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AIXM 5.1 GML Profile

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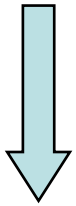
Guidance and Profile of GML for use with Aviation Data

- Published: MAY 2012 by OGC (produced by the Aviation Domain WG)
- Status: OGC Discussion Paper, Revision 1 (https://portal.opengeospatial.org/files/?artifact_id=62852)
- 1st part - Encoding guidelines for aviation specific data
  - srsName (WGS 84 is imposed in aviation)
  - Surface and lines - specials
  - Parallels
  - Arcs
  - Embedded curves/points
  - Geographical borders re-used in Surface definitions
    - In relation with the use of AIXM for aeronautical data encoding
- 2nd part - GML Profile

Why guidelines

```
<geoLat>52.2889</geoLat>
<geoLong>-32.0350</geoLong>
<codeDatum>WGE</codeDatum>
```

AIXM 4.5 – non GML



```
<aixm:ElevatedPoint srsName="urn:ogc:def:crs:EPSG::4326" gml:id="ID55">
    <gml:pos>52.2889 -32.0350</gml:pos>
</aixm:ElevatedPoint>
```

AIXM 5.1– GML

Positions - encoding

```
…
<aixm:ElevatedPoint srsName="urn:ogc:def:crs:EPSG::4326" gml:id="ID55">
    <gml:pos>52.2889 -32.0350</gml:pos>
</aixm:ElevatedPoint>
…
```

