Representación de ficheros SensorML & O&M en clientes Android atacando una base de datos XML para datos oceanográficos

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General Index

1. Introduction.
2. SWE Implementation.
3. O&M Files.
4. SOS Implementation.
5. Android App.
6. Future work.

Introduction Index

1. UTM.
2. Working framework.
3. Data flux.
4. Goals.
5. Exploitation scenarios.

UTM
Marine Technology Unit

The Marine Technology Unit (UTM) belongs to the Department of Natural Resources of the Spanish Research Council(CSIC).

UTM Tasks

- Maintenance of scientific facilities on vessels and Antarctic stations.
- Technical assistance for expeditions.
- Maintenance, calibration and operating of technical and scientific equipment.
- Acquisition and filing of oceanographic data.
- Technological development in the marine and polar fields.

Working Framework

Position

Platform

Time

System CTD

System Termosalinometer station

System Weather station

"Ports"

Inputs

Outputs

Parameters

Components (Physical process)

Relative postion on Platform

Metadata Group

- GENERAL INFORMATION:
  -Identifier.
  -Classifier.
  -Description.

- CAPABILITIES: intended for qualify teh outputs for the purpose of DISCOVERY

- CHARACTERISTICS: physical measurements (long, weight).

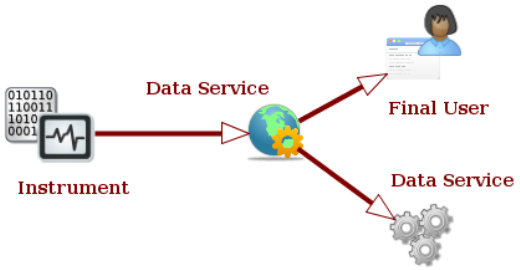
- REFERENCES: contacts and documentation.

- HISTORY: for instance, calibration or maintenace history of a sensor.

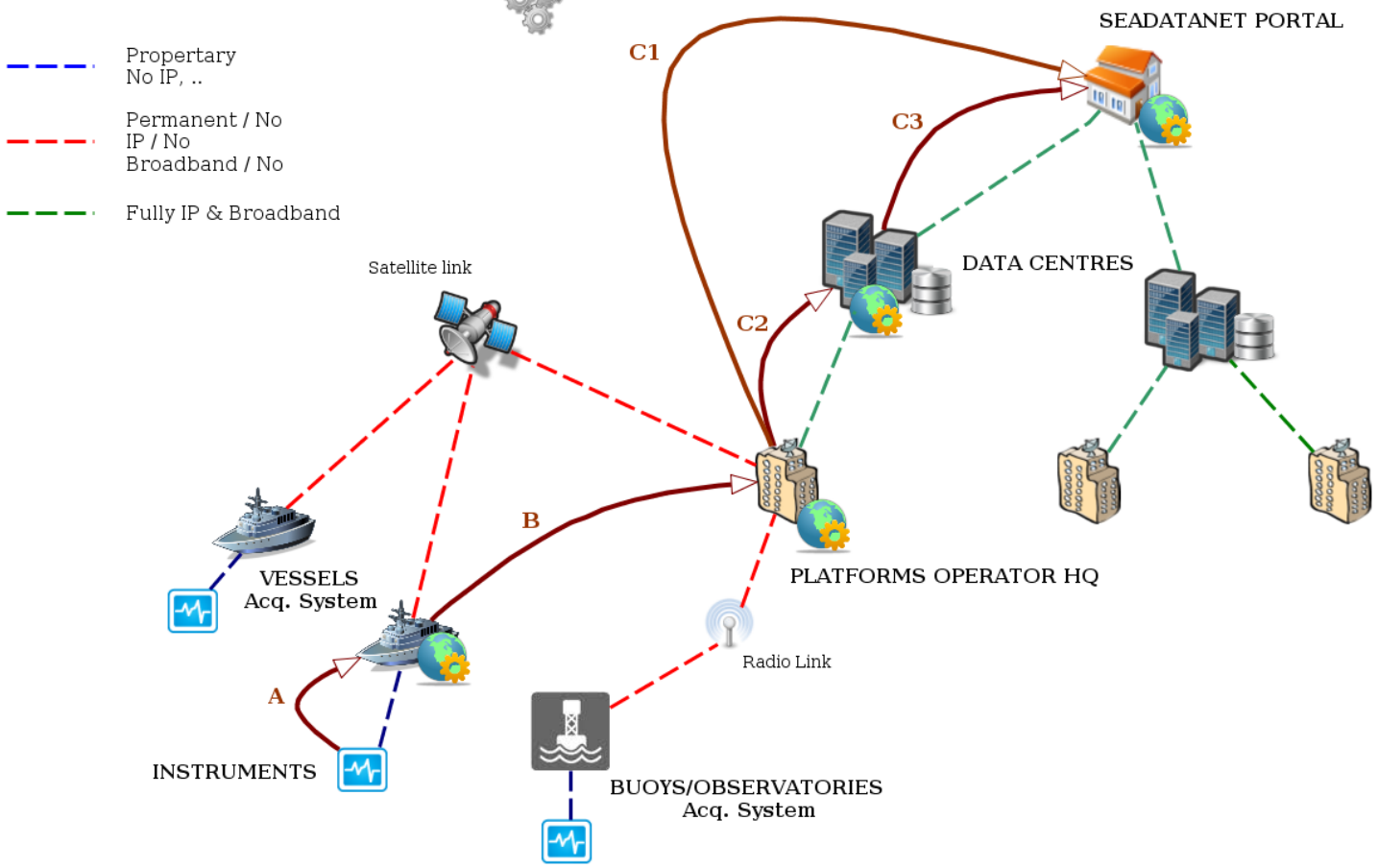
Research vessels are complex data acquisition systems,
consisting of a large number of instruments and sensors
producing complex observations for many different disciplines.

DATA and METADATA

Data flux



From the vessels to the data centers: a “road with interruptions”



