

EARS2: Repositioning data management near data acquisition



Thomas Vandenberghe¹, Paolo Diviaco², Jean-Marc Sinquin³, Jordi Sorribas⁴, Alessandro Busato², Raquel Casas⁴, Guillaume Clodic³, Óscar Sánchez García⁴, Serge Scory¹ and Yvan Stojanov¹

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

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Filling the semantical gap between RV operators

The EU FP7 Projects Eurofleets (EF) and Eurofleets 2 are an European wide alliance of marine research centers that aim to share their research vessels (RVs), 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.

At the time the Eurofleets project started, every institution and country had adopted different strategies and approaches. This complicated the work of users that need to log general purpose information and events on-board different platforms, which sometimes even led to losing the opportunity to produce metadata on-board.

One of the many tasks of Eurofleets 2 is the development of "event log software", the **Eurofleets Automatic Reporting System (EARS)**. EARS enables scientists and operators to record what happens during a survey.

Events generated automatically by acquisition instruments are also 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 successful on-board metadata creation procedure for the whole European fleet. The possibility of automatically reporting metadata and general purpose data, following the OGC standards, simplifies the work of scientists and data managers with regards to data transmission. To make metadata interoperable and fill the semantical gap between organisations, international vocabularies are used. Terms that are not present in vocabularies are created and governed by Eurofleets as part of the developments of EF1 and 2.