First latitude, then longitude

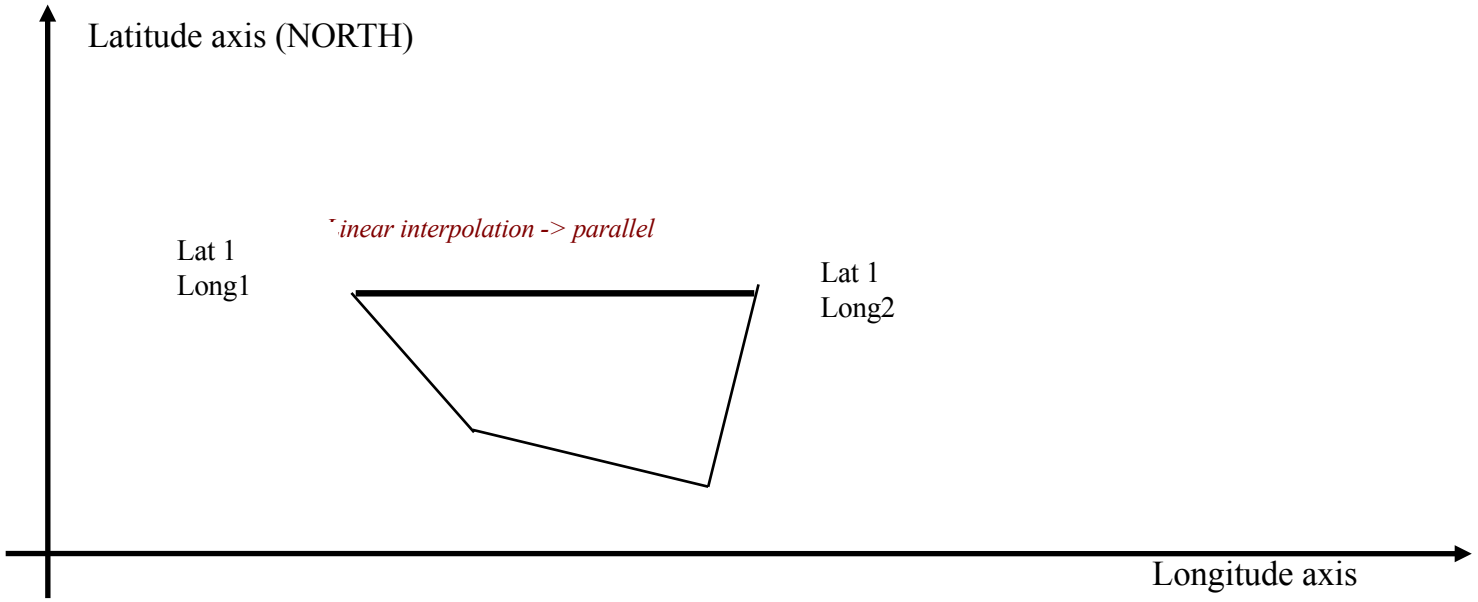
Straight lines

gml:Geodesic

gml:GeodesicString

```
…
<aixm:Surface gml:id="S01" srsName="urn:ogc:def:crs:EPSG::4326">
 <gml:patches>
   <gml:PolygonPatch gml:id=”PP01”>
     <gml:exterior>
       <gml:Ring>
        <gml:curveMember>
          <gml:Curve gml:id="C001">
            <gml:segments>
              <gml:GeodesicString>
                <gml:posList>52.18556 5.20833 52.20611 5.2875 52.18917
5.29889 52.16917 5.29889 52.18556 5.20833</gml:posList>
                                        </gml:GeodesicString>
                …
```

Parallels

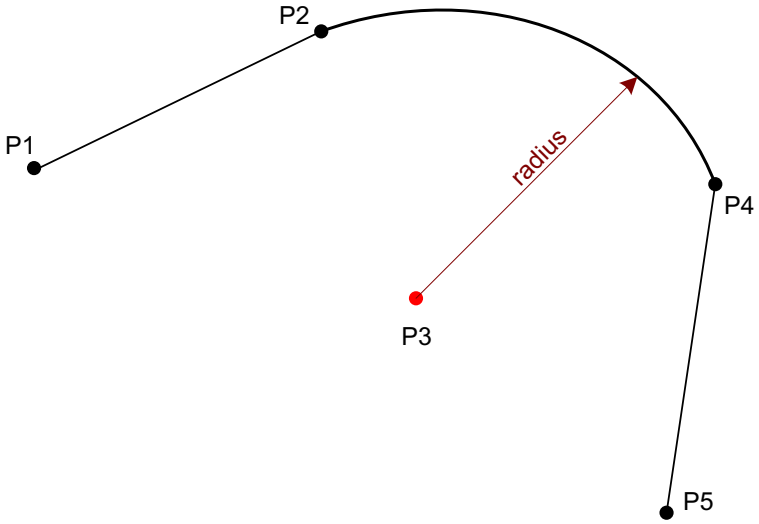


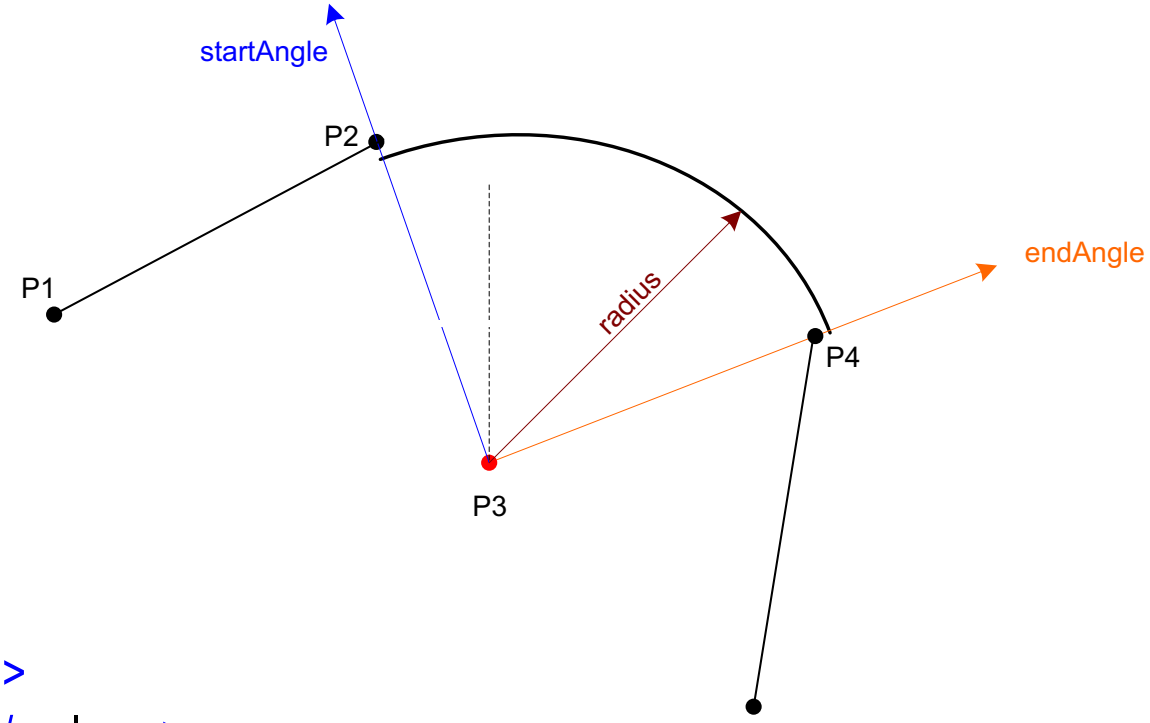
Linear interpolation in a conformal projection, e.g. Mercator