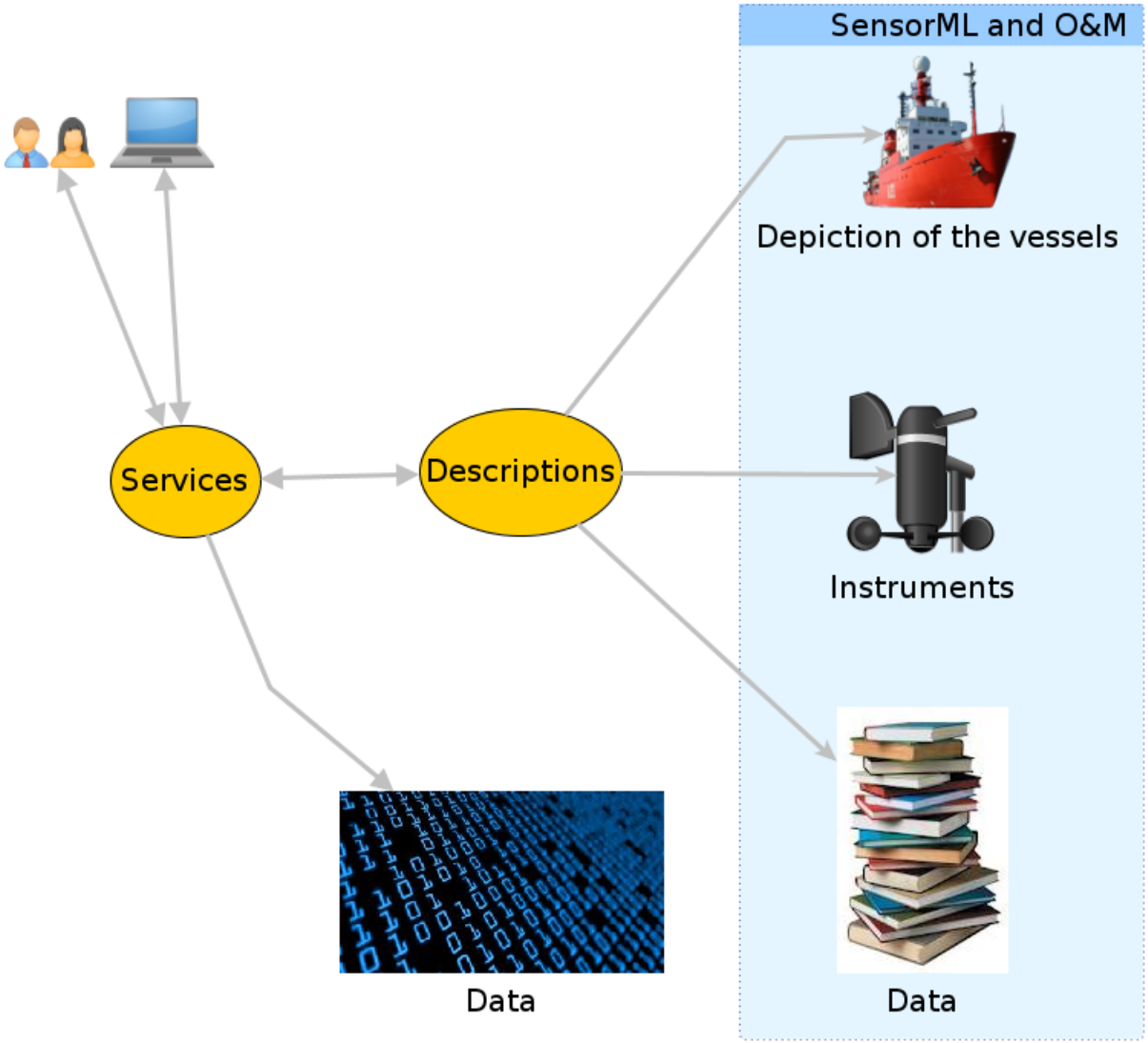
Goals

1. To describe a **multidisciplinary** and **complex mobile** sensor system.
2. To be easily **integrated** with the onboard data acquisition systems.
3. To use the complex but incomplete most used **vocabularies** in marine disciplines.
4. To provide points of contact with the **data** and **metadata** services at the **Data Centers**.
5. To manage the **changes** in instrument set-up over the time.

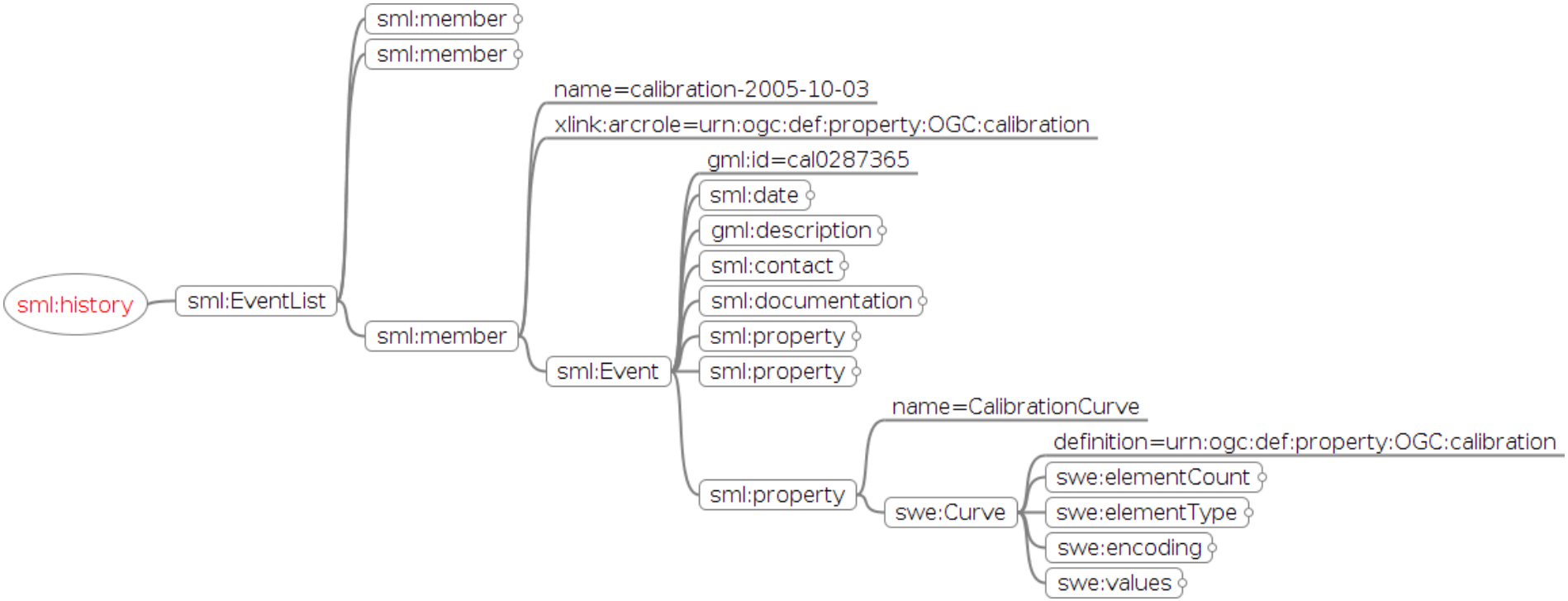
SWE Implementation - Index

1. What we want.
2. SensorML and Sml:history.
3. Global view.

SWE Implementation - What

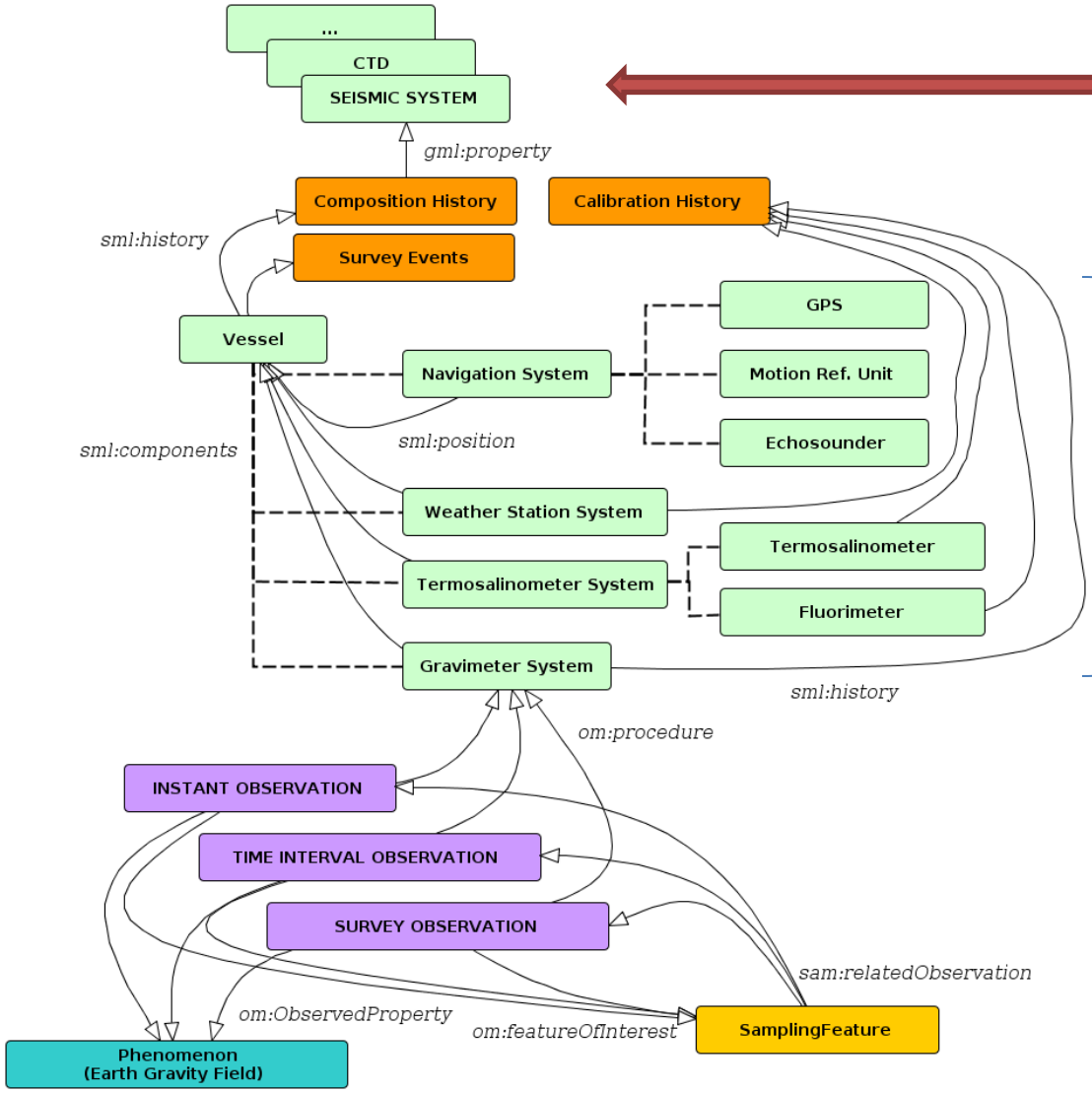


SWE Layer - history



Sml:history can be used to capture any other event related with the vessel, as the "**Eurofleets Events**" reports.This history is also represented as a separated file and referenced through ***xlink:href.***

