EARS : Repositioning data management near data acquisition

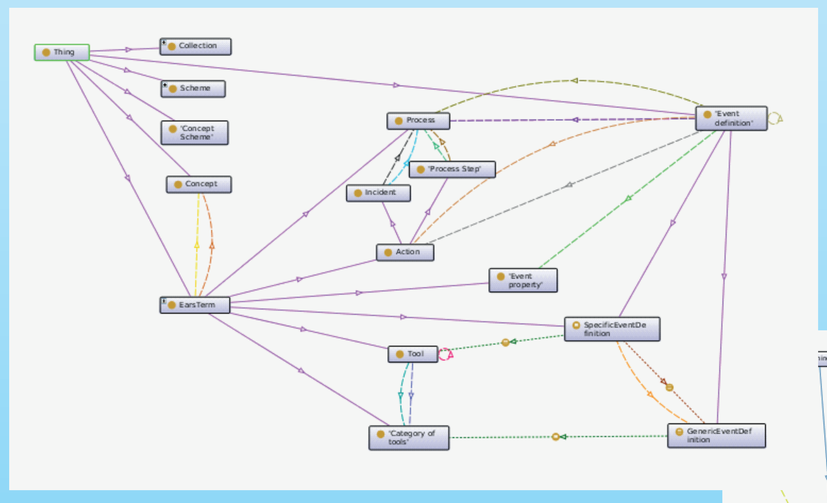
Jean-Marc Sinquin (1), Jordi Sorribas (2), Paolo Diviacco (3), Thomas Vandenberghe (4), Yvan Stojanov (4), Raquel Munoz (2), and Oscar Garcia (2).

(1) Ifremer - BREST - France (jmsinqui@ifremer.fr), (2) CSIC - BARCELONA - Spain (sorribas@utm.csic.es),
(3) OGS - TRIESTE - Italy (pdiviacco@ogs.trieste.it), (4) RBINS - BRUXELLES - Belgium (tvandenberghe@naturalsciences.be)

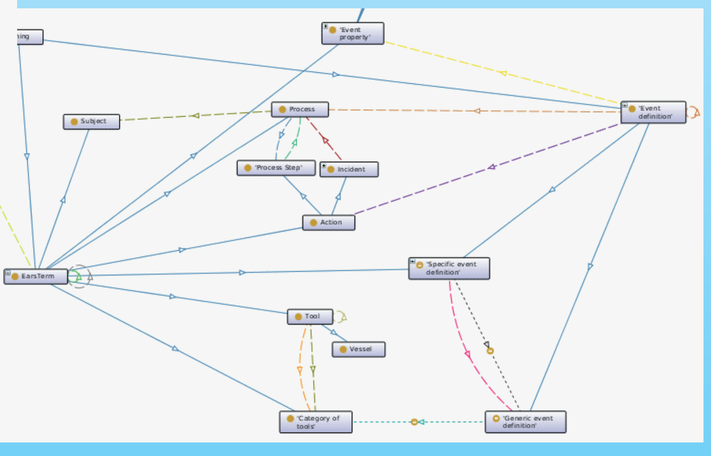
ABSTRACT

The EU FP7 Projects Eurofleets and Eurofleets2 are an European wide alliance of marine research centers that aim to share their research vessels, to improve information sharing on planned, current and completed cruises, on details of ocean-going research vessels and specialized equipment, and to durably improve cost-effectiveness of cruises.
Within this context logging of information on how, when and where anything happens on board of the vessel is crucial information for data users in a later stage. This forms a primordial step in the process of data quality control as it could assist in the understanding of anomalies and unexpected trends recorded in the acquired data sets. In this way completeness of the metadata is improved as it is recorded accurately at the origin of the measurement. The collection of this crucial information has been done in very different ways, using different procedures, formats and pieces of software in the context of the European Research Fleet. At the time that the Eurofleets project started, every institution and country had adopted different strategies and approaches, which complicated the task of users that need to log general purpose information and events on-board whenever they access a different platform loosing the opportunity to produce this valuable metadata on-board.
Among the many goals the Eurofleets project has a very important task is the development of an "event log software" called EARS (Eurofleets Automatic Reporting System) that enables scientists and operators to record what happens during a survey. EARS will allow users to fill, in a standardized way, the gap existing at the moment in metadata description that only very seldom links data with its history. Events generated automatically by acquisition instruments will also be handled, enhancing the granularity and precision of the event annotation. The adoption of a common procedure to log survey events and a common terminology to describe them is crucial to provide a friendly and successfully metadata on-board creation procedure for the whole the European Fleet. The possibility of automatically reporting metadata and general purpose data, following the OGC standards, will simplify the work of scientists and data managers with regards to data transmission
An improved accuracy and completeness of metadata is expected when events are recorded at acquisition time. This will also enhance multiple usages of the data as it allows verification of the different requirements existing in different disciplines.