srsName="urn:ogc:def:crs: EPSG::3395"

Arc by centre point

gml:ArcByCenterPoint

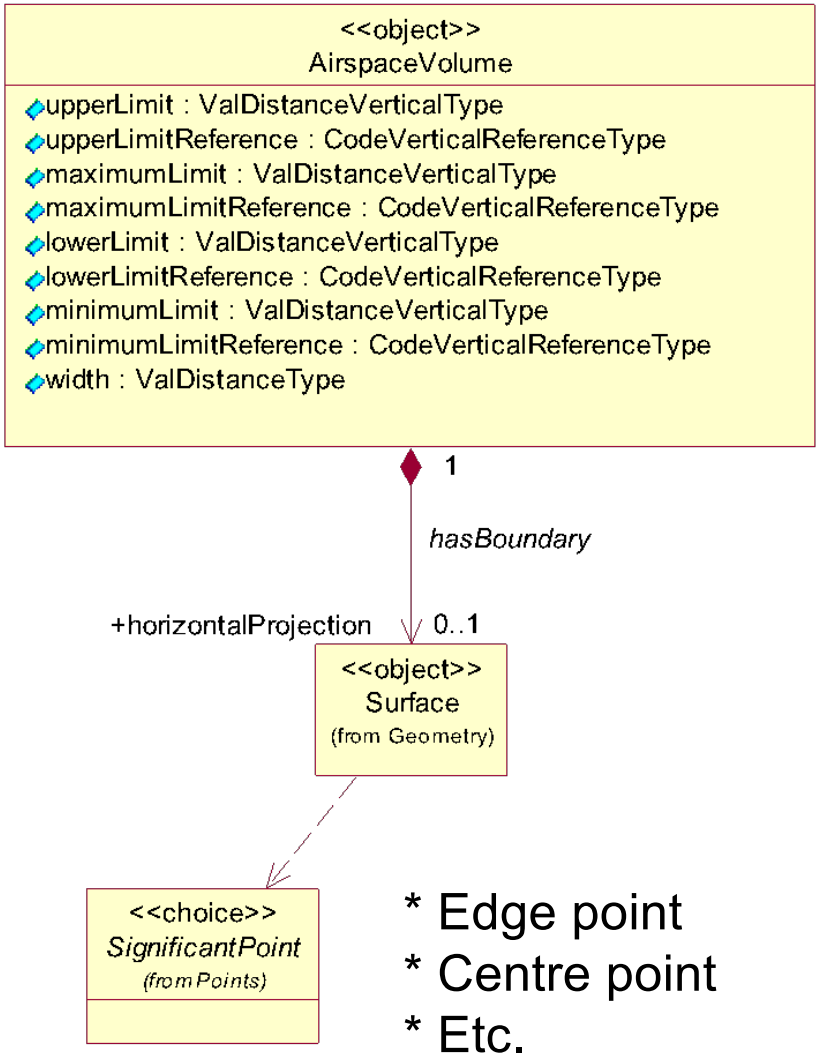





```
<gml:ArcByCenterPoint gml:id="A01">
        <gml:pos>lat_P3 long_P3</gml:pos>
        <gml:radius uom="m">radius</gml:radius>
        <gml:startAngle uom="deg">calculated_start_angle</gml:startAngle>
        <gml:endAngle  uom="deg">calculated_end_angle</gml:endAngle>
</gml:ArcByCenterPoint>
```

Point references

gml:pointProperty



* Edge point
* Centre point
* Etc.