SWE Layer – Global View



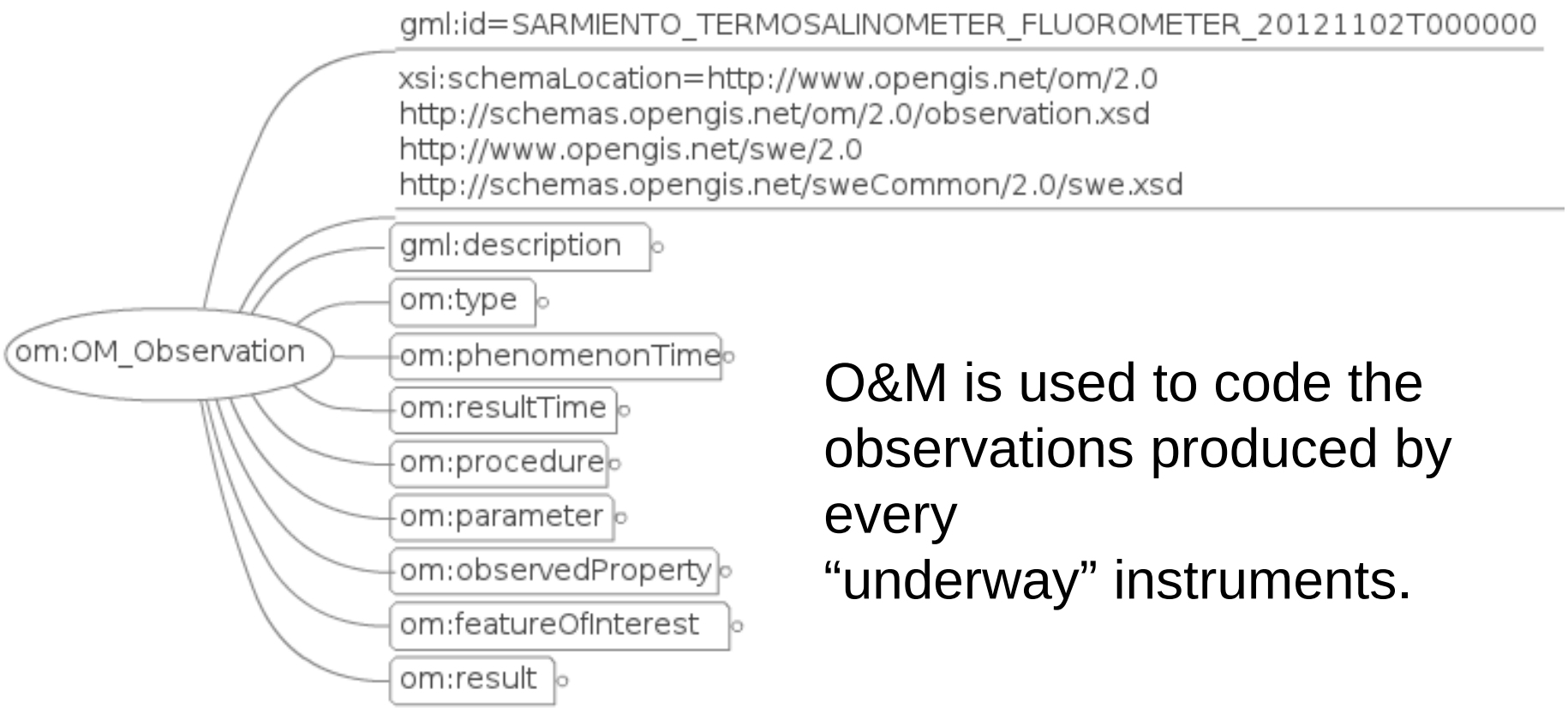
Independent SensorML files. xlink:href At History

"underway data" Independent SensorML files. xlink:href

O&M Files – Index

1. Navigation system.
2. Types of observations and O&M codification.
    1. Survey.
    2. Time interval.
    3. Instant observation.
3. Om:result

SWE Layer - O&M Files

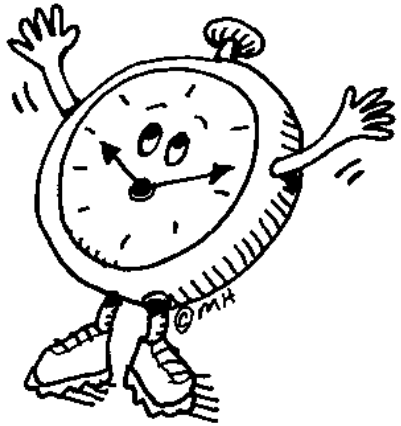


O&M is used to code the observations produced by every "underway" instruments.

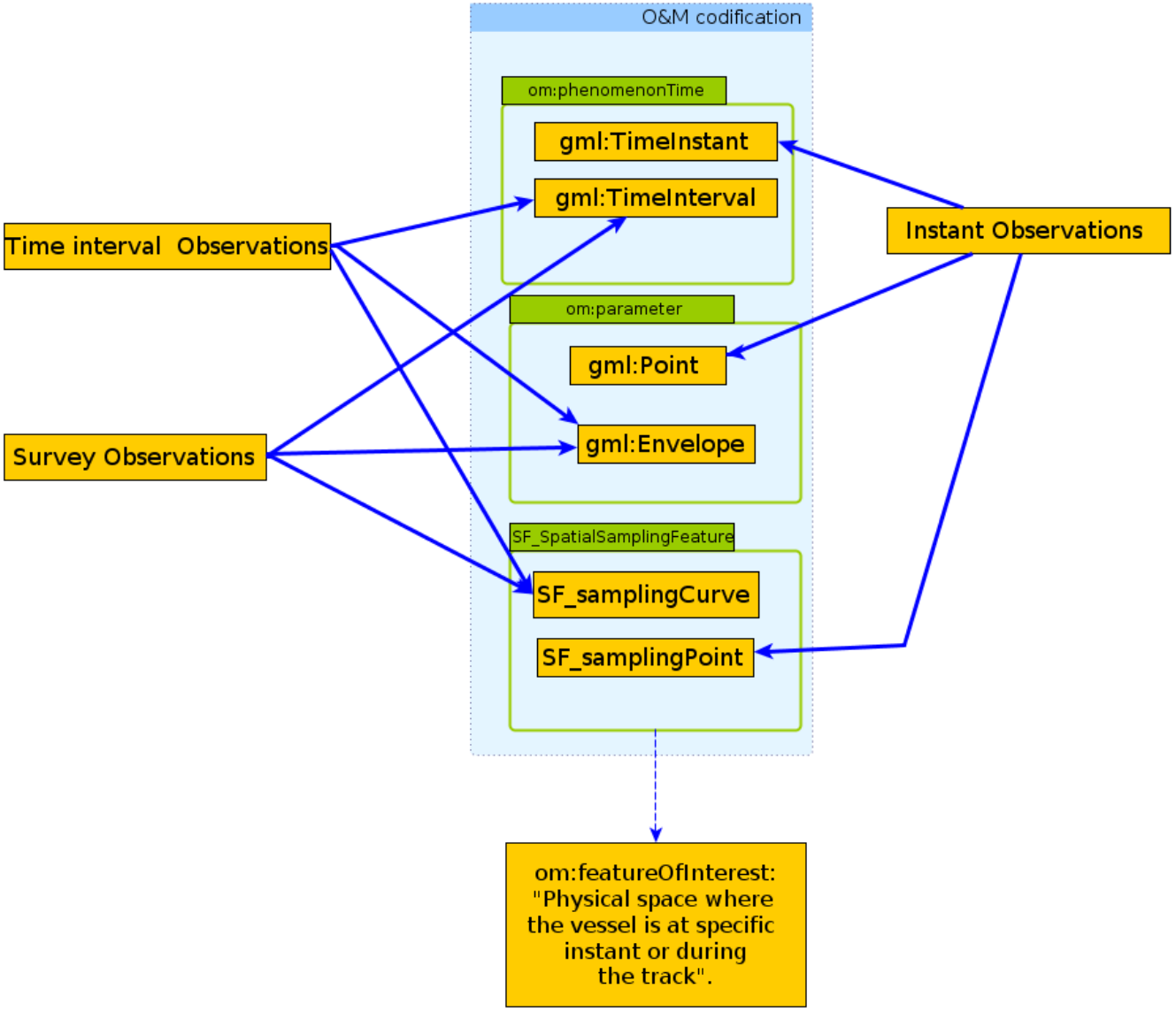
SWE Layer - O&M Files

Three types of observations and SamplingFeature:

