



**SeaDataNet**

PAN-EUROPEAN INFRASTRUCTURE  
FOR OCEAN & MARINE DATA  
MANAGEMENT

**Status of Sensor Web Enablement (SWE)  
(SeaDataNet Deliverables 8.2 - 8.3)  
and planning of XML editor and SOS prototypes**

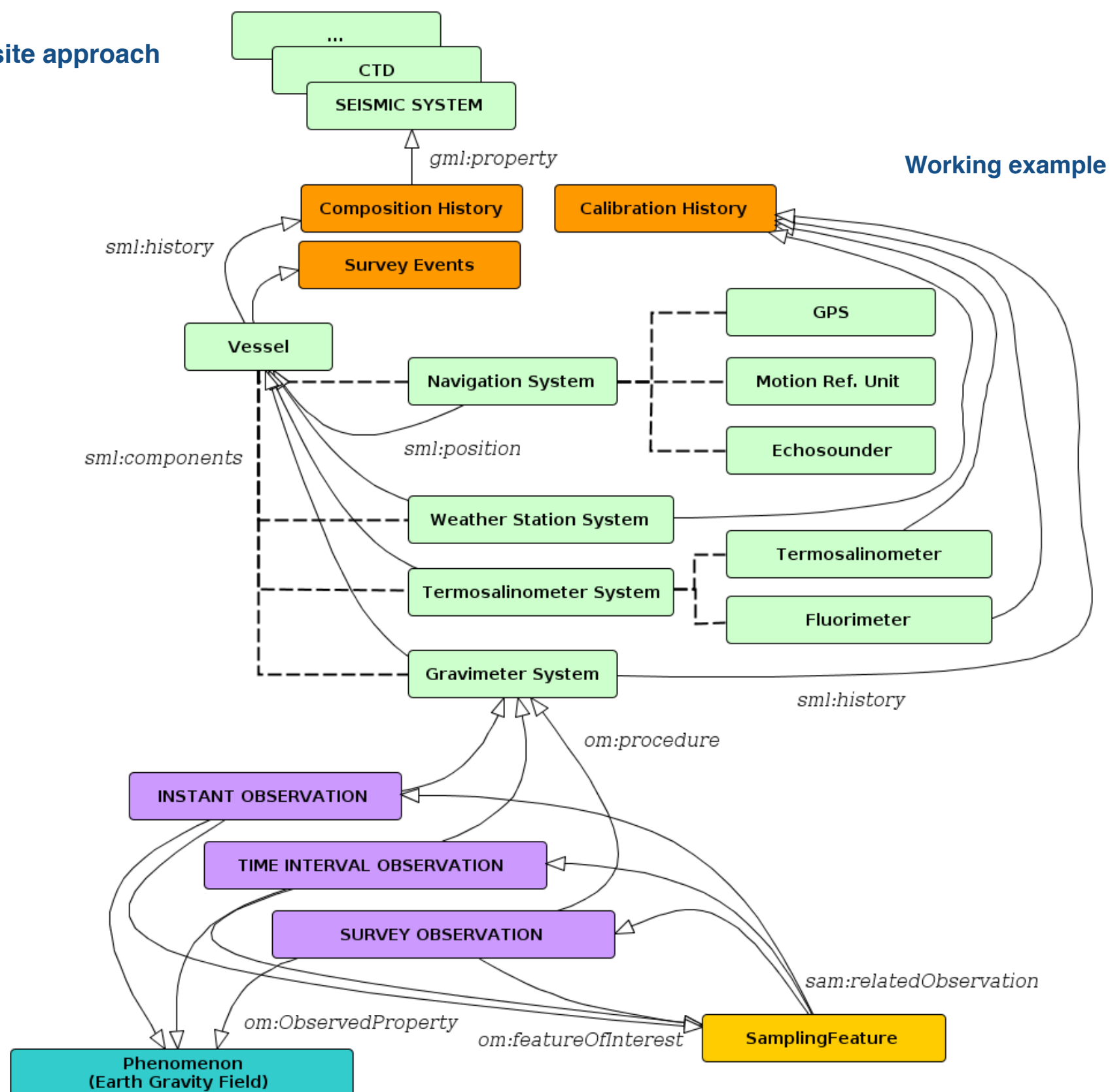
Raquel Casas (UTM-CSIC)

*SeaDataNet - III Annual Meeting*

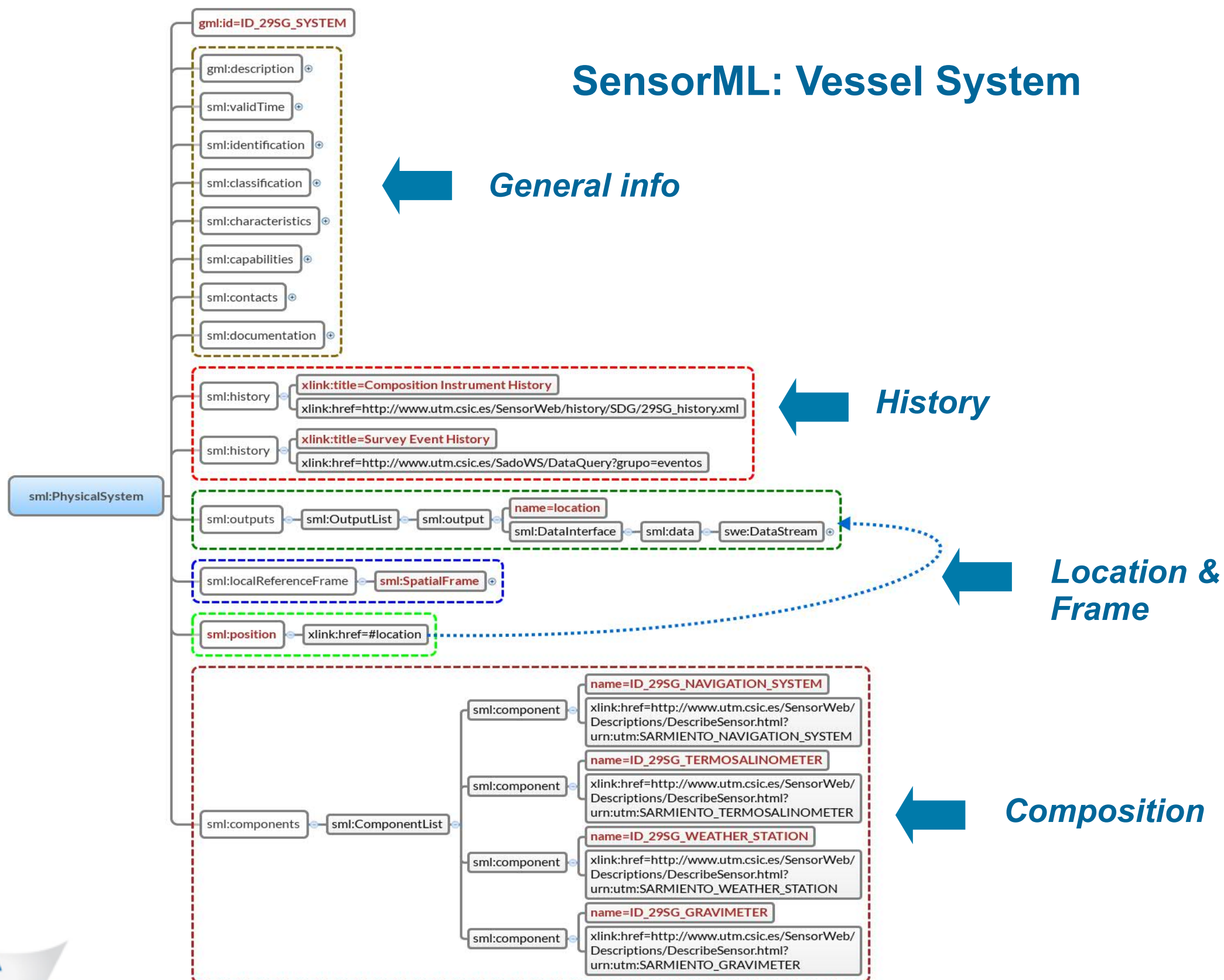
*Split, Croatia, 22-26 September 2014*

- **SensorML and O&M files**
  - Applying BODC vocabularies
- **Profiles** (RelaxNG)
- **SOS**

