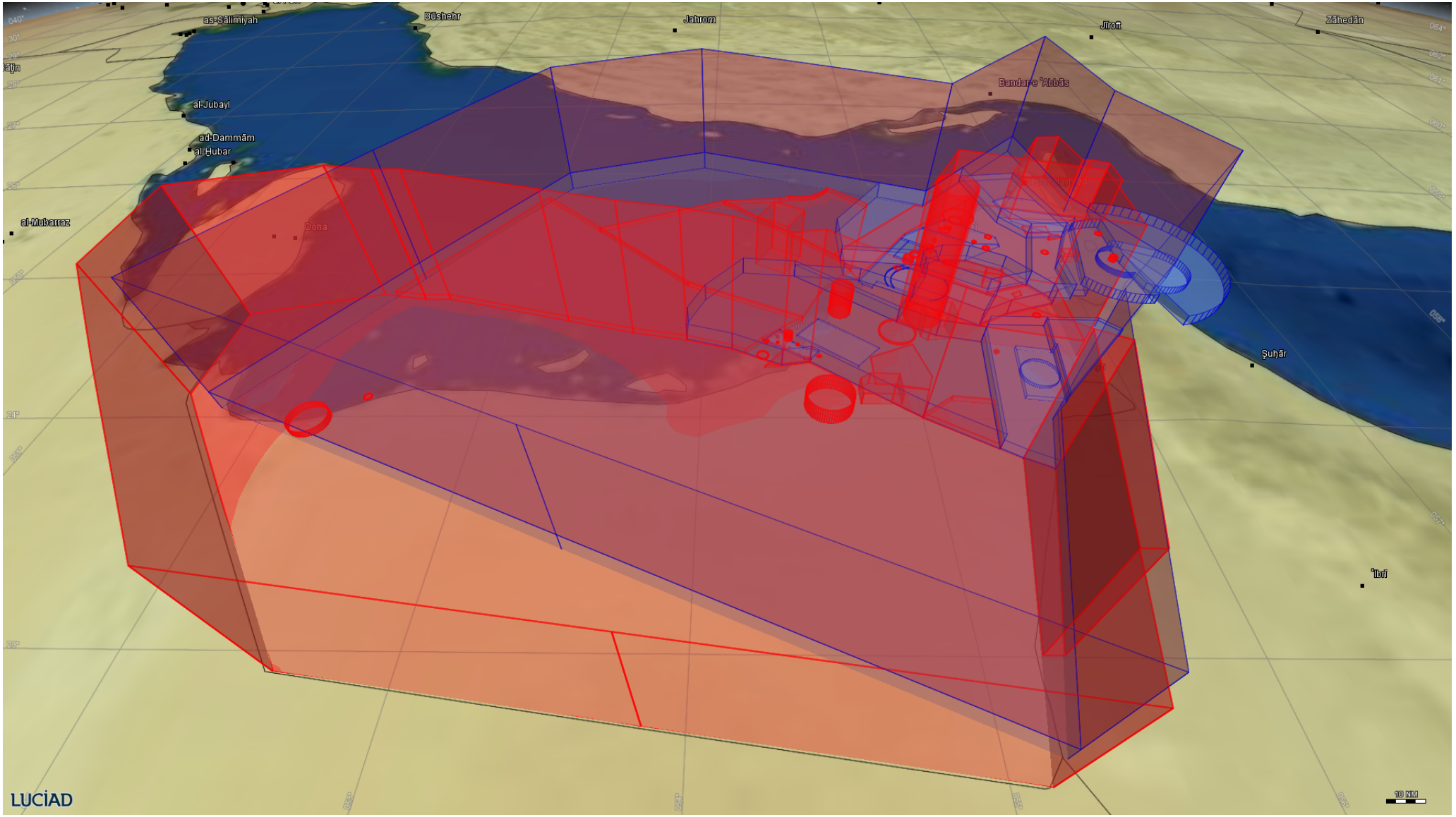



```
<element name="AirspaceExtension" type="easm:AirspaceExtensionType"
substitutionGroup="aixm:AbstractAirspaceExtension"/>
```