1. Time interval.
2. Specific instant.
3. Specific cruise or survey.



SWE Layer - O&M Codification



SWE Layer - O&M Files

http://www.utm.csic.es/SensorWeb/Descriptions/Features/

- **Survey (SamplingFeature):**

  Link to the navigation file of the survey.

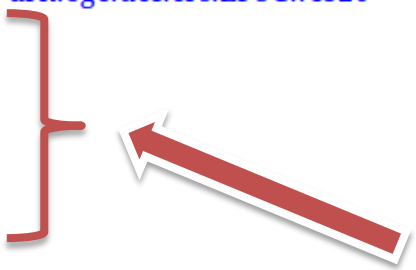
```
<sams:SF_SpatialSamplingFeature xsi:schemaLocation="http://www.opengis.net/samplingSpatial/2.0 http://sch
gml:id="SARMIENTO_sf_29SG20120402">
  <gml:metaDataProperty/>
  <gml:description>Vessel Track</gml:description>
 - <gml:boundedBy>
   - <gml:Envelope srsName="http://www.opengis.net/def/crs/EPSG/0/4326">
      <gml:lowerCorner>-30.711 134.196</gml:lowerCorner>
      <gml:upperCorner>-30.702 134.205</gml:upperCorner>
    </gml:Envelope>
  </gml:boundedBy>
  <sam:type xlink:href="http://www.opengis.net/def/samplingFeatureType/OGC-OM/2.0/SF_SamplingCurve"/>
  <sam:sampledFeature xlink:title="Seawater volume measured along vessel track"> </sam:sampledFeature>
  <sam:relatedObservation xlink:href="SARMIENTO_TERMOSALINOMETER_FLUOROMETER_29SG20120402"/>
  <sams:shape xlink:href="http://www.utm.csic.es/SSR/29AH/29SG20120402/csr/29SG20120402_nav.gml"/>
</sams:SF_SpatialSamplingFeature>
```

SWE Layer - O&M Files

- **Time Interval (SamplingFeature):**

  Track of the vessel is directly coded in GML.

```
- <sams:SF_SpatialSamplingFeature xsi:schemaLocation="http://www.opengis.net/samplingSpatial/2.0 http://schemas.opengis.net/sampling
  gml:id="SARMIENTO_sf_2012-11-02-00-00-00_2012-11-03-00-00-00">
    <gml:metaDataProperty/>
    <gml:description>Vessel Track</gml:description>
  - <gml:boundedBy>
    - <gml:Envelope srsName="http://www.opengis.net/def/crs/EPSG/0/4326">
        <gml:lowerCorner>-30.711 134.196</gml:lowerCorner>
        <gml:upperCorner>-30.702 134.205</gml:upperCorner>
      </gml:Envelope>
    </gml:boundedBy>
    <sam:type xlink:href="http://www.opengis.net/def/samplingFeatureType/OGC-OM/2.0/SF_SamplingCurve"/>
    <sam:sampledFeature xlink:title="Seawater volume measured along vessel track"> </sam:sampledFeature>
    <sam:relatedObservation xlink:href="SARMIENTO_TERMOSALINOMETER_FLUOROMETER_2012-11-02-00-00-00_2012-11-03-00-00-00"/>
  - <sams:shape>
    - <gml:LineString gml:id="pr1_ls1" srsName="urn:ogc:def:crs:EPSG::4326">
        <gml:pos>-30.711 134.205</gml:pos>
        <gml:pos>-30.710 134.204</gml:pos>
        <gml:pos>-30.709 134.203</gml:pos>
        <gml:pos>-30.708 134.201</gml:pos>
        <gml:pos>-30.706 134.196</gml:pos>
        <gml:pos>-30.703 134.197</gml:pos>
        <gml:pos>-30.702 134.199</gml:pos>
      </gml:LineString>
    </sams:shape>
  </sams:SF_SpatialSamplingFeature>
```

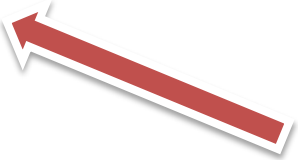


SWE Layer - O&M Files

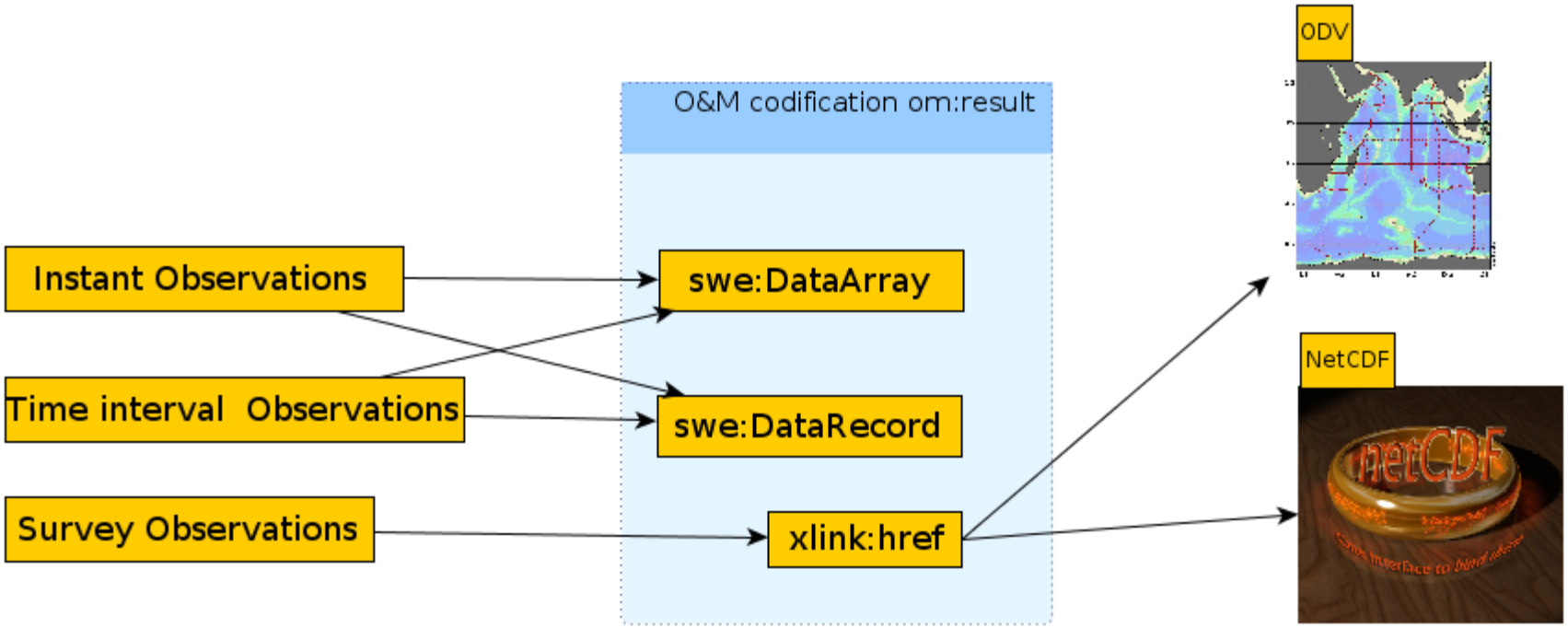
- **Instant observation (SamplingFeature):**

  Track of the vessel directly coded in GML.

