

Detected GML Issues Related to Spatial Reference Systems

IHO S-100WG6-04.3B

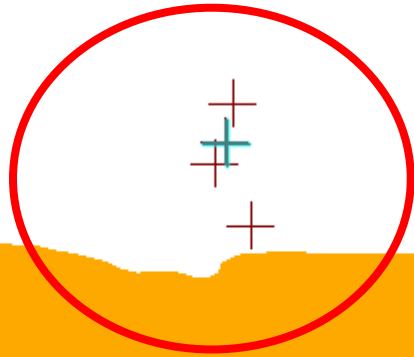
Submitted by

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In Sample GML datasets of Product Specs.

- Two types of axis order
 - Lat/Long vs Long/Lat
- Three types of SRS
 - EPSG:4326
 - <http://www.opengis.net/def/crs/EPSSG/0/4326>
 - urn:ogc:def:crs:EPSSG::4326
- Displayed differently in CARIS & QGIS

Geometries with srsName="EPSG:4326" added to the property all appear near Antarctica.
(Long/Lat interpreted as Lat/Long)



Antarctica

```
<S123:Dataset xmlns:S123="http://www.iho.int/S123/gml/1.0" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" >
  <gml:boundedBy>
    <gml:Envelope srsName="EPSG:4326">
      <gml:lowerCorner>-70.418625 11.663503</gml:lowerCorner>
      <gml:upperCorner>-67.991631 15.410272</gml:upperCorner>
    </gml:Envelope>
  </gml:boundedBy>

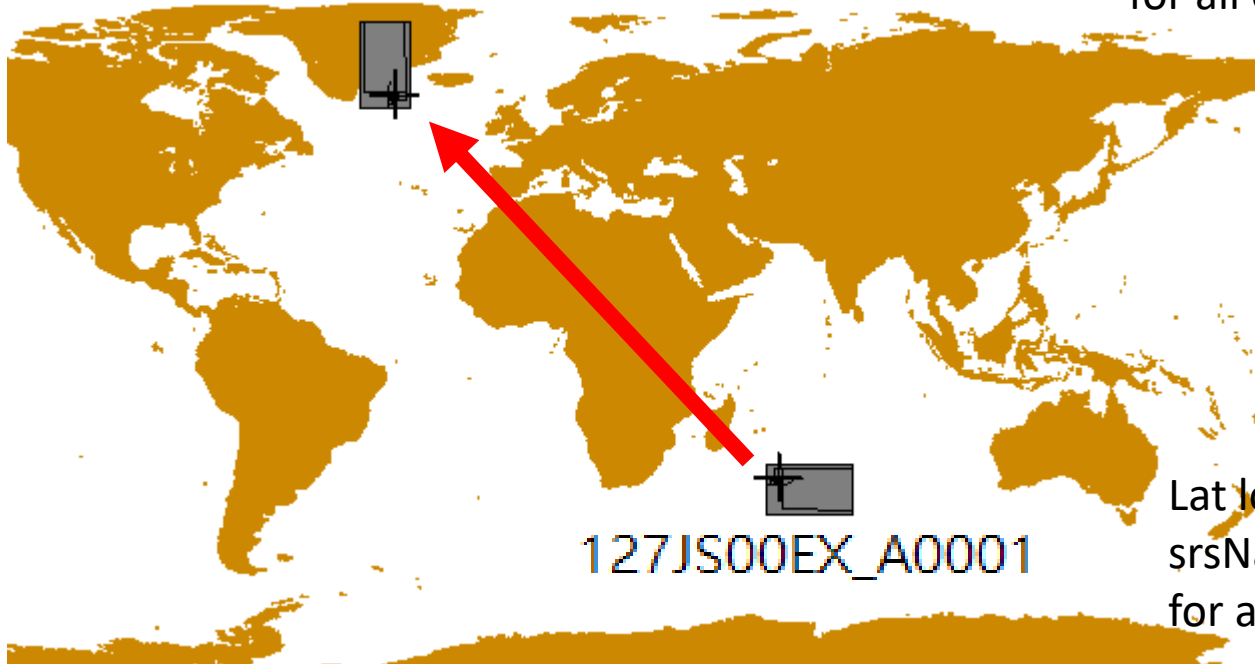