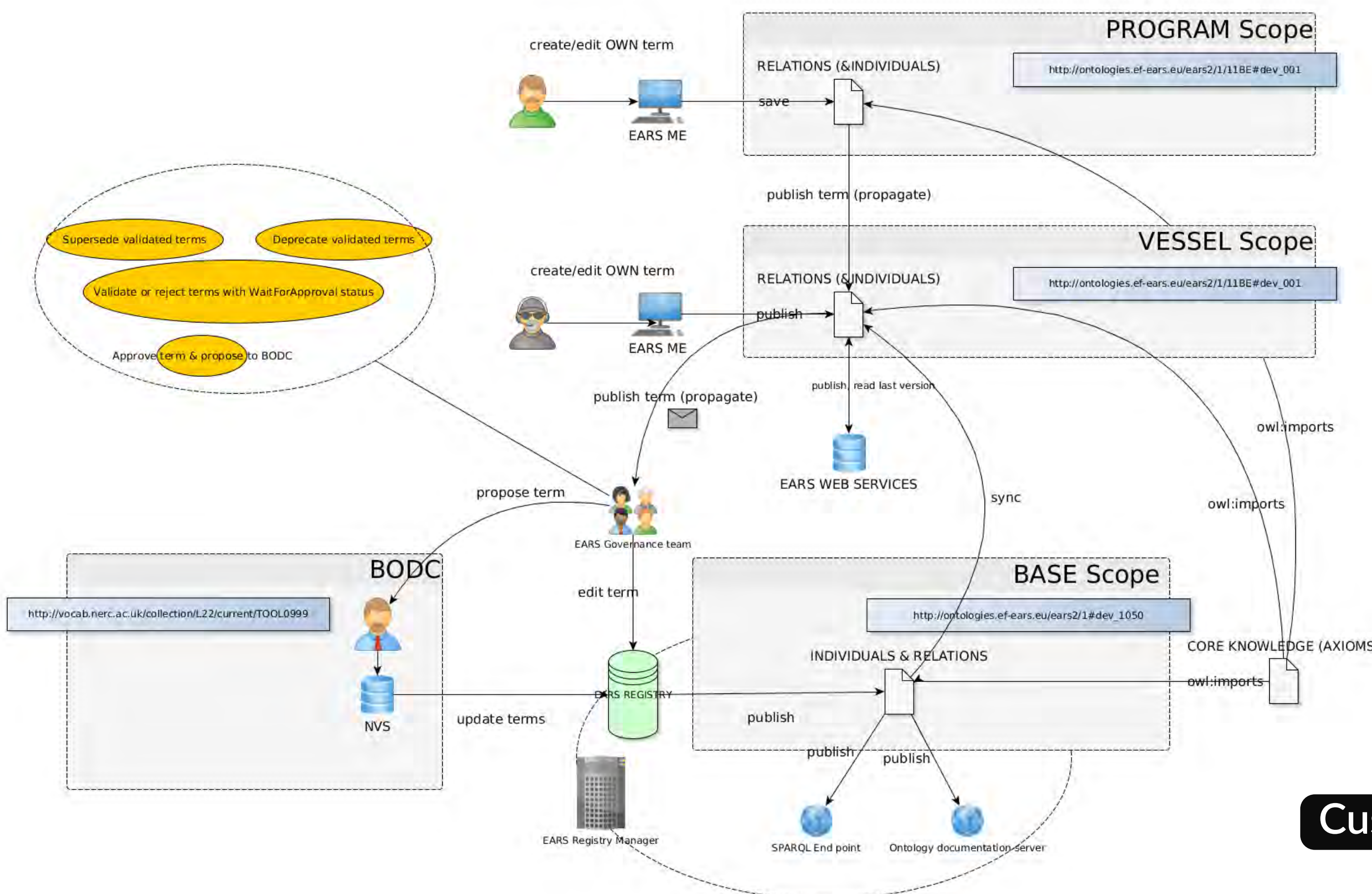
Specification

An event is anything that is performed on or with a RV at a specific time by a specific actor with a specific device. Performing something consists of an action category and a specific action, eg. dredging - start. These are called processes and actions. Properties are stored as key-value pairs.