## Composite approach

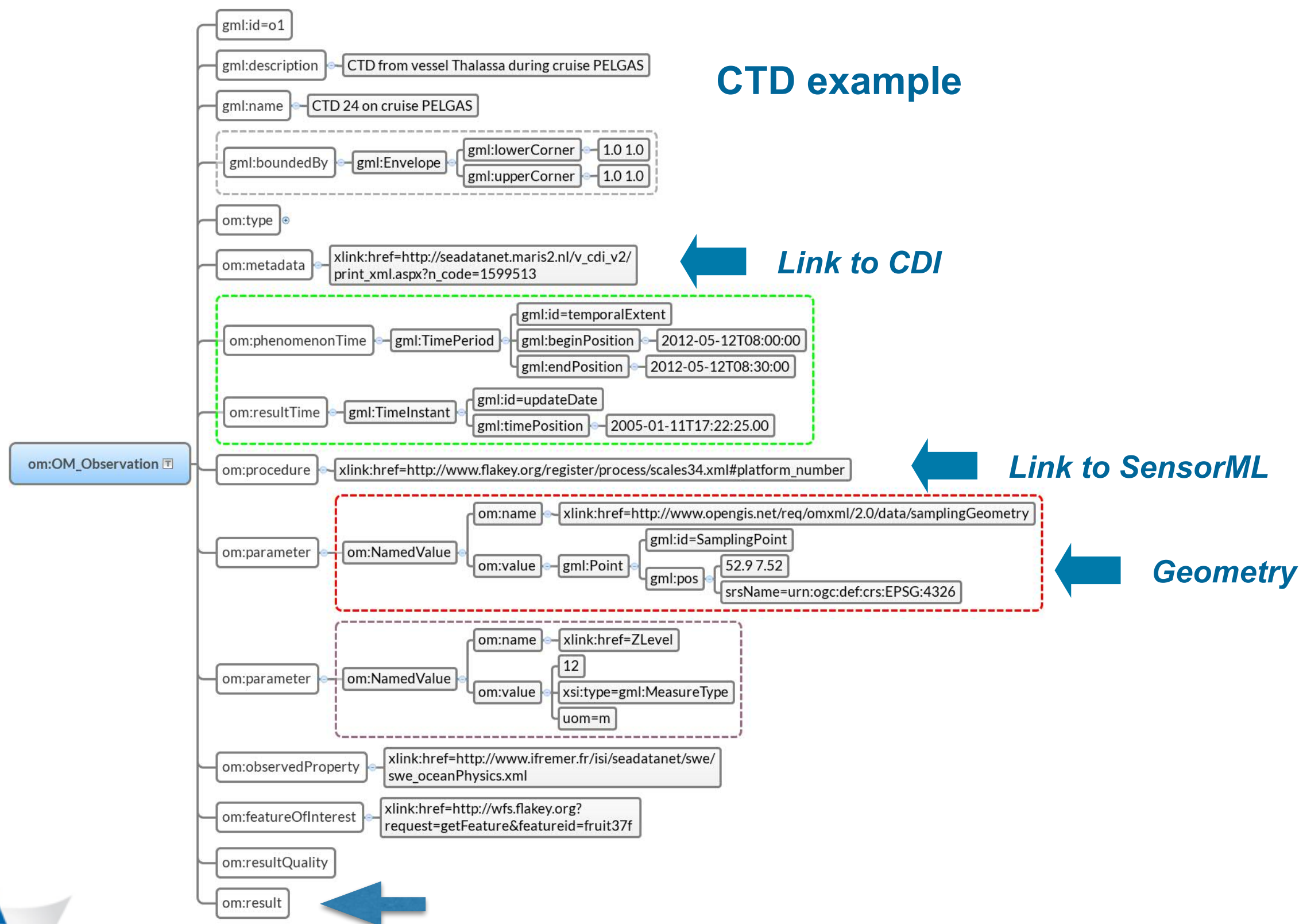


## SensorML: Vessel System





## CTD example



om:OM\_Observation

gml:id=ID\_29SG\_INSTANT\_GRAVITY

xsi:schemaLocation=http://www.opengis.net/om/2.0 http://schemas.opengis.net/om/2.0/observation.xsd http://www.opengis.net/swe/2.0 http://schemas.opengis.net/sweCommon/2.0/swe.xsd

gml:description Instant Earth Gravity Field Observations made onboard Sarmiento de Gamboa Vessel

gml:name Sarmiento Instant Gravity Observation

om:type xlink:href=http://www.opengis.net/def/observationType/OCC-OM/2.0/OM\_ComplexObservation

om:phenomenonTime gml:TimeInstant gml:id=phenomenonTime gml:timePosition 2012-06-29T17:22:25

om:resultTime xlink:href=#phenomenonTime

om:procedure xlink:href=http://www.utm.csic.es/sos/kvp?request=DescribeSensor&amp;procedure=ID\_29SG\_GRAVIMETER

om:observedProperty xlink:href=http://www.utm.csic.es/SensorWeb/Descriptions/1.0.1/GravityField\_Phenomenon.xml

om:featureOfInterest gml:DynamicFeature gml:id=Vessel\_Site

gml:description The vessel site seen as the shape of the observation (a 3D box) in a specific time. Is the Volume of air and water that is been observed. As the vessel is a moving object a Dynamic Feature has been chose to describe the FOI

gml:dataSource xlink:href=http://utm.csic.es/sos/kvp?request=DescribeSensor&procedure=ID\_29SG\_VESSEL\_SYSTEM#location