```

```
<S123:NavtexStationArea gml:id="87257248325912685">
  <S100:featureObjectIdentifier>
    <agency>NL</agency>
    <featureIdentificationNumber>NL 1250642029 00001</featureIdentificationNumber>
    <featureIdentificationSubdivision>1</featureIdentificationSubdivision>
  </S100:featureObjectIdentifier>
  <fixedDateRange />
  <featureName>
    <displayName>true</displayName>
    <language>nl</language>
    <name>Curacao</name>
  </featureName>
  <sourceIndication />
  <txIdentChar>H</txIdentChar>
  <serviceProvider xlink:href="#87257248325912656" xlink:role="http://www.iho.int/S123/gml/1.0#S123:ServiceProvider" />
  <geometry>
    <S100:pointProperty>
      <S100:Point srsDimension="2" srsName="EPSG:4326" gml:id="87257248325912685">
        <gml:pos>-68.8546667 12.1718333</gml:pos>
      </S100:Point>
    </S100:pointProperty>
  </geometry>
</S123:NavtexStationArea>

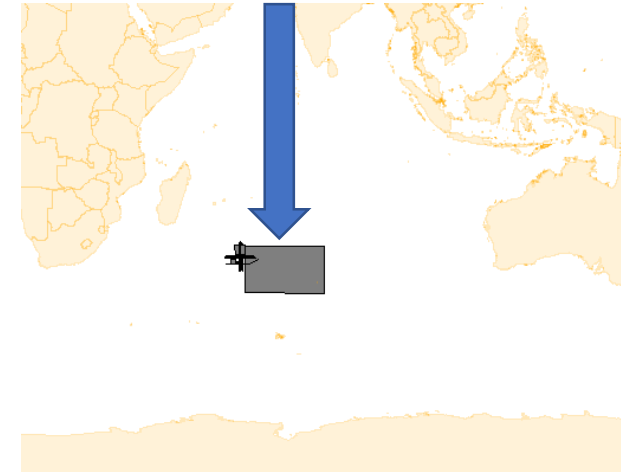
```