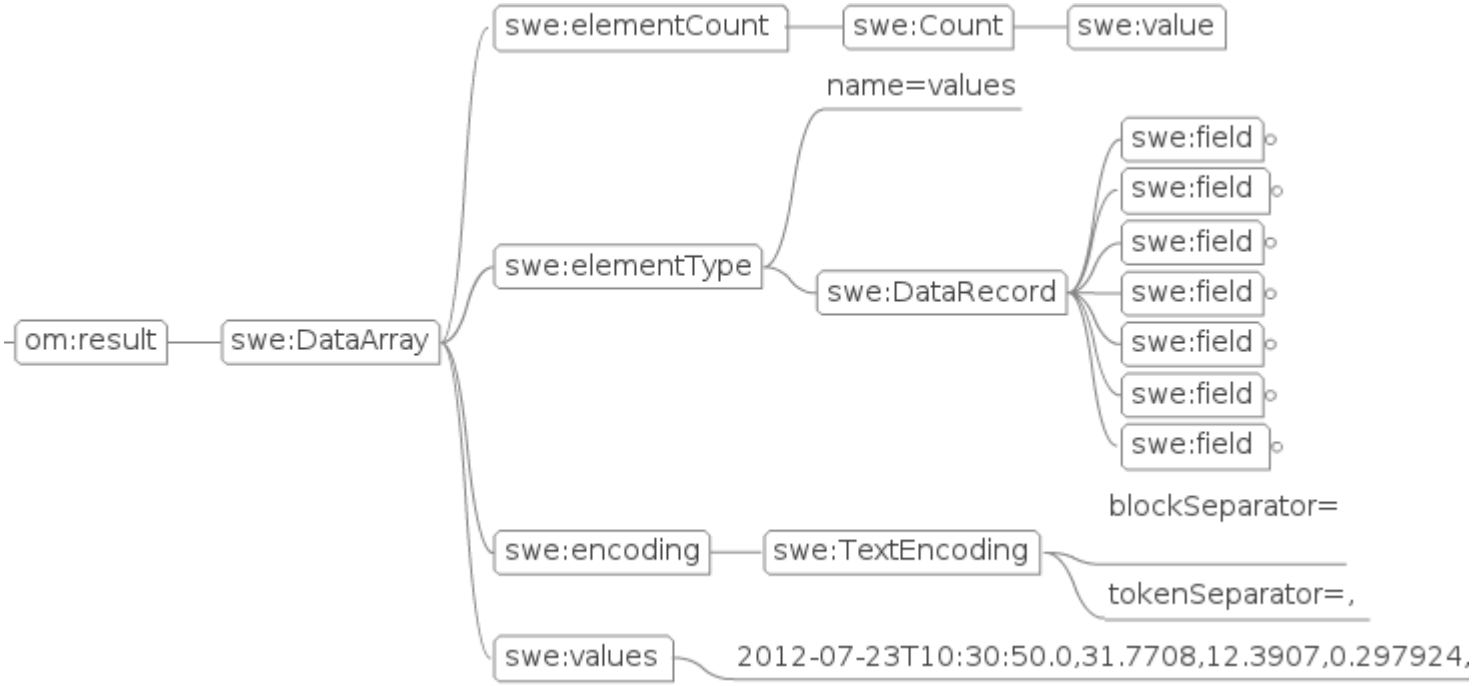
```
- <sams:SF_SpatialSamplingFeature xsi:schemaLocation="http://www.opengis.net/samplingSpatial/2.0 http://schemas
  gml:id="SARMIENTO_sf_2012-11-02-00-00-00">
    <gml:metaDataProperty/>
    <gml:description>Vessel Location</gml:description>
    <sam:type xlink:href="http://www.opengis.net/def/samplingFeatureType/OGC-OM/2.0/SF_SamplingPoint"/>
    <sam:sampledFeature xlink:title="Seawater volume measured at the vessel location"> </sam:sampledFeature>
    <sam:relatedObservation xlink:href="SARMIENTO_TERMOSALINOMETER_FLUOROMETER_2012-11-02-00-00-00"/>
  - <sams:shape>
    - <gml:Point gml:id="vessel_location_1" srsName="urn:ogc:def:crs:EPSG::4326">
        <gml:pos>-30.711 134.205</gml:pos>
      </gml:Point>
    </sams:shape>
  </sams:SF_SpatialSamplingFeature>
```



SWE Layer - O&M Result



SWE Layer - O&M Result




```
- <om:featureOfInterest>
  - <gml:DynamicFeature gml:id="survey">
      <gml:descriptionReference xlink:href="http://www.utm.csic.es/SSR/29AH/29SG20120402/csr/29SG20120402.csr"/>
    - <!--
        The data source  should be expressed as a <gml:history> element
      -->
      <gml:dataSourceReference xlink:href="http://www.utm.csic.es/SSR/29AH/29SG20120402/csr/29SG20120402_nav.gml"/>
    </gml:DynamicFeature>
  </om:featureOfInterest>
  <!-- Result netCDF of 29SG20120402 -->
  <om:result xlink:href="http://www.utm.csic.es/SSR/29AH/29SG20120402/data/29SG20120402_meteo.nc"/>
</om:OM_Observation>
```

SOS Implementation - Index

1. Reasons.
2. What we want.
3. Global view.
4. XML DB.

SOS implementation

Reasons:

- SOS 2.0 standard interfaces.

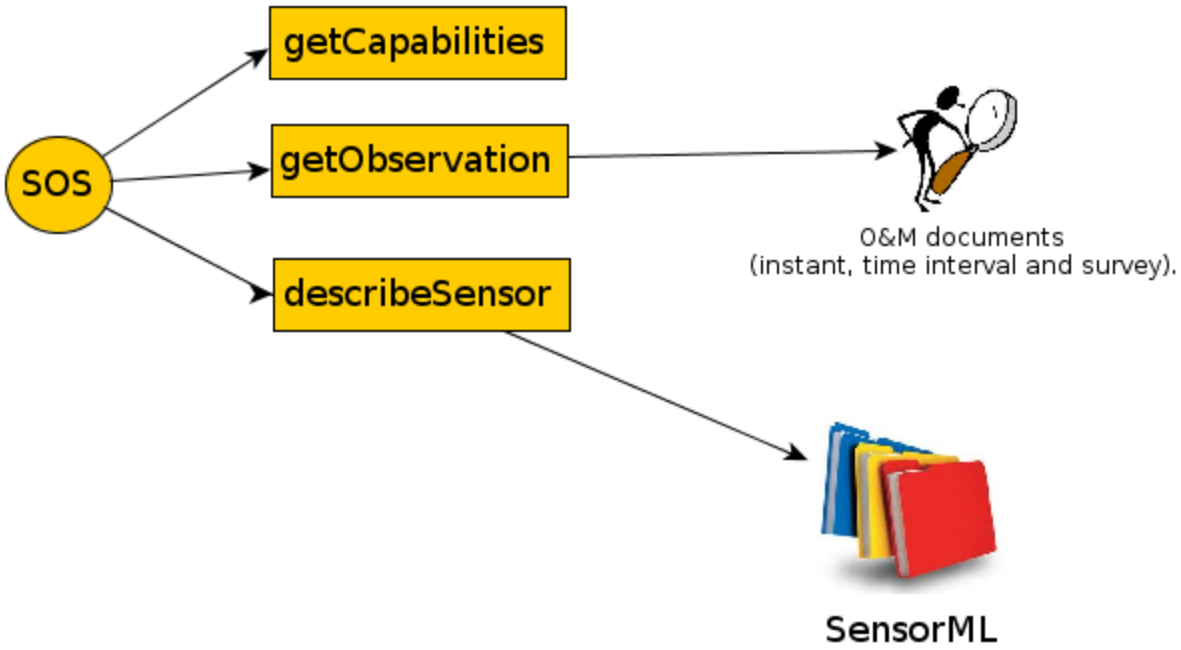
-Restrictions on the structure and contents of the SensorML files that can be registered.