"E) AIR DISPLAY WILL TAKE PLACE WI LATERAL LIMITS: 443838N 0200818E (**NDB OBR**) - 444508N 0201455E (**VILLAGE JAKOVO**) - 443445N 0202447E - 443838N 0200818E (**NDB OBR**).

With annotation

information provided is “for human consumption”

```
<gml:GeodesicString>
   <gml:pos>52.16917 5.29889</gml:pos>
   <gml:pointProperty>
            <aixm:Point gml:id="P001">
               <gml:pos>52.16917 5.21972</gml:pos>
               <aixm:annotation>
                  <aixm:Note gml:id="N001">
                        <aixm:translatedNote>
                           <aixm:LinguisticNote gml:id="N002">
                                 <aixm:note lang="ENG">VILLAGE JAKOVO</aixm:note>
                           </aixm:LinguisticNote>
                        </aixm:translatedNote>
                  </aixm:Note>
               </aixm:annotation>
            </aixm:Point>
      </gml:pointProperty>
</gml:GeodesicString>
```

With xlink:href

Or with remote references
- to the feature!
  - Looking into other xlink attributes…
- include xlink:title for display purpose

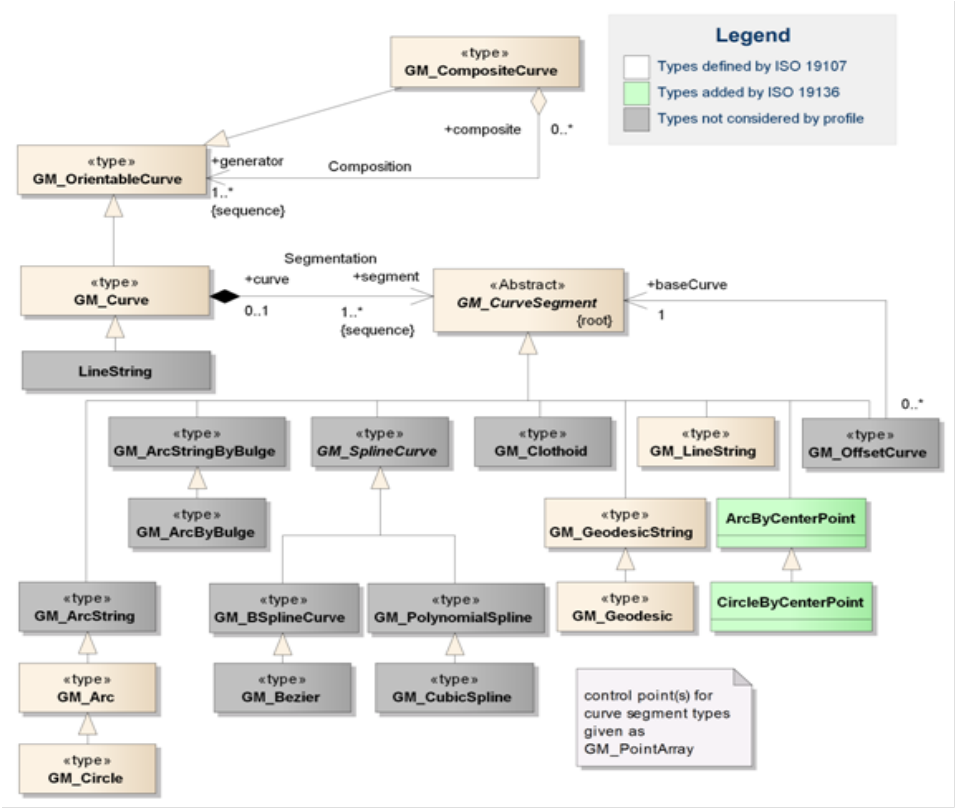
```
<aixm:Navaid gml:id="NID2168342">
  ...
    <aixm:type>VOR_DME</aixm:type>
    <aixm:name>DONLON</aixm:name>
    <aixm:location>
      <aixm:ElevatedPoint gml:id="P0001" srsName="urn:ogc:def:crs:EPSG::4326">
        <gml:pos>52.2889 -32.0350</gml:pos>
        <aixm:elevation uom="FT">365</aixm:elevation>
      </aixm:ElevatedPoint>
    </aixm:location>
  ...
</aixm:Navaid>

<aixm:Airspace gml:id="VID2168342">
  ...
    <aixm:theAirspaceVolume>
      <aixm:AirspaceVolume gml:id="V001">
        <aixm:horizontalProjection>
          <aixm:Surface gml:id="S001" srsName="urn:ogc:def:crs:EPSG::4326">
            <gml:polygonPatches>
              <gml:PolygonPatch>
                <gml:exterior>
                  <gml:Ring>
                    <gml:curveMember>
                      <gml:Curve gml:id="CUR001">
                        <gml:segments>
                          <gml:CircleByCenterPoint numArc="1">
                            <gml:pointProperty xlink:href="#P0001" xlink:title="VOR/DME DONLON"/>
                            <gml:radius uom="[nmi_i]">12</gml:radius>
```