swe:elementCount swe:Count swe:value

name=values

swe:field

name=ObservationTime

swe:Time definition=timestamp\_value

swe:uom xlink:href=http://vocab.nerc.ac.uk/collection/P01/current/DTUT8601/

swe:field

name=Gravity\_field\_of\_the\_Earth

definition=http://vocab.nerc.ac.uk/collection/P01/current/GRAVFLDX

swe:Quantity

code=mGal

swe:uom xlink:href=http://vocab.nerc.ac.uk/collection/P06/current/MGAL

swe:field

name=Spring\_Tension

swe:Quantity

swe:uom

name=Location

definition=gpsLocation

referenceFrame=http://www.opengis.net/def/crs/EPSC/0/4326

swe:coordinate

name=Latitude

definition=http://vocab.nerc.ac.uk/collection/P01/current/ALATGP01/

swe:Quantity

axisID=latitude

code=deg

swe:uom xlink:href=http://vocab.nerc.ac.uk/collection/P06/current/UAAA/

swe:coordinate

name=Longitude

definition=http://vocab.nerc.ac.uk/collection/P01/current/ALONGP01/

swe:Quantity

axisID=longitude

code=deg

swe:uom xlink:href=http://vocab.nerc.ac.uk/collection/P06/current/UAAA/

swe:coordinate

name=Altitude

definition=altitude

swe:Quantity

axisID=altitude

code=deg

swe:uom xlink:href=http://vocab.nerc.ac.uk/collection/P06/current/UAAA/

swe:coordinate

name=Heading

definition=http://vocab.nerc.ac.uk/collection/P01/current/HDNGGP01/

swe:Quantity

axisID=heading

code=deg

swe:uom xlink:href=http://vocab.nerc.ac.uk/collection/P06/current/UAAA/

swe:coordinate

name=Speed

definition=http://vocab.nerc.ac.uk/collection/P01/current/APSAINW01

swe:Quantity

axisID=vessel\_speed

code=knots

swe:uom

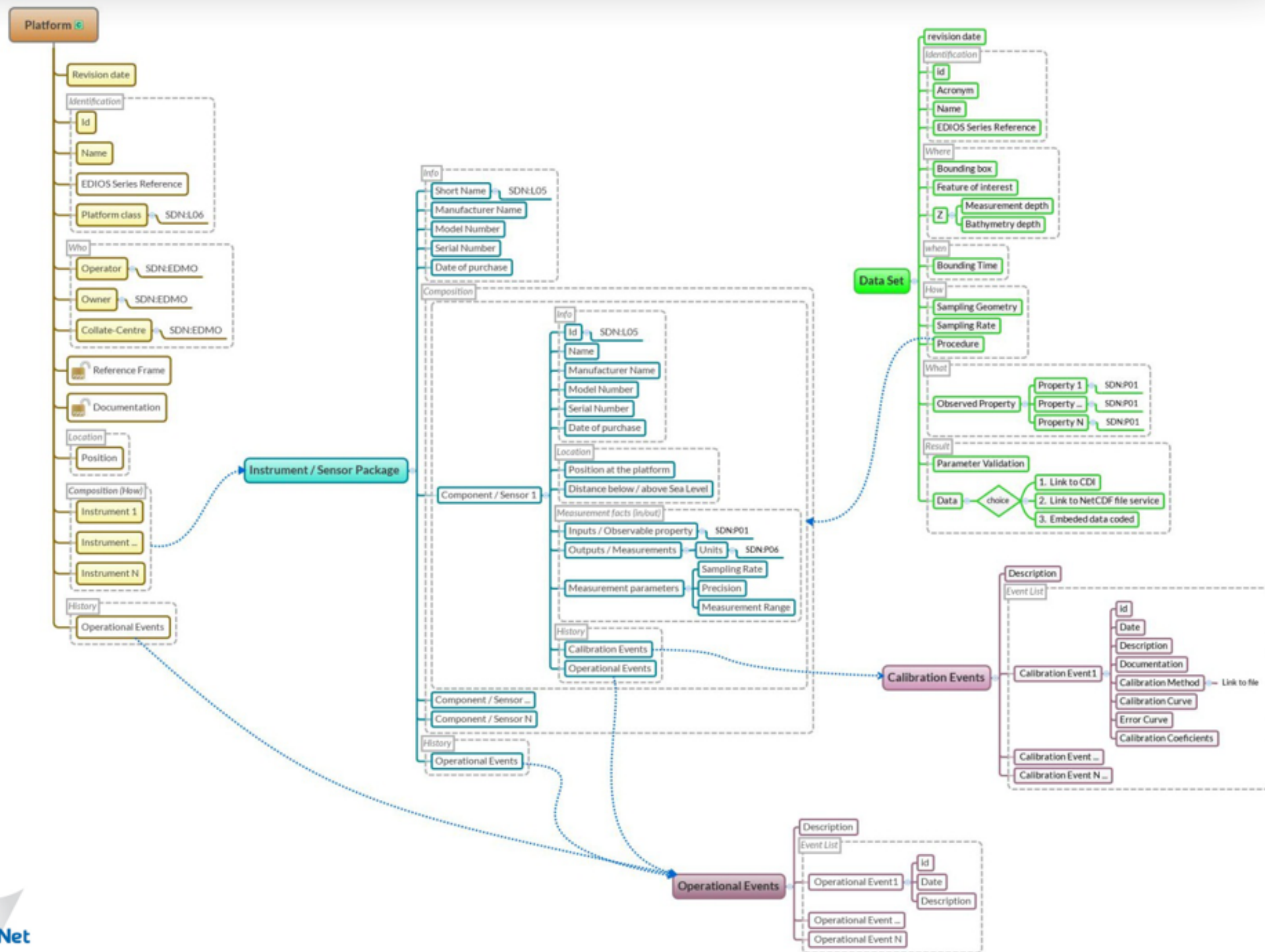
om:result swe:DataArray

swe:elementType

swe:DataRecord

swe:field

swe:Vector



In our visit to BODC we decided to make the following adjustments to our SensorML and O&M files:

- Create a new glossary with needed terms (coming soon).
- Change contact information to EDMO Code.
- Add URL to P06 in units of measure.
- Change definitions to L22 BODC vocabulary URL.
- Change the vessel information to C17 BODC vocabulary URL.

Add vocabulary URL's to SensorML and O&M files

Vessel System old Identification

```
<sml:identification>
  <sml:IdentifierList>
    <sml:identifier>
      <sml:Term definition="uniqueID">
        <sml:label>uniqueID</sml:label>
        <sml:value>SARMIENTO</sml:value>
      </sml:Term>
    </sml:identifier>
    <sml:identifier>
      <sml:Term definition="longName">
        <sml:label>Long Name</sml:label>
        <sml:value>RV SARMIENTO DE GAMBOA</sml:value>
      </sml:Term>
    </sml:identifier>
    <sml:identifier>
      <sml:Term definition="shortName">
        <sml:label>Short Name</sml:label>
        <sml:value>29AH</sml:value>
      </sml:Term>
    </sml:identifier>
  </sml:IdentifierList>
</sml:identification>
```

**OLD**

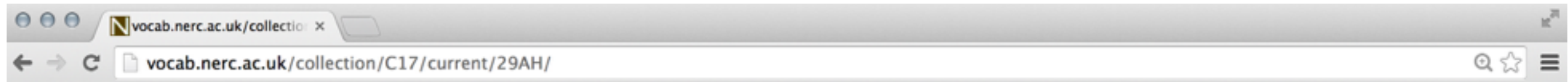
```
<sml:classification>
  <sml:ClassifierList>
    <sml:classifier>
      <sml:Term definition="platform_category">
        <sml:label>SeaVox Platform Category</sml:label>
        <sml:value>http://vocab.nerc.ac.uk/collection/L0
      </sml:Term>
    </sml:classifier>
  </sml:ClassifierList>
</sml:classification>
```

Vessel System new Identification

```
<sml:identification xlink:href="http://vocab.nerc.ac.uk/collection/C17/current/29AH/" />
```

**NEW**

<http://vocab.nerc.ac.uk/collection/C17/current/29AH/>



This XML file does not appear to have any style information associated with it. The document tree is shown below.

```
<?xml version="1.0" encoding="UTF-8"?>
<rdf:RDF xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#" xmlns:skos="http://www.w3.org/2004/02/skos/core#"
  xmlns:dc="http://purl.org/dc/terms/" xmlns:dce="http://purl.org/dc/elements/1.1/" xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"
  xmlns:owl="http://www.w3.org/2002/07/owl#" xmlns:void="http://rdfs.org/ns/void#">
  <skos:Concept rdf:about="http://vocab.nerc.ac.uk/collection/C17/current/29AH/">
    <skos:prefLabel xml:lang="en">Sarmiento de Gamboa</skos:prefLabel>
    <skos:altLabel/>
    <skos:definition xml:lang="en">
      { "country": "Spain", "platformclass": "research vessel", "commissioned": "2006", "notes": "CSIC Research vessel, built 2006. Operated by
        CSIC UTM (Marine Technology Unit). Active as at Jun 2007, length 70.5m." }
    </skos:definition>
    <dc:identifier>SDN:C17::29AH</dc:identifier>
    <dce:identifier>SDN:C17::29AH</dce:identifier>
    <skos:notation>SDN:C17::29AH</skos:notation>
    <owl:versionInfo>2</owl:versionInfo>
    <dc:date>2013-07-01 09:12:49.0</dc:date>
    <skos:note xml:lang="en">accepted</skos:note>
    <owl:deprecated>false</owl:deprecated>
    <skos:broader rdf:resource="http://vocab.nerc.ac.uk/collection/L06/current/31/" />
    <owl:sameAs rdf:resource="http://www.rvinfobase.eurocean.org/spec/vessel.jsp?id=3874" />
    <skos:broader rdf:resource="http://vocab.nerc.ac.uk/collection/L19/current/SDNKG04/" />
    <owl:sameAs rdf:resource="http://vocab.nerc.ac.uk/collection/P17/current/29AH/" />
    <void:inDataset rdf:resource="http://vocab.nerc.ac.uk/.well-known/void" />
  </skos:Concept>
</rdf:RDF>
```

Adapt and reduce contact info, changing it to a link to EDMO Code

Old Contact Identification

```
<sml:contact xlink:arcrole="owner" xlink:title="UTM (CSIC)">
  <gmd:CI_ResponsibleParty>
    <gmd:organisationName>
      <gco:CharacterString>UTM (CSIC)</gco:CharacterString>
    </gmd:organisationName>
    <gmd:contactInfo>
      <gmd:CI_Contact>
        <gmd:address>
          <gmd:CI_Address>
            <gmd:city><gco:CharacterString>Barcelona</gco:CharacterString></gmd:city>
            <gmd:postalCode><gco:CharacterString>08003</gco:CharacterString></gmd:postalCode>
            <gmd:country><gco:CharacterString>SPAIN</gco:CharacterString></gmd:country>
            <gmd:electronicMailAddress><gco:CharacterString>utmtel@utm.cmima.csic.es</gco:CharacterString></gmd:electronicMailAddress>
          </gmd:CI_Address>
        </gmd:address>
        <gmd:onlineResource>
          <gmd:CI_OnlineResource>
            <gmd:linkage>
              <gmd:URL>http://www.utm.csic.es</gmd:URL>
            </gmd:linkage>
          </gmd:CI_OnlineResource>
        </gmd:onlineResource>
      </gmd:CI_Contact>
    </gmd:contactInfo>
    <gmd:role gco:nilReason="inapplicable"></gmd:role>
  </gmd:CI_ResponsibleParty>
</sml:contact>
```

OLD

New Contact Identification, with EDMO Code URL

```
<sml:contact xlink:arcrole="owner" xlink:title="UTM (CSIC)" xlink:href="http://seadatanet.maris2.nl/v_edmo/print.asp?n_code=2489">
```

NEW

[http://seadatanet.maris2.nl/v\\_edmo/print.asp?n\\_code=2489](http://seadatanet.maris2.nl/v_edmo/print.asp?n_code=2489)

Seadatanet search

← → ↺

seadatanet.maris2.nl/v\_edmo/print.asp?n\_code=2489



**PAN-EUROPEAN INFRASTRUCTURE  
FOR OCEAN & MARINE DATA  
MANAGEMENT**

European Directory of Marine Organisations (EDMO)