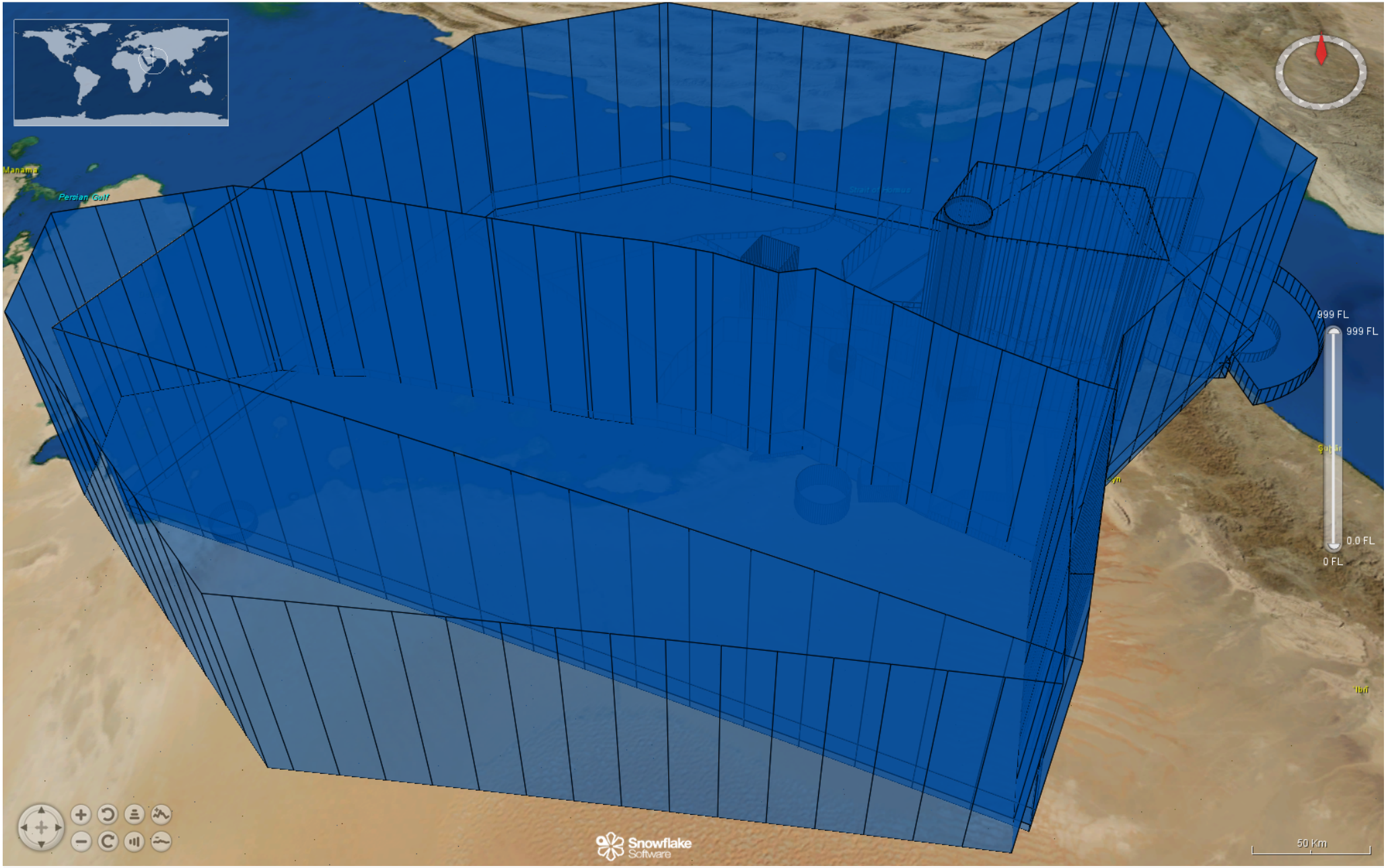
AIXM XML Sample



Luciad AIXM Viewer



Snowflake ATM Viewer



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Questions?