Example:
In SOS 1.0 52ºN implementation a ***gml:MetaDataProperty*** *body with an* ***offering*** *tag must be* included in every ***output*** *description.*

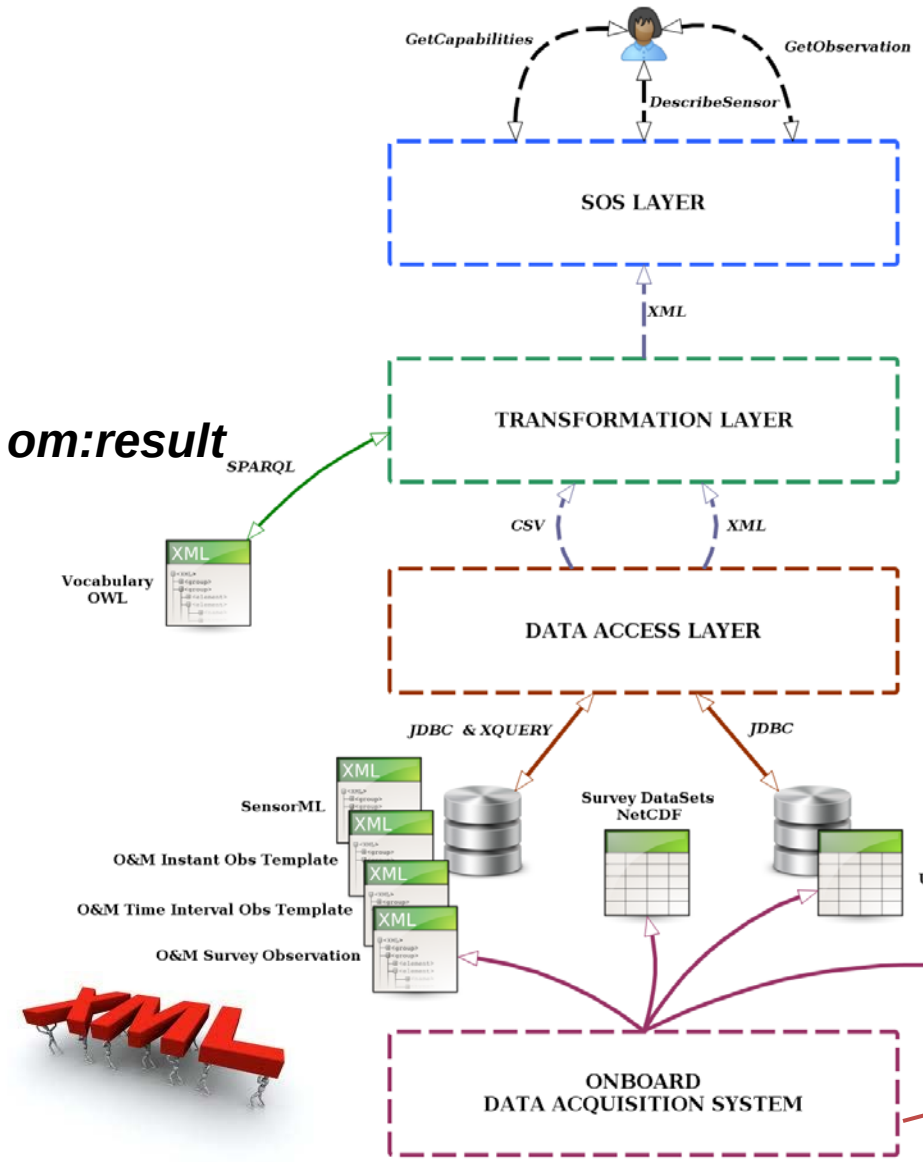
- To use an existing data base structure as the main data storage for SOS.

The application was not meant to be an all-purpose SOS implementation

SOS implementation



SOS implementation



Three layer architecture

3 Interface with the final user

2 The business logic.
On the fly generates:
O&M Instant and
Time Interval Observation
files

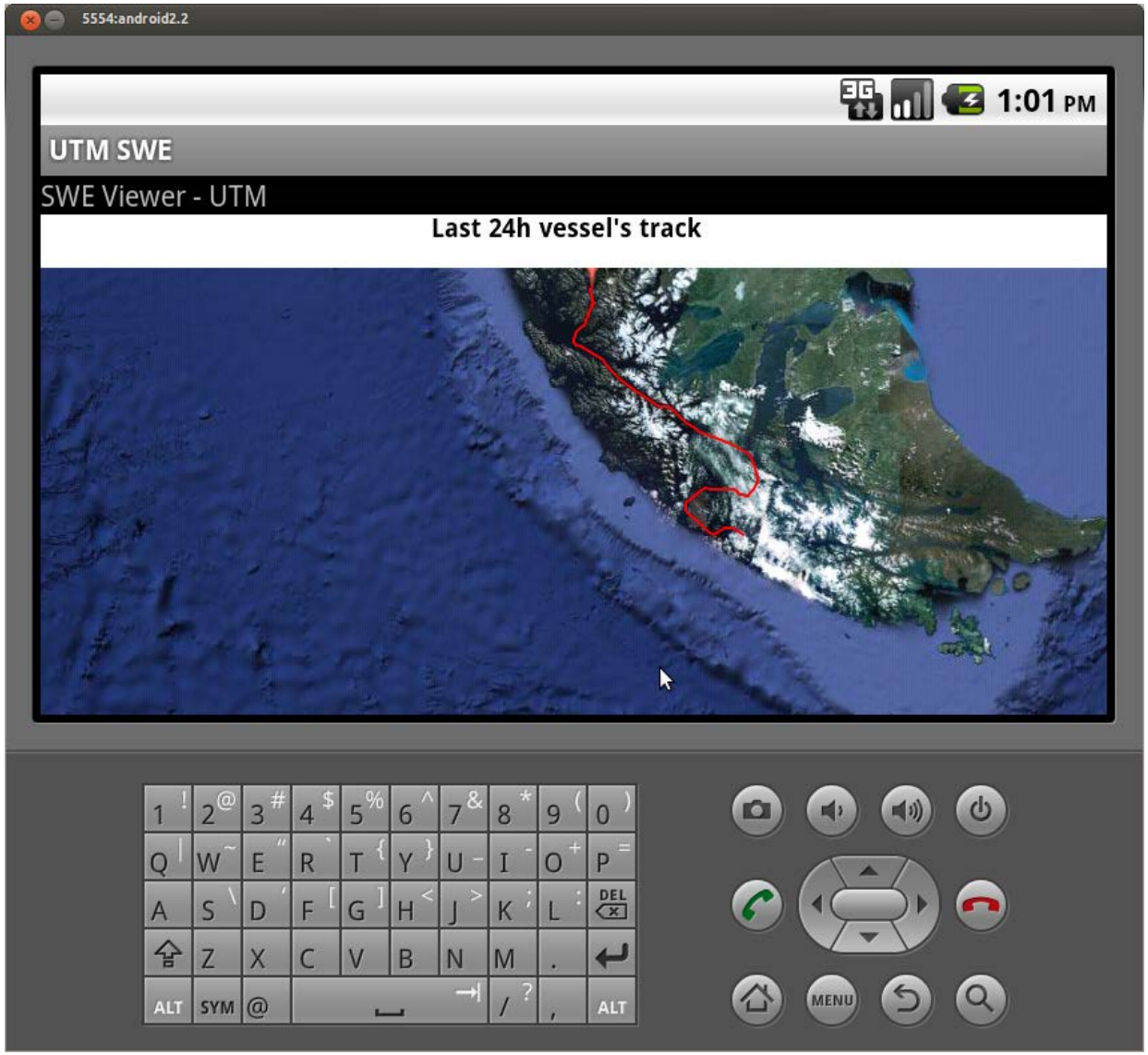
1

When the cruise ends it generates:
-Survey Observation O&M files.
-ISO CSR and CDI.
(At least the underway data).