Organisation details

Show (1550 of 2997) ◀ ▶

DETAILS

|                |                                                                                                 |
|----------------|-------------------------------------------------------------------------------------------------|
| Name           | Marine Technology Unit. Mediterranean Marine and Environmental Research Centre (CMIMA-UTM-CSIC) |
| Native name    | Unidad de Tecnología Marina. Centro Mediterraneo de Investigaciones Marinas y Ambientales       |
| Address        | Paseo Marítimo de la Barceloneta, 37-49                                                         |
| Zipcode        | 08003                                                                                           |
| City           | Barcelona                                                                                       |
| Country        | Spain                                                                                           |
| Phone          | +34 932 309500                                                                                  |
| Fax            | +34 932 309555                                                                                  |
| Email          | <a href="mailto:utmtel@utm.csic.es">utmtel@utm.csic.es</a>                                      |
| Centre Website | <a href="http://www.utm.csic.es">http://www.utm.csic.es</a>                                     |

ORGANISATION PROFILE



The Unidad de Tecnología Marina (UTM) was created in year 2000, after a decision of the CSIC Governing Board, to perform a significant restructuring from the old UGBO (1992) profiting from their experience. The UTM is part of the Natural Resources Area within the CSIC, with the mission to install, maintain and develop valuable technologies to support the marine and polar national research programs. The objective was to establishing a complete marine and polar national service and to develop marine science and technology with the joint efforts from scientist and engineers, to accomplish the increasing complexity and challenges rising in the sea systems in marine and polar research. Moreover, the mission is



Click to zoom

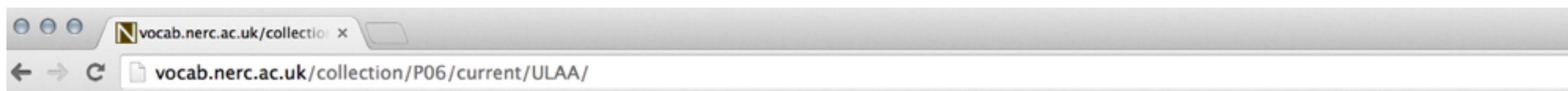
Google

Map data ©2014 Google, basado en BCN IGN España Terms of Use

GET DIRECTIONS

## Other vocabulary entries

```
<swe:uom code="m" xlink:href="http://vocab.nerc.ac.uk/collection/P06/current/ULAA"/>
```



This XML file does not appear to have any style information associated with it. The document tree is shown below.

```
<rdf:RDF xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#" xmlns:skos="http://www.w3.org/2004/02/skos/core#"
  xmlns:dc="http://purl.org/dc/terms/" xmlns:dce="http://purl.org/dc/elements/1.1/" xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"
  xmlns:owl="http://www.w3.org/2002/07/owl#" xmlns:void="http://rdfs.org/ns/void#">
  <skos:Concept rdf:about="http://vocab.nerc.ac.uk/collection/P06/current/ULAA/">
    <skos:prefLabel xml:lang="en">Metres</skos:prefLabel>
    <skos:altLabel xml:lang="en">m</skos:altLabel>
    <skos:definition xml:lang="en">Unavailable</skos:definition>
    <dc:identifier>SDN:P06::ULAA</dc:identifier>
    <dce:identifier>SDN:P06::ULAA</dce:identifier>
    <skos:notation>SDN:P06::ULAA</skos:notation>
    <owl:versionInfo>1</owl:versionInfo>
    <dc:date>2005-11-04 12:47:29.0</dc:date>
    <skos:note xml:lang="en">accepted</skos:note>
    <owl:deprecated>false</owl:deprecated>
    <skos:related rdf:resource="http://vocab.nerc.ac.uk/collection/P09/current/BATH/" />
    <skos:related rdf:resource="http://vocab.nerc.ac.uk/collection/P09/current/SLEV/" />
    <skos:related rdf:resource="http://vocab.nerc.ac.uk/collection/P09/current/VAVH/" />
    <skos:related rdf:resource="http://vocab.nerc.ac.uk/collection/P09/current/DPS1/" />
    <skos:related rdf:resource="http://vocab.nerc.ac.uk/collection/P09/current/DPSF/" />
```

```
<sml:input name="Depth">
  <sml:ObservableProperty definition="http://vocab.nerc.ac.uk/collection/P01/current/ADEPZZ01"/>
</sml:input>
```



This XML file does not appear to have any style information associated with it. The document tree is shown below.

```
<rdf:RDF xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#" xmlns:skos="http://www.w3.org/2004/02/skos/core#"
  xmlns:dc="http://purl.org/dc/terms/" xmlns:dce="http://purl.org/dc/elements/1.1/" xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"
  xmlns:owl="http://www.w3.org/2002/07/owl#" xmlns:void="http://rdfs.org/ns/void#">
  <skos:Concept rdf:about="http://vocab.nerc.ac.uk/collection/P01/current/ADEPZZ01/">
    <skos:prefLabel xml:lang="en">Depth below surface of the water body</skos:prefLabel>
    <skos:altLabel xml:lang="en">DepBelowSurf</skos:altLabel>
    <skos:definition xml:lang="en">
      The distance of a sensor or sampling point below the sea surface
    </skos:definition>
    <dc:identifier>SDN:P01::ADEPZZ01</dc:identifier>
    <dce:identifier>SDN:P01::ADEPZZ01</dce:identifier>
    <skos:notation>SDN:P01::ADEPZZ01</skos:notation>
    <owl:versionInfo>1</owl:versionInfo>
    <dc:date>2009-11-03 16:19:38.0</dc:date>
    <skos:note xml:lang="en">accepted</skos:note>
    <owl:deprecated>false</owl:deprecated>
    <owl:sameAs rdf:resource="http://vocab.nerc.ac.uk/collection/P09/current/DEPH/" />
    <skos:broader rdf:resource="http://vocab.nerc.ac.uk/collection/P02/current/AHGT/" />
    <skos:related rdf:resource="http://vocab.nerc.ac.uk/collection/P06/current/ULAA/" />
    <skos:related rdf:resource="http://vocab.nerc.ac.uk/collection/L22/current/TOOL0442/" />
    <void:inDataset rdf:resource="http://vocab.nerc.ac.uk/.well-known/void" />
  </skos:Concept>
</rdf:RDF>
```

```
<swe:uom code="ISO8601" xlink:href="http://vocab.nerc.ac.uk/collection/P01/current/DTUT8601"/>
```



This XML file does not appear to have any style information associated with it. The document tree is shown below.