Local

AIXM 5.1 Guidelines

- 2nd part: GML Profile



XSD Element	gml:Circle
Type	gml:CircleType
BaseType	gml:ArcType (see section 9.4.13)
Restriction	Use of the child elements "gml:pointRep" and "gml:coordinates" is deprecated.
Usage	To define a circle that is given via three control points – usually to define the boundary of a circular airspace.
Definition	A Circle is an arc whose ends coincide to form a simple closed loop. The three control points shall be distinct non-co-linear points for the circle to be unambiguously defined. The arc is simply extended past the third control point until the first control point is encountered.
Comments	Other than CircleByCenterPoint (see section 9.4.12), Circle has a well defined direction.
Used in	As child of GM_Arc (see section 9.4.13), usually to represent a segment of a GM_Curve (see section 9.4.9) that forms a circle.
XML Schema File	(./ISO_19136_Schemas/) geometryPrimitives.xsd

XML Schema Component	`<element name="Circle" type="gml:CircleType" substitutionGroup="gml:Arc"/>`
	`<complexType name="CircleType">`
	`<complexContent>`
	`<extension base="gml:ArcType"/>`
	`</complexContent>`
	`</complexType>`

Example	`<gml:Circle …>`
	`<gml:posList>0 1 -1 0 0 -1</gml:posList>`
	`</gml:Circle>`

GML Profile

AIXM Conceptual Types and the relevant XSD Implementation to document

AIXM Conceptual Type	AIXM XSD Implementation (Element and Type)	Section Reference
Point	aixm:Point, -Type	Annex G
ElevatedPoint	aixm:ElevatedPoint, -Type	
Curve	aixm:Curve, -Type	
ElevatedCurve	aixm:ElevatedCurve, -Type	
Surface	aixm:Surface, -Type	
ElevatedSurface	aixm:ElevatedSurface, -Type	

GML Profile – example of an element

XSD Element	aixm:Curve
Type	aixm:CurveType
BaseType	gml:CurveType
Restriction	*none*
Usage	To define shapes (e.g. of a linear obstacle), trajectories (e.g. in a SegmentLeg), centerlines (e.g. of an airspace volume), and extent (e.g. of a route segment).
Definition	An AIXM curve derived from GM_Curve and extended to include Horizontal Accuracy Properties.
Comments	Annotations of an AIXM Curve can be used to provide additional information about the curve for human consumption.
Used in	Used in some AIXM features. Can also be used as a substitute for GM_Curve / gml:Curve.
XML Schema File	AIXM_Features.xsd

XML Schema Component	`<element name="Curve" type="aixm:CurveType" substitutionGroup="gml:Curve"/>`
	`<complexType name="CurveType">`
	`<complexContent>`
	`<extension base="gml:CurveType">`
	`<sequence>`
	`<group ref="aixm:CurvePropertyGroup"/>`
	`</sequence>`
	`</extension>`

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Questions?