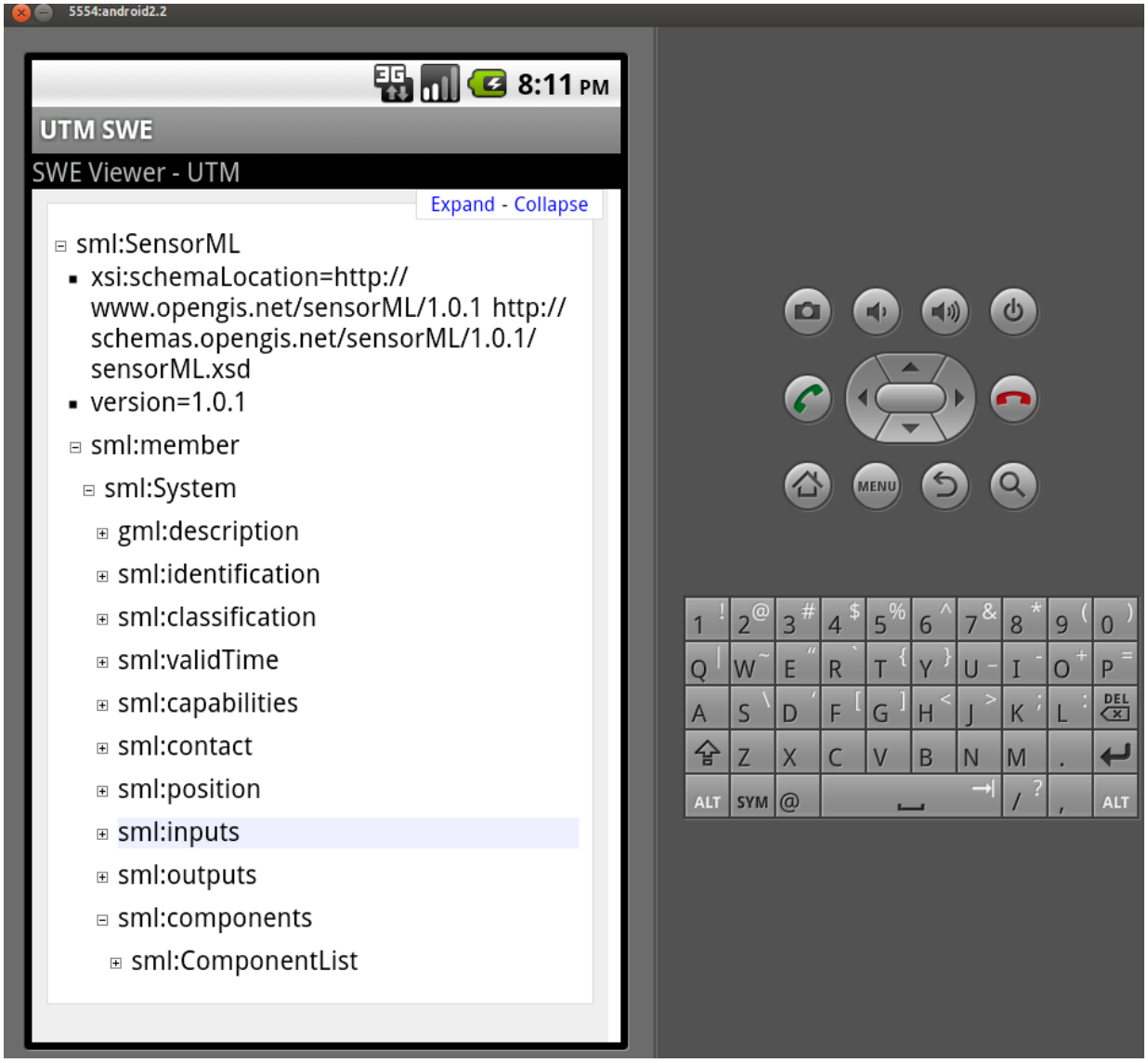
Native XML database

- To store all the SensorML and O&M.
- To increase the flexibility to serve different profiles of SensorML and O&M.
- XQUERY.