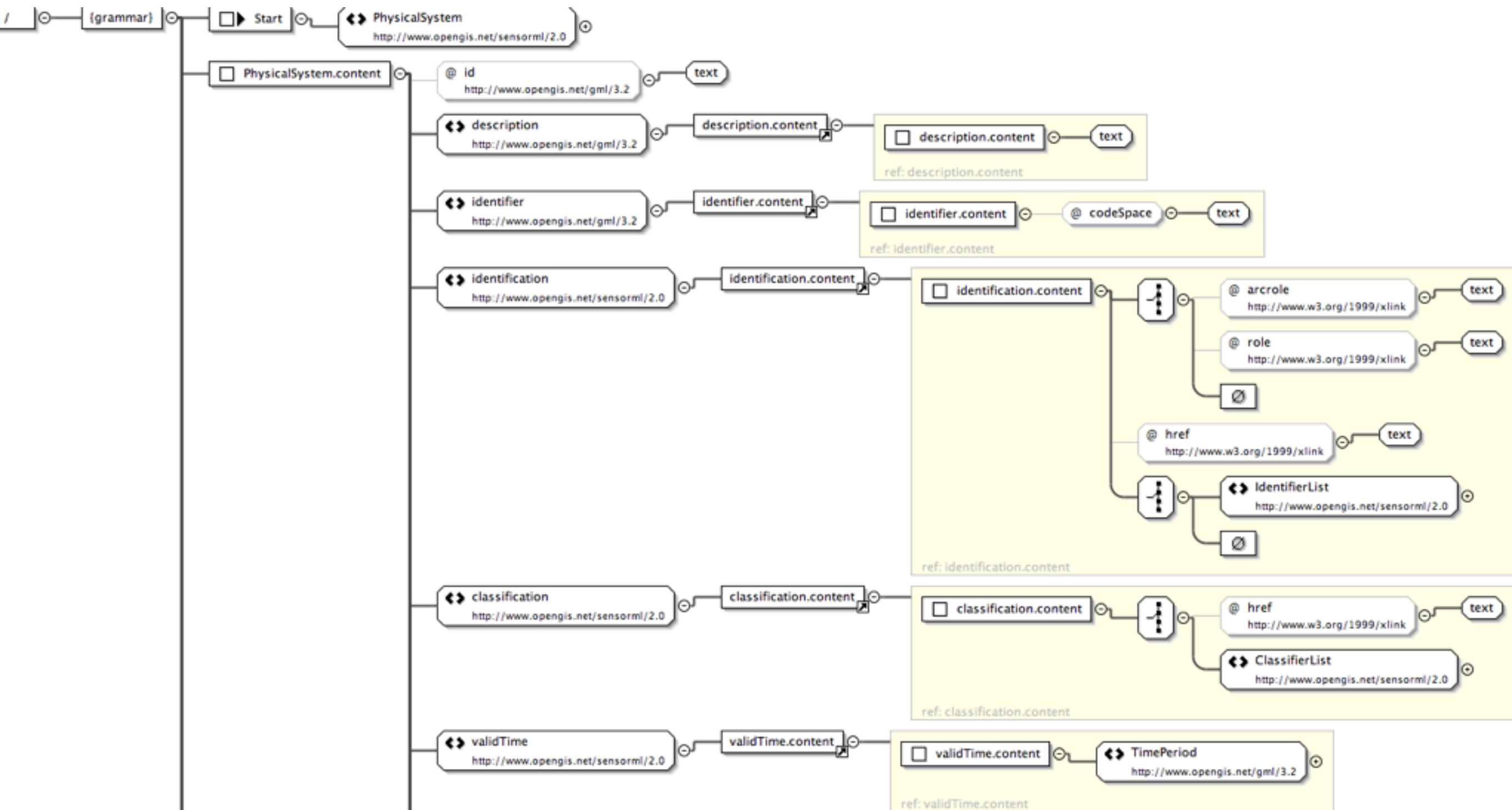
```
▼<rdf:RDF xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#" xmlns:skos="http://www.w3.org/2004/02/skos/core#"
  xmlns:dc="http://purl.org/dc/terms/" xmlns:dce="http://purl.org/dc/elements/1.1/" xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"
  xmlns:owl="http://www.w3.org/2002/07/owl#" xmlns:void="http://rdfs.org/ns/void#">
  ▼<skos:Concept rdf:about="http://vocab.nerc.ac.uk/collection/P01/current/DTUT8601/">
    ▼<skos:prefLabel xml:lang="en">
      Date and time (UT in ISO8601 format to sub-second precision)
    </skos:prefLabel>
    <skos:altLabel xml:lang="en">UT_ISO8601</skos:altLabel>
    ▼<skos:definition xml:lang="en">
      String corresponding to format 'yyyy-mm-ddThh:mi:ss.sssZ' or other valid ISO8601 string
    </skos:definition>
    <dc:identifier>SDN:P01::DTUT8601</dc:identifier>
    <dce:identifier>SDN:P01::DTUT8601</dce:identifier>
    <skos:notation>SDN:P01::DTUT8601</skos:notation>
    <owl:versionInfo>3</owl:versionInfo>
    <dc:date>2014-08-20 16:47:03.0</dc:date>
    <skos:note xml:lang="en">accepted</skos:note>
    <owl:deprecated>false</owl:deprecated>
    <skos:broader rdf:resource="http://vocab.nerc.ac.uk/collection/P02/current/AYMD/" />
    <skos:related rdf:resource="http://vocab.nerc.ac.uk/collection/P06/current/TISO/" />
    <void:inDataset rdf:resource="http://vocab.nerc.ac.uk/.well-known/void" />
  </skos:Concept>
</rdf:RDF>
```

## Relax NG

- Relax NG is a schema language for XML.
- Specifies a pattern for the structure and content of an XML document.
- Is itself an XML document, but it also offers a popular compact non-XML syntax.
- Compared to other XML schema languages, Relax NG is very simple, the syntax is intuitive.
- Relax NG schema makes sure that all the required elements and attributes are present, and that some of these have the correct datatype.

```
<element name="book" xmlns="http://relaxng.org/ns/structure/1.0">  
  <oneOrMore>  
    <element name="page">  
      <text/>  
    </element>  
  </oneOrMore>  
</element>
```

## RelaxNG MAP



## Relax NG + Schematron

- Using RelaxNG + Schematron we will apply ISO/IEC 19757.
- Embedding Schematron rules in Relax NG is very simple because a Relax NG validator ignores all elements not in Relax NG namespace. This means that Schematron rules can be embedded in any element and on any level in Relax NG Schema.
- Schematron embedded in Relax NG can easily check all of totalAmount, payments, groups, ... constraints. And the context definition in the language provides a logical grouping of the constraints.
- **Only one Relax NG file is needed to validate the vessel and all instruments.**

```
<?xml version="1.0" encoding="UTF-8"?>
<grammar
  xmlns="http://relaxng.org/ns/structure/1.0"
  xmlns:a="http://relaxng.org/ns/compatibility/annotations/1.0"
  xmlns:swe="http://www.opengis.net/swe/2.0"
  xmlns:sch="http://www.ascc.net/xml/schematron"
  xmlns:gmd="http://www.isotc211.org/2005/gmd"
  xmlns:gco="http://www.isotc211.org/2005/gco"
  xmlns:sml="http://www.opengis.net/sensorml/2.0"
  xmlns:xlink="http://www.w3.org/1999/xlink"
  xmlns:gml="http://www.opengis.net/gml/3.2"
  datatypeLibrary="http://www.w3.org/2001/XMLSchema-datatypes">
  <sch:ns prefix="gml" uri="http://www.opengis.net/gml/3.2"/>
  <sch:ns prefix="sml" uri="http://www.opengis.net/sensorml/2.0"/>
  <start>
    <element name="sml:PhysicalSystem">
      <ref name="sml.PhysicalSystem"/>
    </element>
  </start>
  <define name="sml.PhysicalSystem">
    <ref name="gml.id"/>
    <ref name="gml.description"/>
    <ref name="gml.identifier"/>
    <ref name="sml.identification"/>
    <ref name="sml.classification"/>
    <ref name="sml.validTime"/>
    <ref name="sml.capabilities"/>
    <ref name="sml.contacts"/>
    <ref name="sml.documentation"/>
    <ref name="sml.history"/>
    <ref name="sml.inputs"/>
    <ref name="sml.outputs"/>
    <ref name="sml.attachedTo"/>
    <ref name="sml.position"/>
    <ref name="sml.components"/>
  </define>
  <define name="gml.id">
    <a:documentation>Local Identifier (for further reference)</a:documentation>
    <attribute name="gml:id">
      <data type="ID"></data>
    </attribute>
  </define>
  <define name="gml.description">
    <element name="gml:description">
      <ref name="string"/>
    </element>
  </define>
```

**Schematron  
embedded**

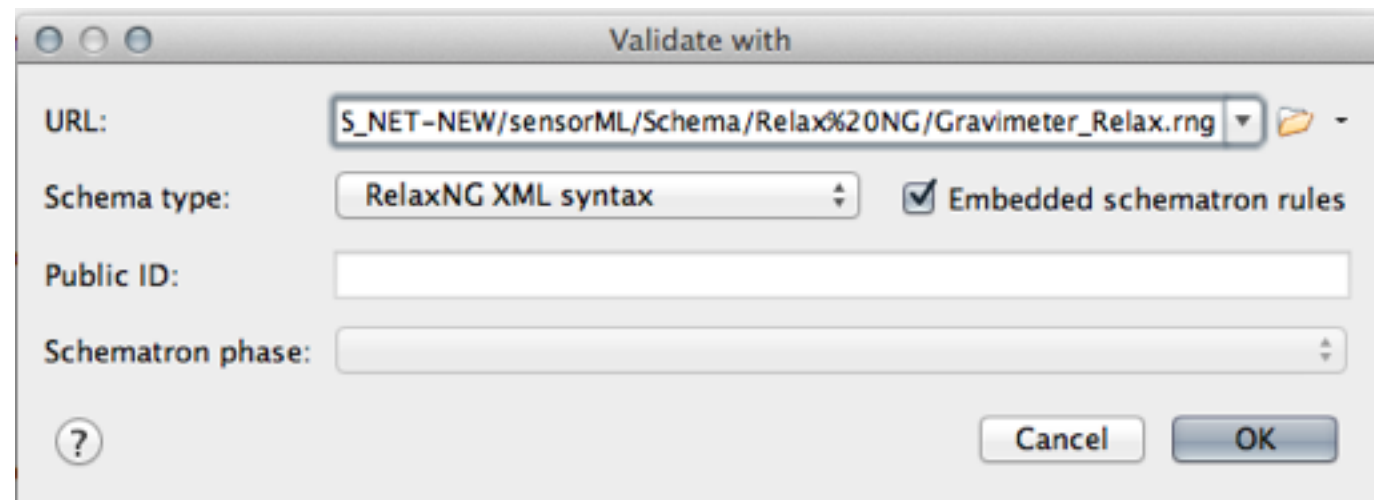


```
<define name="gml.identifier">
```

```
<!-- SCHEMATRON -->
<sch:pattern>
  <sch:title>Req 46</sch:title>
  <sch:rule context="sml:PhysicalSystem">
    <sch:assert test="count(gml:identifier) = 1">
      There shall be one and only one "gml:identifier" for
      any PhysicalSystem. (Req 46)
    </sch:assert>
  </sch:rule>
</sch:pattern>
<sch:pattern>
  <sch:title>Req 46</sch:title>
  <sch:rule context="sml:PhysicalSystem/gml:identifier">
    <sch:assert test="@codeSpace = 'uniqueID' ">
      The value of the "codespace" attribute of a
      "gml:identifier" must be "uniqueID". (Req 46)
    </sch:assert>
  </sch:rule>
</sch:pattern>
<!-- SCHEMATRON -->

<element name="gml:identifier">
  <a:documentation>Local Identifier (for further reference)
  </a:documentation>
  <attribute name="codeSpace">
    <text/>
  </attribute>
</element>
</define>
```