S-127(JS) GML in CARIS S-57 Composer

Lat long axis order
srsName="EPSG:4326"
for all elements



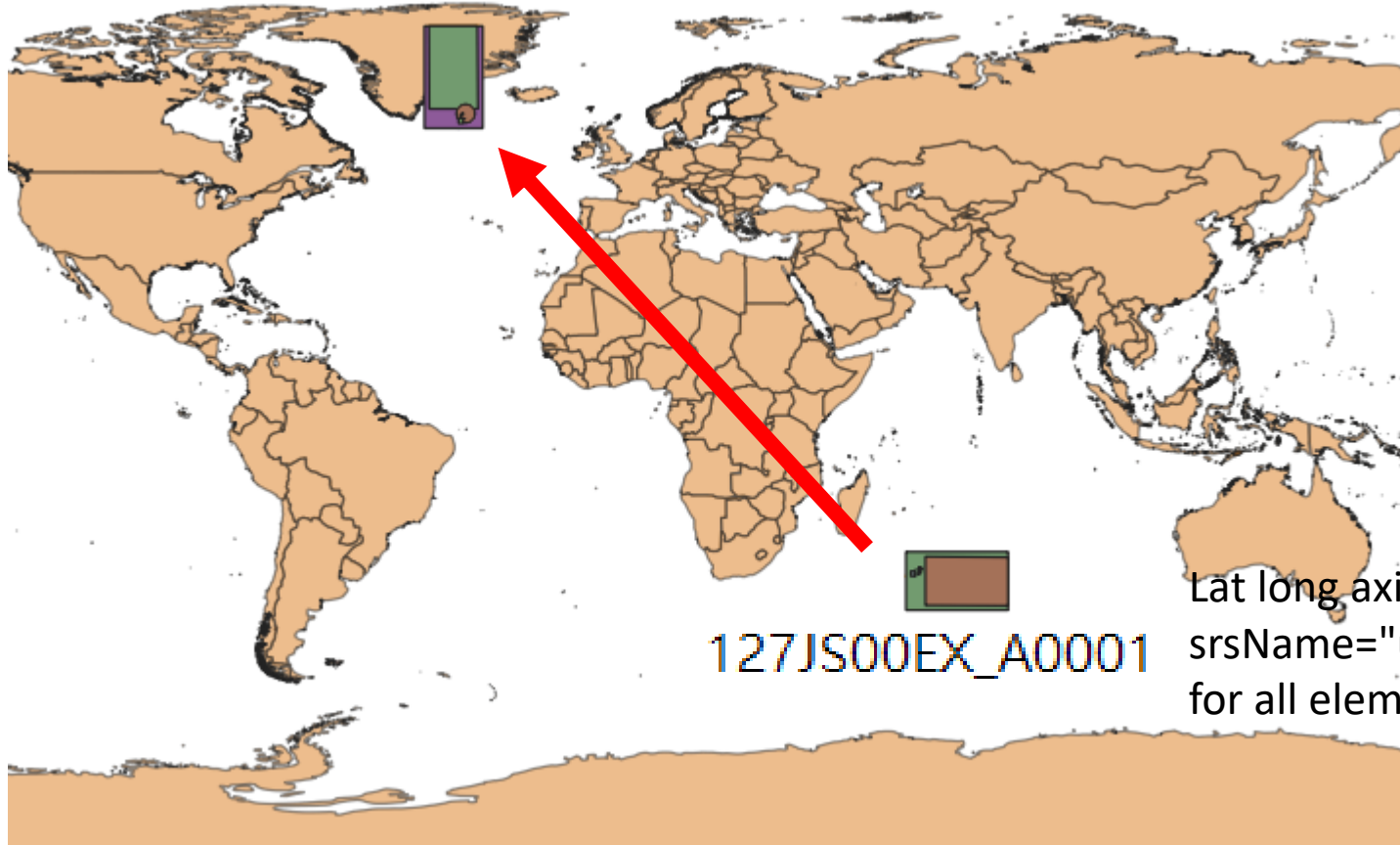
Lat long axis order
srsName="http://www.opengis.net/def/crs/EPSSG/0/4326"
for all elements



Lat long axis order
srsName="urn:ogc:def:crs:EPSSG::4326"
for all elements

S-127(JS) GML in QGIS

Lat long axis order
srsName="EPSG:4326" for all elements



127JS00EX_A0001

Lat long axis order
srsName="http://www.opengis.net/def/crs/EPSSG/0/4326"
for all elements



Lat long axis order
srsName="urn:ogc:def:crs:EPSG::4326"
for all elements

Experiments

- If SRS is not encoded for the feature, GIS software default: Long/Lat
- Replacing the URN form with URI form to the srsName attribute of all elements in the S-127 dataset the displayed locations remain correct
- However, if only the gml:Envelope has srsName attribute specified (in URI or URN form), both CARIS and QGIS treat the axis ordering as Long/Lat (perhaps the internal default) and have the geometries displayed at the wrong hemisphere.

Conclusions

- To reduce the risk of inconsistency in GML encodings
 - SRS shall be identified using the URI convention specified by OGC, which is “<http://www.opengis.net/def/crs/EPSSG/0/4326>” for S-1xx compliant NPUB data products, and
 - the axis order shall be Lat/Long, strictly following the definition of EPSG4326.
- For the application software to correctly determine the SRS of every instance of geometry in a dataset, using the srsName and srsDimension attributes for individual geometry elements is safer than using srsName for the gml:Envelope only

Conclusions and Suggestions

- S-100 gives guidance on GML (ISO 19136) encoding. S-100 Part 10b-9.8 has already specified various key points on the Coordinate Reference System in a rather concise way.
- However, issues reported in this paper, and some others found during the test production, suggest that a more detailed and clear guidance is needed to better ensure the compliance and consistency of GML encoded data products for use in navigation, as well as the broader applications aimed by S-100.
- Comparison of S-100 Part10 a, b and c with respect to the contents and revision history further indicates that a (normative) implementation guidance or rules for data product specifications using GML encoding should be provided.