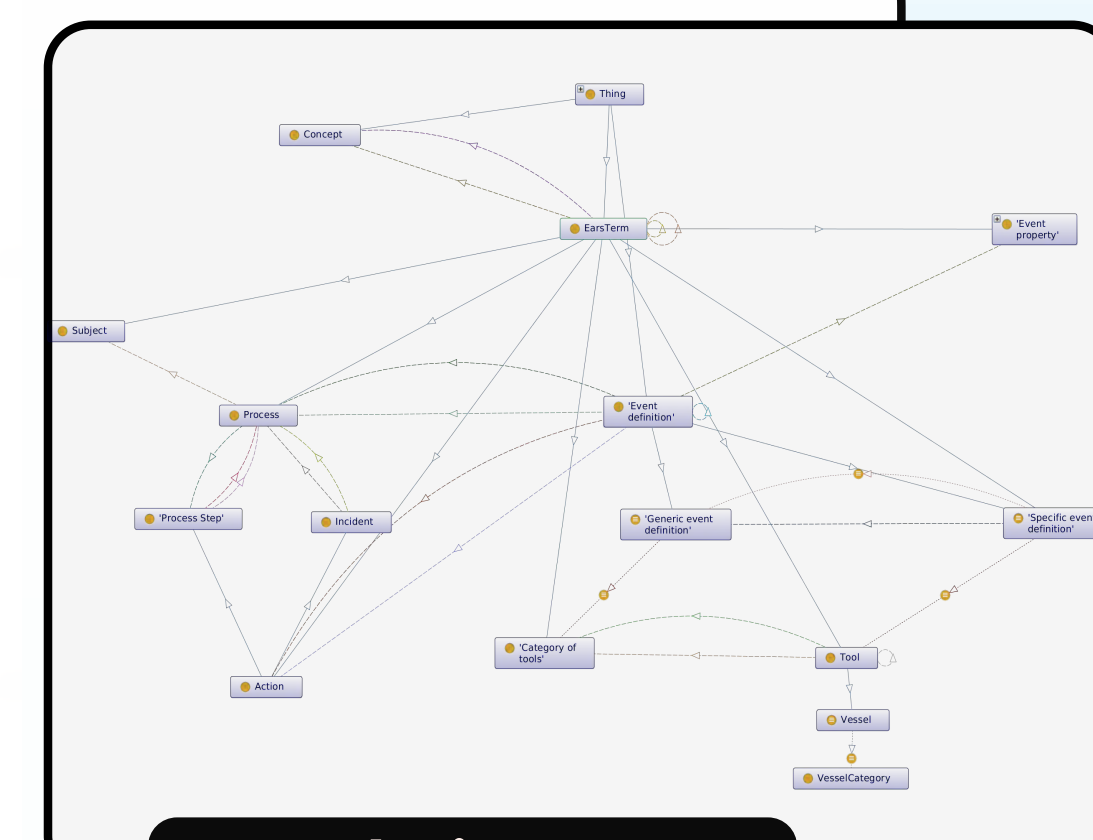
Definitions

Action: a specific operation (e.g. Start, AtBottom,...).
Process: a general operation that can occur during a campaign (Initialisation, Sampling,...).
Tool category: a superset of tools.
Tool: a gear or instrument (sensor) used directly or indirectly on a vessel.