## Application example



12 <!-- ===== -->  
 13 <!-- SYSTEM DESCRIPTION -->  
 14 <!-- ===== -->  
 15  
 16 <gml:description>LaCoste&Romberg Air&Sea II gravimeter at R.V. Sarmiento de  
 17 Gamboa</gml:description>  
 18  
 19 <gml:identifier codeSpace="uniqueID"/>  
 20 <gml:identifier codeSpace="uniqueID2"/>  
 21 <!--<gml:identifier codeSpace="\"uniqueId\""/>-->  
 22 <sml:identification>  
 23 <sml:IdentifierList>  
 24 <sml:identifier>  
 25 <sml:Term definition="http://mmisw.org/ont/ioos/definition/sensorID.html">

❗ E [Schematron 1.5] There shall be one and only one "gml:identifier" for any PhysicalSystem. (Req 46) (count(gml:identifier) = 1) [assert]

Text Grid

Results

Info Description - 3 items

29SG\_GRAVIMETER.xml, schema "Gravimeter\_Relax.rng" (1 item)

❗ - E [jing] element "gml:identifier" not allowed here; expected element "sml:identification"

29SG\_GRAVIMETER.xml (2 items)

❗ - E [Schematron 1.5] There shall be one and only one "gml:identifier" for any PhysicalSystem. (Req 46) (count(gml:identifier) = 1) [assert]

❗ - E [Schematron 1.5] The value of the "codespace" attribute of a "gml:identifier" must be "uniqueID". (Req 46) (@codeSpace = 'uniqueID') [assert]