1. GENERAL REQUIREMENTS / ONTOLOGY



Action: a general event that can occur during a campaign.
Action_property: any property of an action.
Category: a superset of actions, an action category.
Subject: a superset of tools, a tool category.
Tool: a gear or instrument (sensor) used directly or indirectly on a vessel



Event: An event is something that happens at specific time
related to an action, a category, a subject and a tool, (by a specific actor)
It can have values for (predefined) properties.
It realizes an abstract predefined "event".

2. IMPLEMENTATION

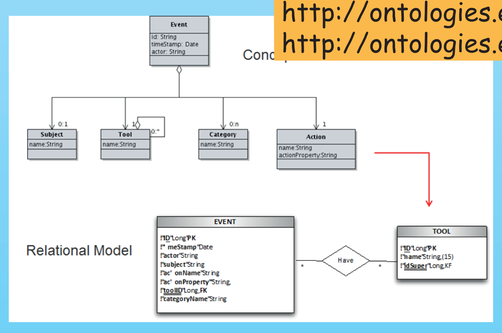
Ontology axioms (classes and constraints)
OWL (protégé, TopBraid)

Terms Registry

Web application
Modify terms and their relationships
Publish ontology (rdf, json, owl) and create doc
NamedIndividuals (=class instances)

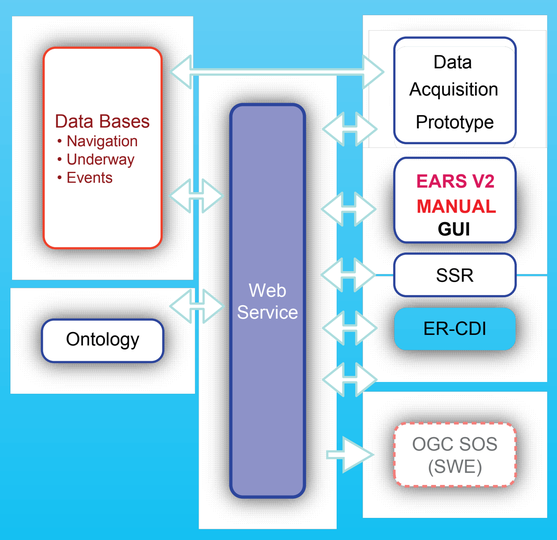
Ontology servers

http://ontologies.ef-ears.eu/ears2/1
http://ontologies.ef-ears.eu/ears2/1/current/
http://ontologies.ef-ears.eu/ears2/1/sparql/