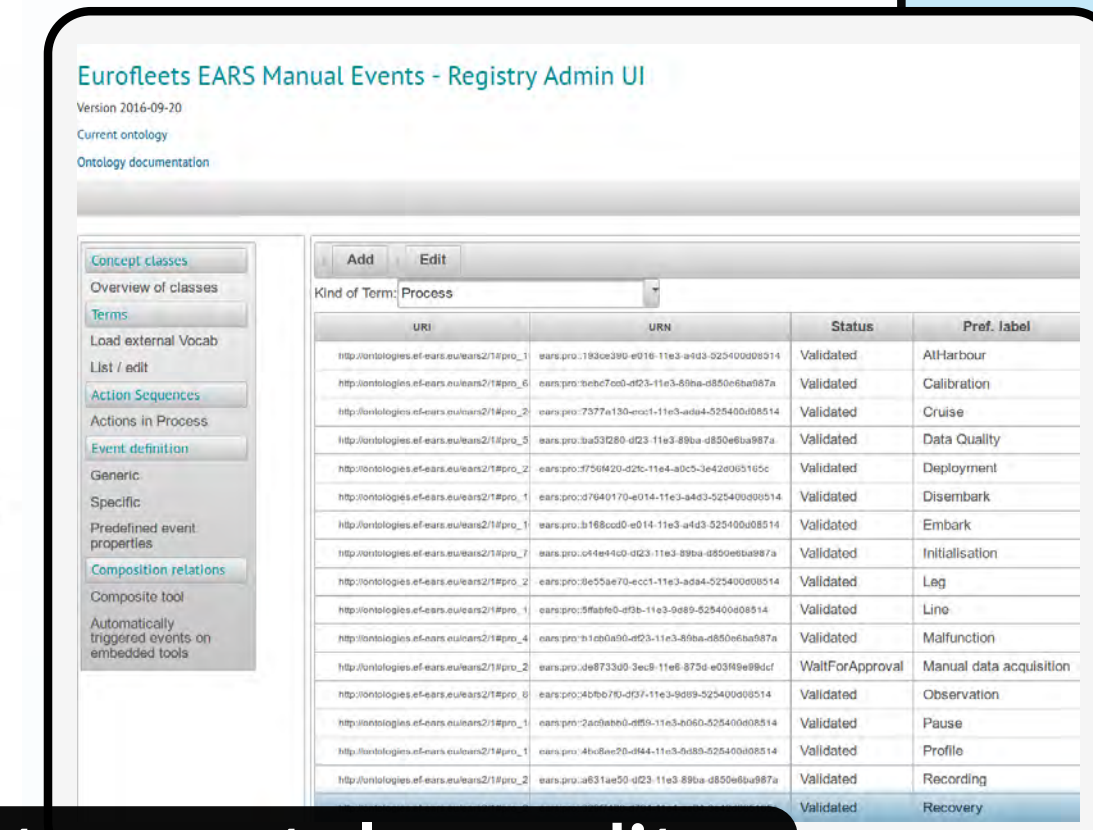
Ontology (infra)structure



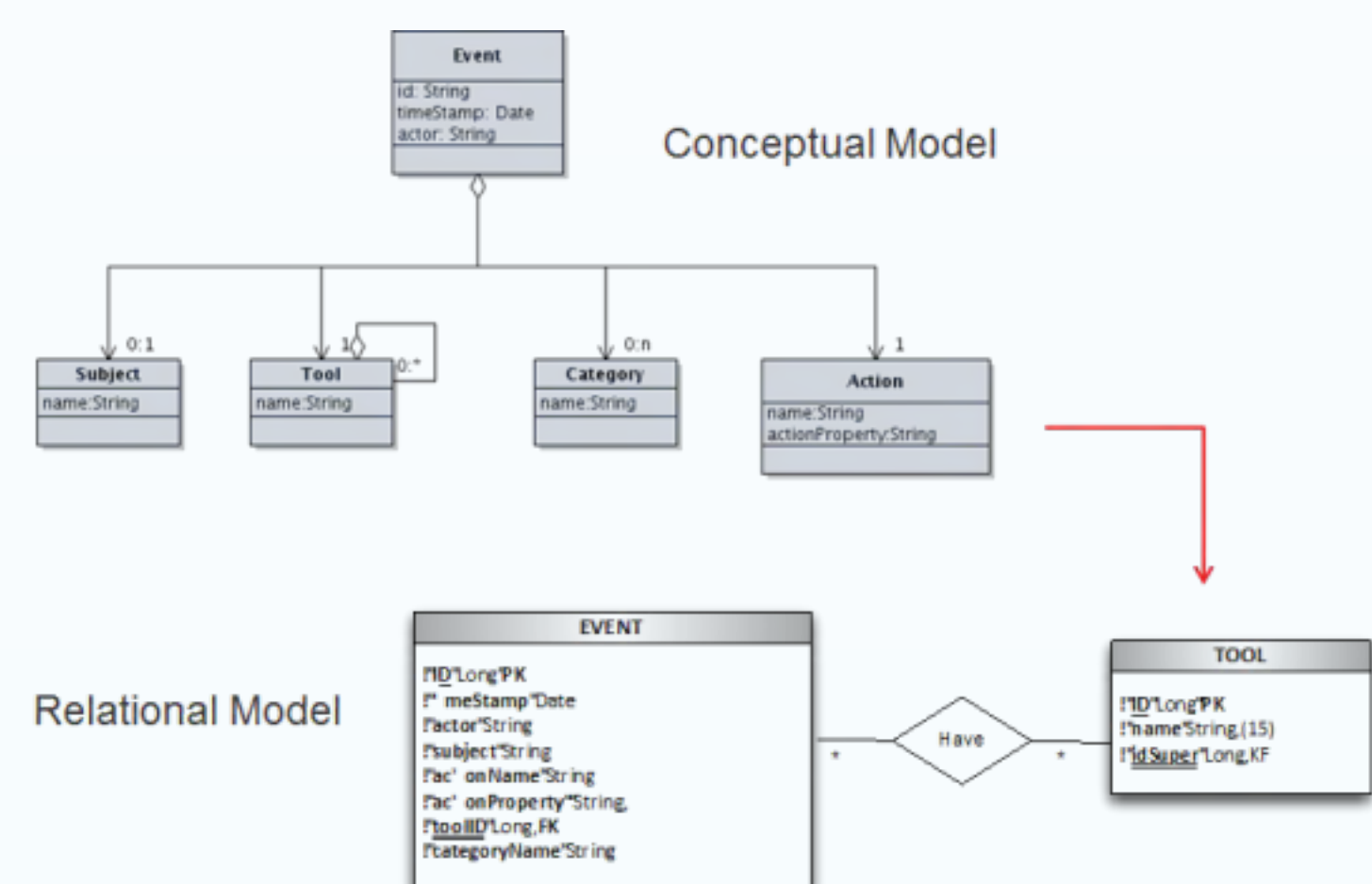