RELAX NG



Schematron



## **How to use Relax NG profiles in Java Application (i.e. Mikado)**

### **Jing**

<http://www.thaiopensource.com/relaxng/jing.html>

### **The Java XML Validation API**

<http://www.ibm.com/developerworks/library/x-javaxxmlvalidapi/>

Register a new Sensor

http://www.utm.csic.es/RegisterSensor

Google

Create a new Vessel

Vessel Name

text

Identifier

text

Description

text

OK

Exit

Create a new Instrument

Select a Vessel

Sarmiento de Gamboa

Garcia del Cid

Instrument

Gravimeter

Navigation System

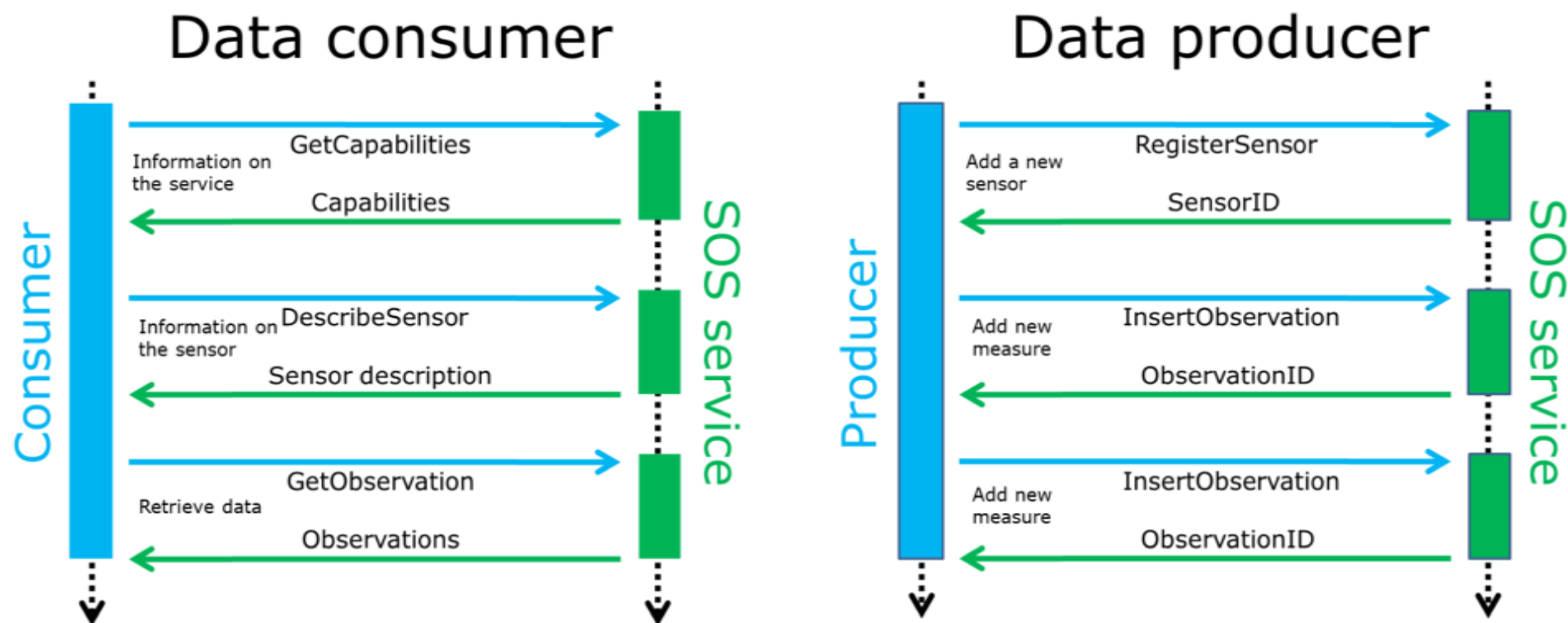
Weather Station

Termosalinometer

OK

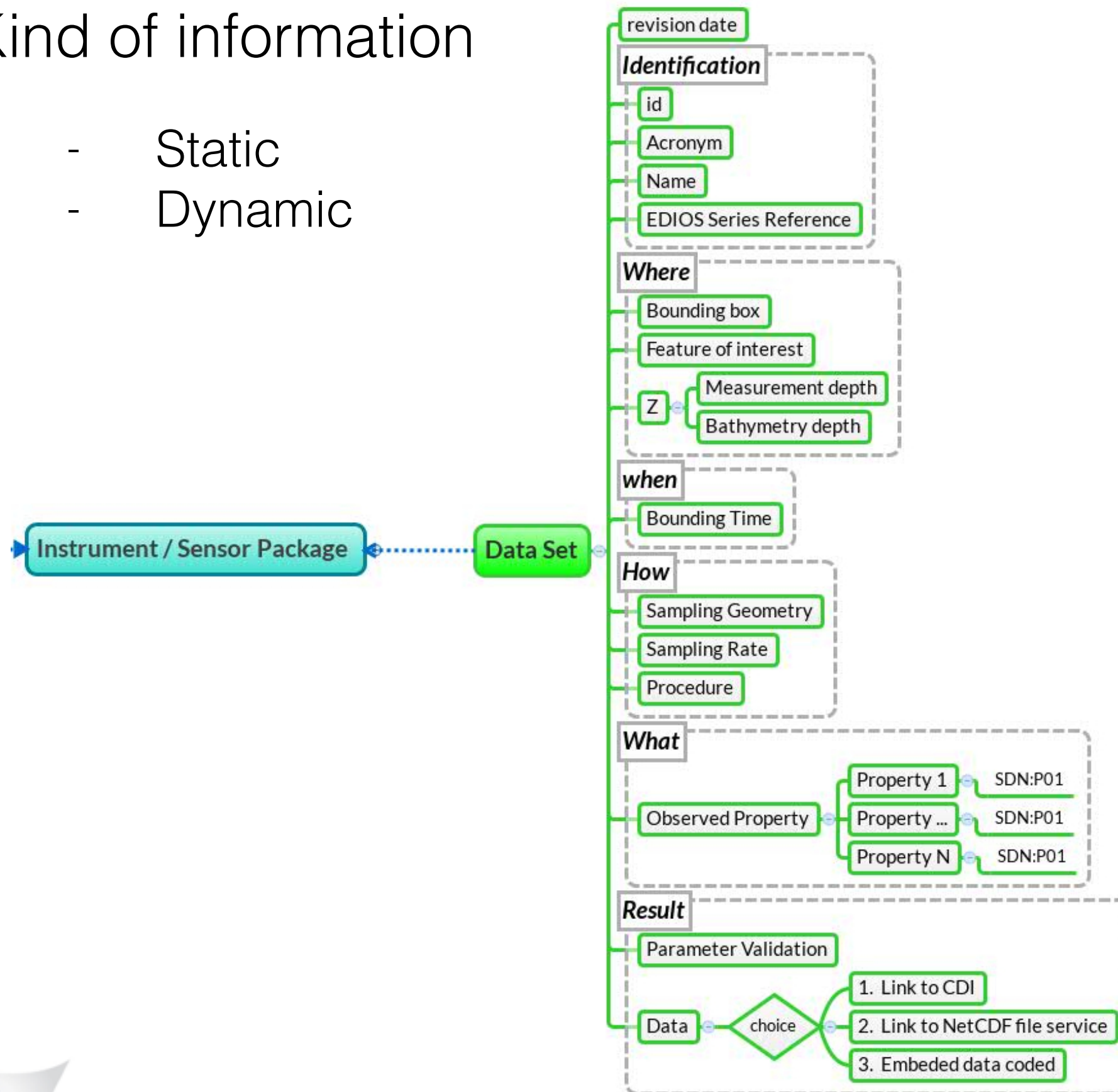
Exit

## SensorML and O&M files by using SOS



# Kind of information

- Static
- Dynamic



Static part

Dynamic part

## Stages of approach

### - Step 1

Produce SensorML

Create an O&M Template

### - Step 2

Add dynamic part on O&M

Embedded expression (Data)

Point to netCDF

Point to ODV

We have two options:

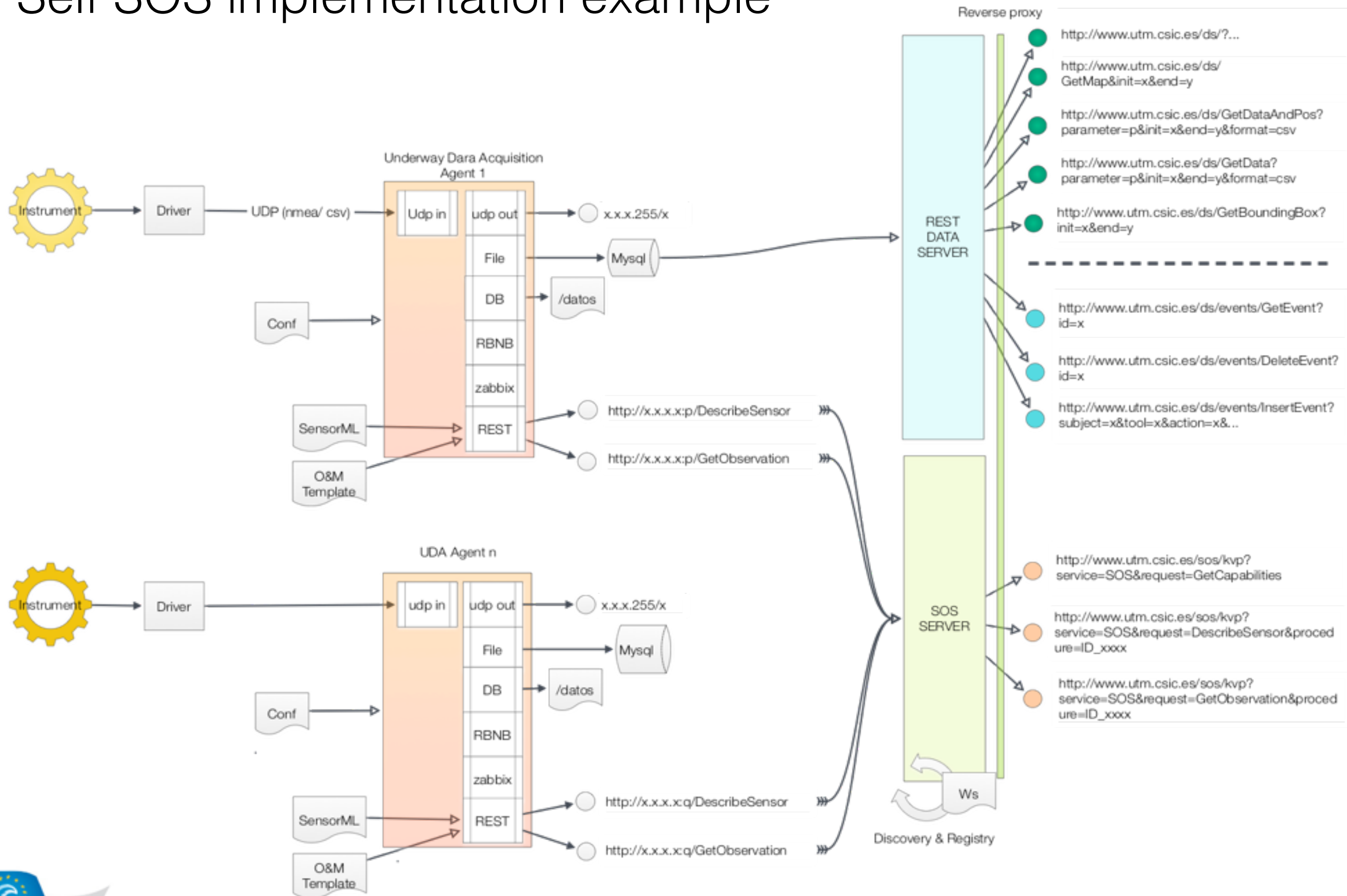
### **Specific developed or adapted SOS implementation**

- Very simple implementation
- Only a few interfaces
- Storing directly XML files (O&M, SensorML)
- SensorML 2.0
- Difficulties:
  - Long term maintenance
  - Not community of developers and users
  - Evolution over the time

### **Already existing SOS implementation**

- Best option: 52N
- Big community of developers
- Difficulties:
  - SensorML 1.0
  - Very restrictive in validation

# Self SOS implementation example



### CAPABILITIES

<http://www.utm.csic.es/sos/kvp?service=SOS&request=GetCapabilities>

← → ↻  [www.utm.csic.es/sos/kvp?service=SOS&request=GetCapabilities](http://www.utm.csic.es/sos/kvp?service=SOS&request=GetCapabilities)

This XML file does not appear to have any style information associated with it. The document tree is shown below.

```

▼ <sos:Capabilities xmlns:sos="http://www.opengis.net/sos/2.0" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:ows="http://www
xmlns:xlink="http://www.w3.org/1999/xlink" xmlns:fes="http://www.opengis.net/fes/2.0" version="2.0.0" xsi:schemaLocation="http://www.ope
http://schemas.opengis.net/filter/2.0/filterAll.xsd http://www.opengis.net/sos/2.0 http://schemas.opengis.net/sos/2.0/sosGetCapabilities
http://www.opengis.net/ows/1.1 http://schemas.opengis.net/ows/1.1.0/owsAll.xsd">
  ▼ <ows:ServiceIdentification>
    <ows:Title>utmSOS</ows:Title>
    ▼ <ows:Abstract>
      utmSOS Sensor Observation Service - Data Access for the Sensor Web
    </ows:Abstract>
    <ows:ServiceType>OGC:SOS</ows:ServiceType>
    <ows:ServiceTypeVersion>2.0.0</ows:ServiceTypeVersion>
    ▼ <ows:Profile>
      http://www.opengis.net/extension/SOSDO/1.0/observationDeletion
    </ows:Profile>
    ▼ <ows:Profile>
      http://www.opengis.net/spec/OMXML/1.0/conf/categoryObservation
    </ows:Profile>
    ▼ <ows:Profile>
      http://www.opengis.net/spec/OMXML/1.0/conf/countObservation
    </ows:Profile>
    ▼ <ows:Profile>
      http://www.opengis.net/spec/OMXML/1.0/conf/geometryObservation
    </ows:Profile>
    ▼ <ows:Profile>
      http://www.opengis.net/spec/OMXML/1.0/conf/measurement
    </ows:Profile>
    ▼ <ows:Profile>
      http://www.opengis.net/spec/OMXML/1.0/conf/textObservation
    </ows:Profile>
    ▼ <ows:Profile>
      http://www.opengis.net/spec/OMXML/1.0/conf/truthObservation
    </ows:Profile>
  