Map to existing vocabularies (SeaDataNet, R2R, ongoing)
Ease data entry

3. EARS Log Book at sea

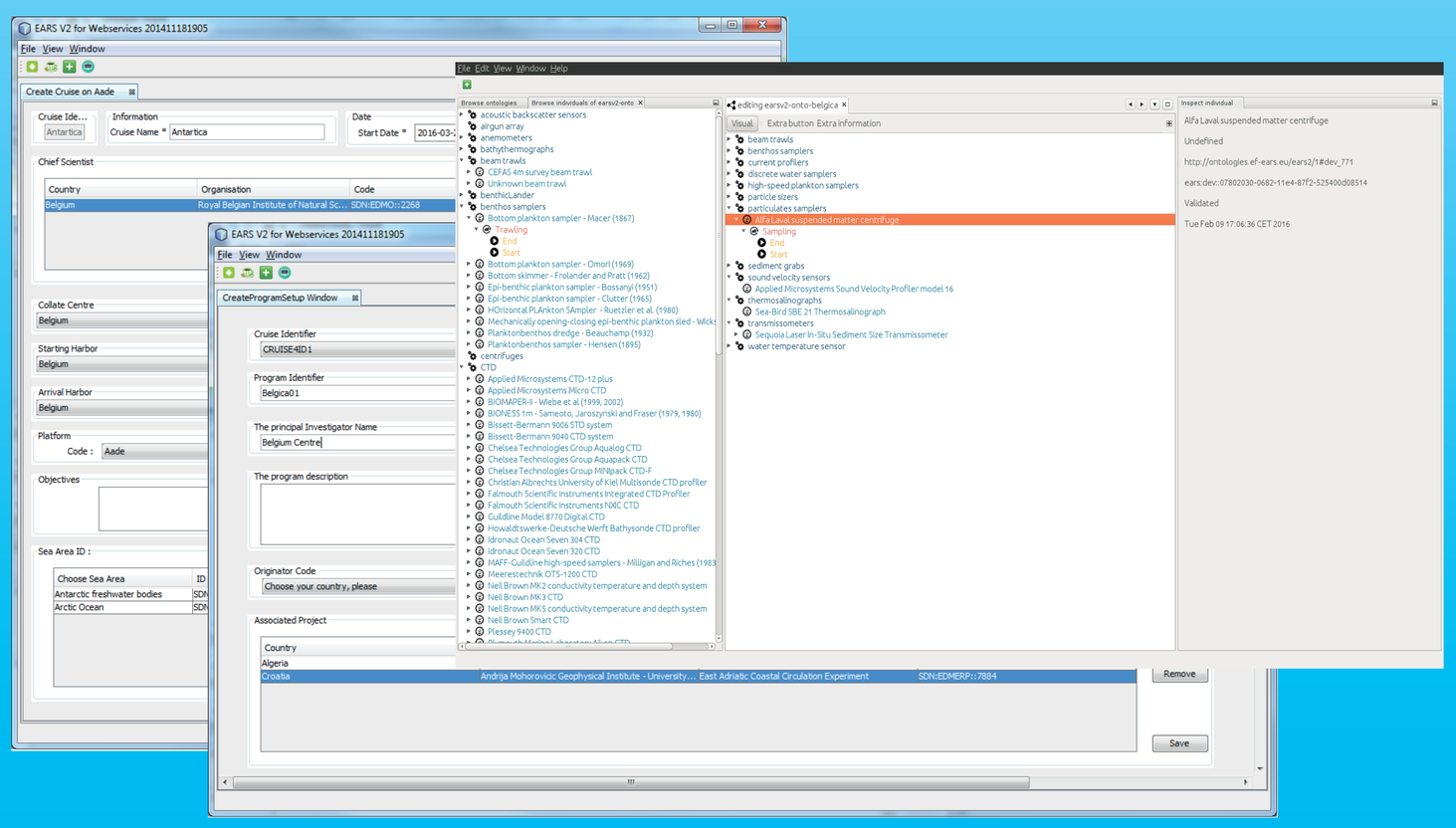


Seatrials on Belgica vessel - 2013

Seatrials on Sarmiento di Gamboa - 2016 (planned)

12/01/2015 08:10:50, Research vessel, vessel, cruise, cruise_start, reference, "BE11/200515"
12/01/2015 11:10:25, Research vessel, vessel, station, station_start, reference, "mumm_46460"
12/01/2015 11:10:25, Research vessel, vessel, profile, profile_start, category_ref, "profile1.1", @1
12/01/2015 11:10:25, discrete water samplers, Rosette, deployment, deployment_start, @1
12/01/2015 11:10:26, discrete water samplers, Rosette, operation, in_water
(...)
12/01/2015 11:30:10, discrete water samplers, Rosette, CTD, malfunction, instrument_damaged, @1
12/01/2015 11:40:25, Research vessel, vessel, station, station_end, category_ref, "mumm_46460"
12/01/2015 11:45:25, Research vessel, vessel, leg, leg_start

4. EARS GUI & functionnalities



5. CONCLUSION & PERSPECTIVES

Event logging allows to move the process of creation of metadata as close as possible to the acquisition moment. If metadata creation is done later, each institution will tend to bias information after its own practice, so that eventually information will be difficult to read. This was the situation at the beginning of the Eurofleets project when several partner had their own system, that generates metadata in customised and inconsistent ways. EARS filled the gap between the different approaches and implementations reducing as much as possible the semantic gap between what recorded by different institutions, while at the same time remaining flexible enough to accomodate specific needs. Output of metadata is available as O&M and SensorML OGC standards.
Summaries of what recorded is made available to other Eurofleets initiatives such s EVIOR.
A very interesting future improvement of EARS will be towards the integration on remote access to the vessels. This will allow users to analyse in near-time what was recorded.
In fact if the logger records, as events, the links to the data and viewers of data are made available in a server-side set up (meaning without transferring large amounts of data but only representation of what recorded) data can be made available also remotely from on-shore

Eurofleets

The research leading to these results has received funding from the European Union Seventh Framework Programme (FP7/2007-2013) under the Joint Research Activity of the EUROFLEETS(1) and EUROFLEETS2 projects, grant agreements n°228344 and 312762