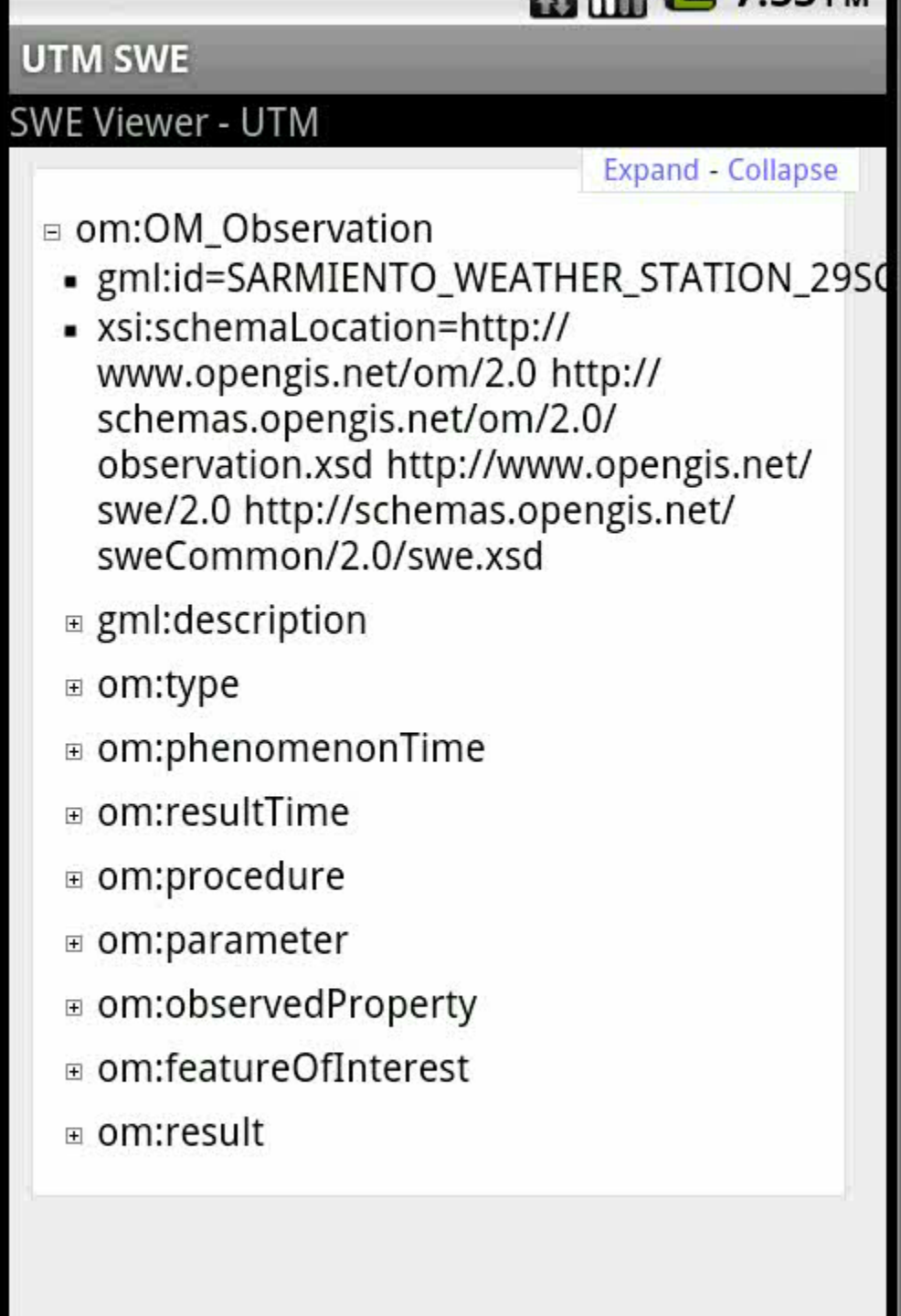
Android App


5554:android2.2
1:01 PM
UTM SWE
SWE Viewer - UTM
Last 24h vessel's track
MENU

Android App

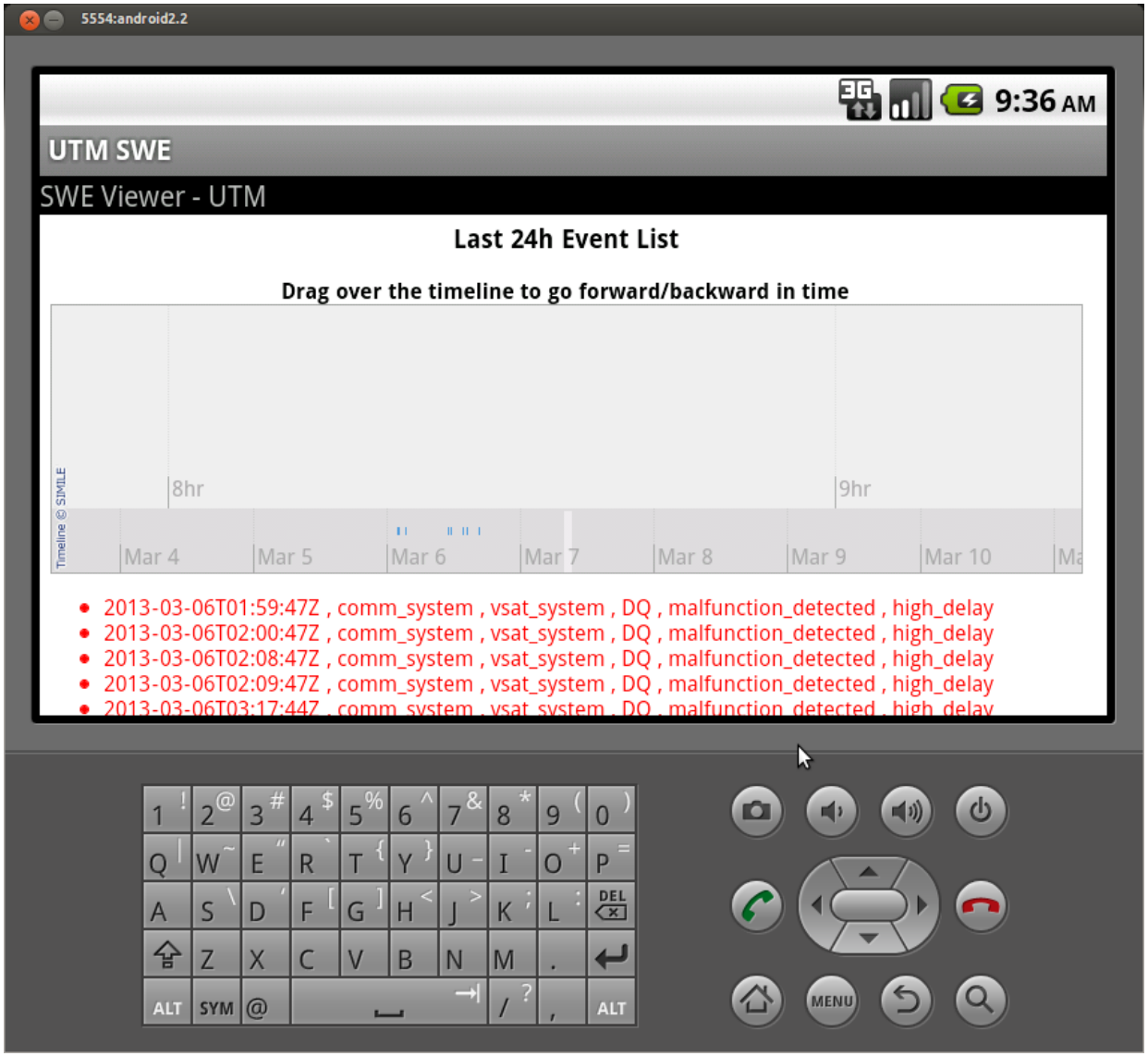

5554:android2.2
8:11 PM
UTM SWE
SWE Viewer - UTM
Expand - Collapse
sml:SensorML
xsi:schemaLocation=http://www.opengis.net/sensorML/1.0.1 http://schemas.opengis.net/sensorML/1.0.1/sensorML.xsd
version=1.0.1
sml:member
sml:System
gml:description
sml:identification
sml:classification
sml:validTime
sml:capabilities
sml:contact
sml:position
sml:inputs
sml:outputs
sml:components
sml:ComponentList
MENU


Google
See all your apps.
Touch the Launcher icon.
1 of 6
MENU


UTM SWE
SWE Viewer - UTM
Expand - Collapse
om:OM_Observation
gml:id=SARMIENTO_WEATHER_STATION_29S
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
om:type
om:phenomenonTime
om:resultTime
om:procedure
om:parameter
om:observedProperty
om:featureOfInterest
om:result

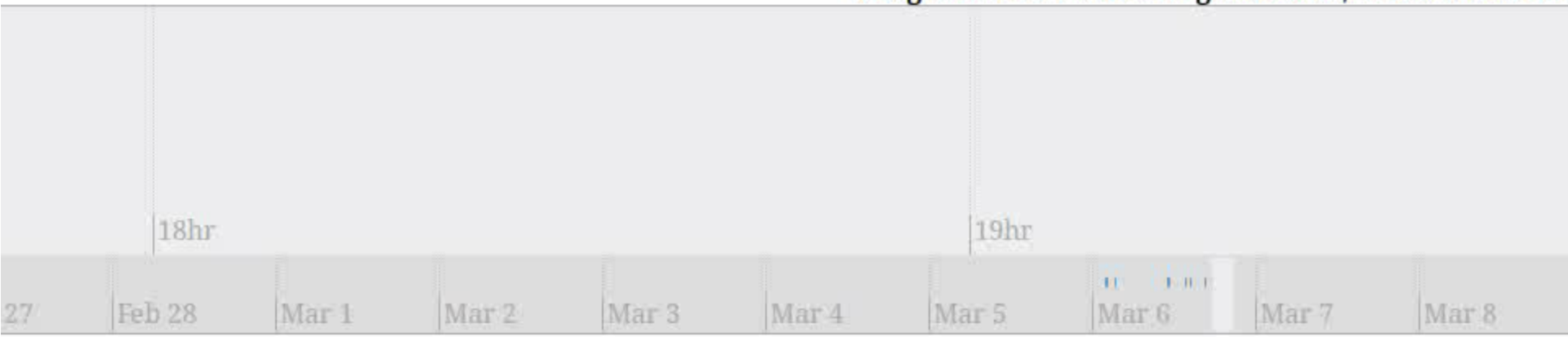

MENU

Android App


5554:android2.2
9:36 AM
UTM SWE
SWE Viewer - UTM
Last 24h Event List
Drag over the timeline to go forward/backward in time
8hr
9hr
Timeline © SIMILE
Mar 4
Mar 5
Mar 6
Mar 7
Mar 8
Mar 9
Mar 10
2013-03-06T01:59:47Z , comm_system , vsat_system , DQ , malfunction_detected , high_delay
2013-03-06T02:00:47Z , comm_system , vsat_system , DQ , malfunction_detected , high_delay
2013-03-06T02:08:47Z , comm_system , vsat_system , DQ , malfunction_detected , high_delay
2013-03-06T02:09:47Z , comm_system , vsat_system , DQ , malfunction_detected , high_delay
MENU

Last 24h Event List

Drag over the timeline to go forward/backward in tim



- 2013-03-06T01:59:47Z , comm_system , vsat_system , DQ , malfunction_detected , high_delay
- 2013-03-06T02:00:47Z , comm_system , vsat_system , DQ , malfunction_detected , high_delay
- 2013-03-06T02:08:47Z , comm_system , vsat_system , DQ , malfunction_detected , high_delay
- 2013-03-06T02:09:47Z , comm_system , vsat_system , DQ , malfunction_detected , high_delay
- 2013-03-06T03:17:44Z , comm_system , vsat_system , DQ , malfunction_detected , high_delay
- 2013-03-06T03:18:47Z , comm_system , vsat_system , DQ , malfunction_detected , high_delay
- 2013-03-06T10:57:47Z , comm_system , vsat_system , DQ , malfunction_detected , high_delay
- 2013-03-06T10:59:48Z , comm_system , vsat_system , DQ , malfunction_detected , high_delay
- 2013-03-06T11:00:51Z , comm_system , vsat_system , DQ , malfunction_detected , high_delay
- 2013-03-06T11:22:46Z , comm_system , vsat_system , DQ , malfunction_detected , high_delay
- 2013-03-06T11:23:46Z , comm_system , vsat_system , DQ , malfunction_detected , high_delay
- 2013-03-06T13:39:50Z , comm_system , vsat_system , DQ , malfunction_detected , high_delay
- 2013-03-06T13:41:48Z , comm_system , vsat_system , DQ , malfunction_detected , high_delay
- 2013-03-06T14:18:48Z , comm_system , vsat_system , DQ , malfunction_detected , high_delay
- 2013-03-06T14:20:45Z , comm_system , vsat_system , DQ , malfunction_detected , high_delay
- 2013-03-06T16:31:47Z , comm_system , vsat_system , DQ , malfunction_detected , high_delay
- 2013-03-06T16:32:47Z , comm_system , vsat_system , DQ , malfunction_detected , high_delay

The End

Thank you very much