```

## DESCRIBE SENSOR

### Navigation System

[http://www.utm.csic.es/sos/kvp?service=SOS&request=DescribeSensor&procedure=ID\\_29SG\\_NAVIGATION\\_SYSTEM](http://www.utm.csic.es/sos/kvp?service=SOS&request=DescribeSensor&procedure=ID_29SG_NAVIGATION_SYSTEM)

← → ↻ [www.utm.csic.es/sos/kvp?service=SOS&request=DescribeSensor&procedure=ID\\_29SG\\_NAVIGATION\\_SYSTEM](http://www.utm.csic.es/sos/kvp?service=SOS&request=DescribeSensor&procedure=ID_29SG_NAVIGATION_SYSTEM)

This XML file does not appear to have any style information associated with it. The document tree is shown below.

```

<sml:PhysicalSystem xmlns:sml="http://www.opengis.net/sensorML/2.0" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xmlns:gmd="http://www.isotc211.org/2005/gmd" xmlns:gco="http://www.isotc211.org/2005/gco" xmlns:xlink="http://www.w3.org/1999/xlink"
  xmlns:gml="http://www.opengis.net/gml/3.2" xmlns:swe="http://www.opengis.net/swe/2.0" xsi:schemaLocation="http://www.opengis.net/sensorML/2.0
  http://www.utm.csic.es/SensorWeb/Schemas/sensorML/2.0/sensorML.xsd" gml:id="ID_29SG_NAVIGATION_SYSTEM">
  <!-- ===== -->
  <!--      SYSTEM DESCRIPTION      -->
  <!-- ===== -->
  <gml:description>
    Integrated Navigation System onboard R.V. Sarmiento de Gamboa
  </gml:description>
  <gml:identifier codeSpace="uniqueID"/>
  <sml:identification>
    <sml:IdentifierList>
      <sml:identifier>
        <sml:Term definition="uniqueID">
          <sml:label>uniqueID</sml:label>
          <sml:value>urn:utm:29SG_INTEGRATED_NAVIGATION_SYSTEM</sml:value>
        </sml:Term>
      </sml:identifier>
      <sml:identifier>

```

## Weather Station

[http://www.utm.csic.es/sos/kvp?service=SOS&request=DescribeSensor&procedure=ID\\_29SG\\_WEATHER\\_STATION](http://www.utm.csic.es/sos/kvp?service=SOS&request=DescribeSensor&procedure=ID_29SG_WEATHER_STATION)

← → ↻ [www.utm.csic.es/sos/kvp?service=SOS&request=DescribeSensor&procedure=ID\\_29SG\\_WEATHER\\_STATION](http://www.utm.csic.es/sos/kvp?service=SOS&request=DescribeSensor&procedure=ID_29SG_WEATHER_STATION)

This XML file does not appear to have any style information associated with it. The document tree is shown below.

```

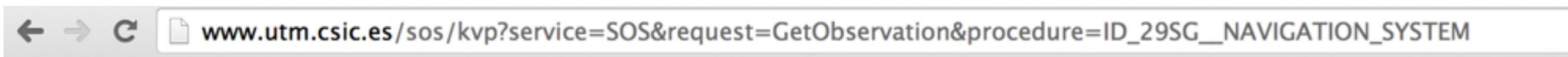
▼<?xml-model
  href="../../../SensorML/Esquemas_OGC/SensorML2.0/Final%20Version/schema/Modificat/physical_system.sch" type="application/xml" ?>
▼<sml:PhysicalSystem xmlns:sml="http://www.opengis.net/sensorML/2.0" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xmlns:gco="http://www.isotc211.org/2005/gco" xmlns:gmd="http://www.isotc211.org/2005/gmd" xmlns:xlink="http://www.w3.org/2001/xlink"
  xmlns:gml="http://www.opengis.net/gml/3.2" xmlns:swe="http://www.opengis.net/swe/2.0" xsi:schemaLocation="http://www.opengis.net/sensorML/2.0
  http://www.utm.csic.es/SensorWeb/Schemas/sensorML/2.0/sensorML.xsd" gml:id="ID_29SG_WEATHER_STATION">
  <!-- ===== -->
  <!--      SYSTEM DESCRIPTION      -->
  <!-- ===== -->
  ▼<gml:description>
    Weather Station Geonica MTD-3000 at R.V. Sarmiento de Gamboa
  </gml:description>
  <gml:identifier codeSpace="uniqueID"/>
  ▼<sml:identification>
    ▼<sml:IdentifierList>
      ▼<sml:identifier>
        ▼<sml:Term definition="uniqueID">
          <sml:label>uniqueID</sml:label>
          <sml:value>urn:utm:SARMIENTO_WEATHER_STATION</sml:value>
        </sml:Term>
      </sml:identifier>
    </sml:IdentifierList>
  </sml:identification>

```

## GET OBSERVATION

### Navigation System

[http://www.utm.csic.es/sos/kvp?service=SOS&request=GetObservation&procedure=ID\\_29SG\\_\\_NAVIGATION\\_SYSTEM](http://www.utm.csic.es/sos/kvp?service=SOS&request=GetObservation&procedure=ID_29SG__NAVIGATION_SYSTEM)



This XML file does not appear to have any style information associated with it. The document tree is shown below.

```
<?xml version="1.0" encoding="UTF-8" ?>
<om:OM_Observation xmlns:om="http://www.opengis.net/om/2.0" xmlns:swe="http://www.opengis.net/swe/2.0" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xmlns:xlink="http://www.w3.org/1999/xlink" xmlns:gml="http://www.opengis.net/gml/3.2" xmlns:md="http://www.isotc211.org/2005/MD_Metadata"
  xmlns:gco="http://www.isotc211.org/2005/gco" gml:id="ID_29SG_INSTANT_NAVIGATION" xsi:schemaLocation="http://www.opengis.net/schemas.opengis.net/om/2.0/observation.xsd http://www.opengis.net/swe/2.0 http://schemas.opengis.net/sweCommon
  <!-- Description -->
  <gml:description>
    Instant Navigation Data of Sarmiento de Gamboa vessel
  </gml:description>
  <!-- Name -->
  <gml:name>Sarmiento Instant Navigation Data</gml:name>
  <!-- Type -->
  <om:type xlink:href="http://www.opengis.net/def/observationType/OGC-OM/2.0/OM_ComplexObservation"/>
  <!-- Phenomenon Time -->
  <om:phenomenonTime>
    <gml:TimeInstant gml:id="phenomenonTime">
      <gml:timePosition>2014-09-18T12:30:28</gml:timePosition>
    </gml:TimeInstant>
  </om:phenomenonTime>
</om:OM_Observation>
```

## Weather Station

[http://www.utm.csic.es/sos/kvp?service=SOS&request=GetObservation&procedure=ID\\_29SG\\_WEATHER\\_STATION](http://www.utm.csic.es/sos/kvp?service=SOS&request=GetObservation&procedure=ID_29SG_WEATHER_STATION)

← → ↻  [www.utm.csic.es/sos/kvp?service=SOS&request=GetObservation&procedure=ID\\_29SG\\_WEATHER\\_STATION](http://www.utm.csic.es/sos/kvp?service=SOS&request=GetObservation&procedure=ID_29SG_WEATHER_STATION)

This XML file does not appear to have any style information associated with it. The document tree is shown below.

```
▼<om:OM_Observation xmlns:om="http://www.opengis.net/om/2.0" xmlns:swe="http://www.opengis.net/swe/2.0" xmlns:xsi="http://www.
xmlns:xlink="http://www.w3.org/1999/xlink" xmlns:gml="http://www.opengis.net/gml/3.2" xmlns:md="http://www.isotc211.org/2005/
xmlns:gco="http://www.isotc211.org/2005/gco" gml:id="ID_29SG_INSTANT_WEATHER_STATION" xsi:schemaLocation="http://www.opengis.
http://schemas.opengis.net/om/2.0/observation.xsd http://www.opengis.net/swe/2.0 http://schemas.opengis.net/sweCommon/2.0/swe
  <!-- Description -->
  ▼<gml:description>
    Instant Weather Observation made onboard Sarmiento de Gamboa vessel
  </gml:description>
  <!-- Name -->
  <gml:name>Sarmiento Instant Weather Observation</gml:name>
  <!-- Type -->
  <om:type xlink:href="http://www.opengis.net/def/observationType/OGC-OM/2.0/OM_ComplexObservation"/>
  <!-- Phenomenon Time -->
  ▼<om:phenomenonTime>
    ▼<gml:TimeInstant gml:id="phenomenonTime">
      <gml:timePosition>2014-09-18T12:30:55</gml:timePosition>
    </gml:TimeInstant>
  </om:phenomenonTime>
  <om:resultTime xlink:href="#phenomenonTime"/>
```