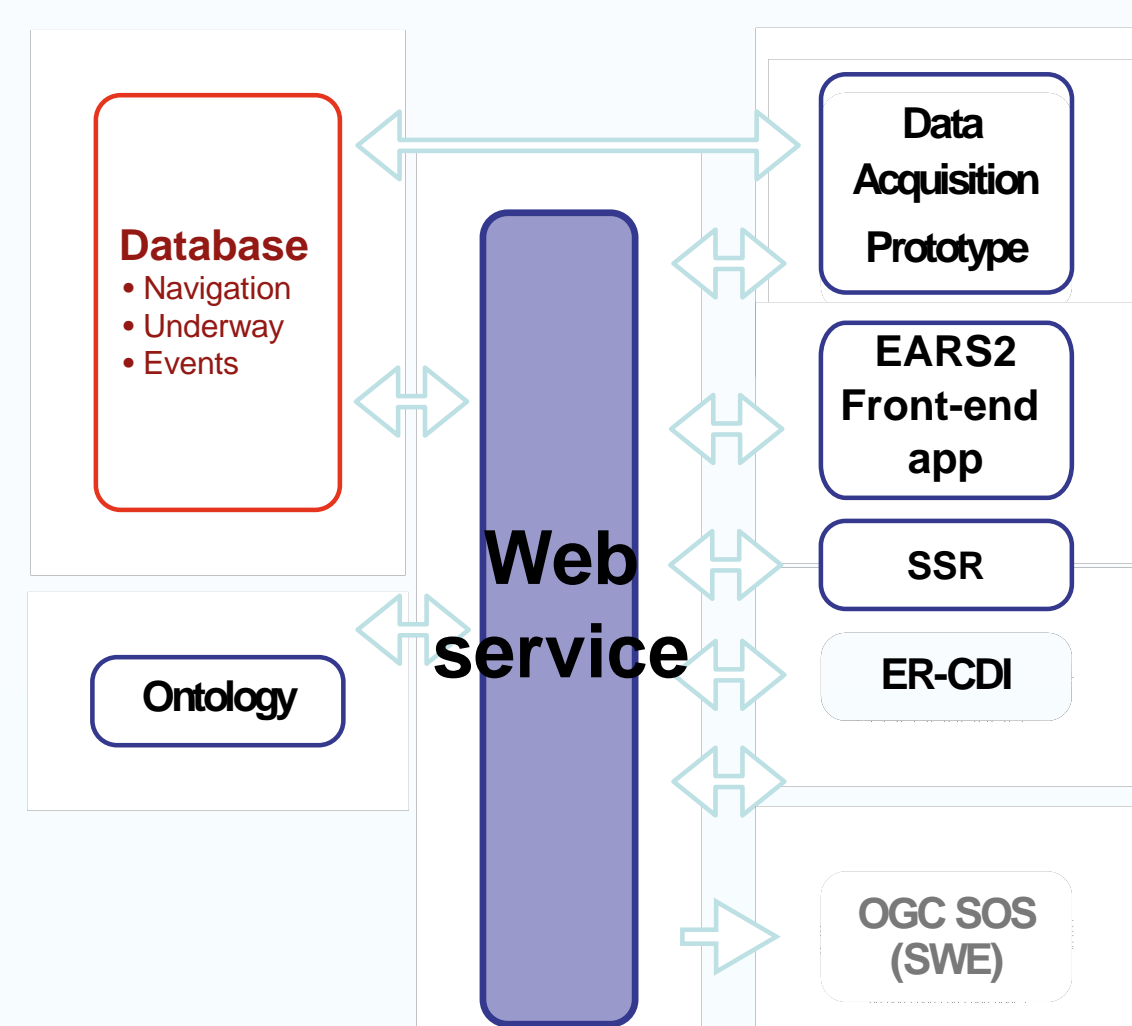
Axioms



Custom ontology editor

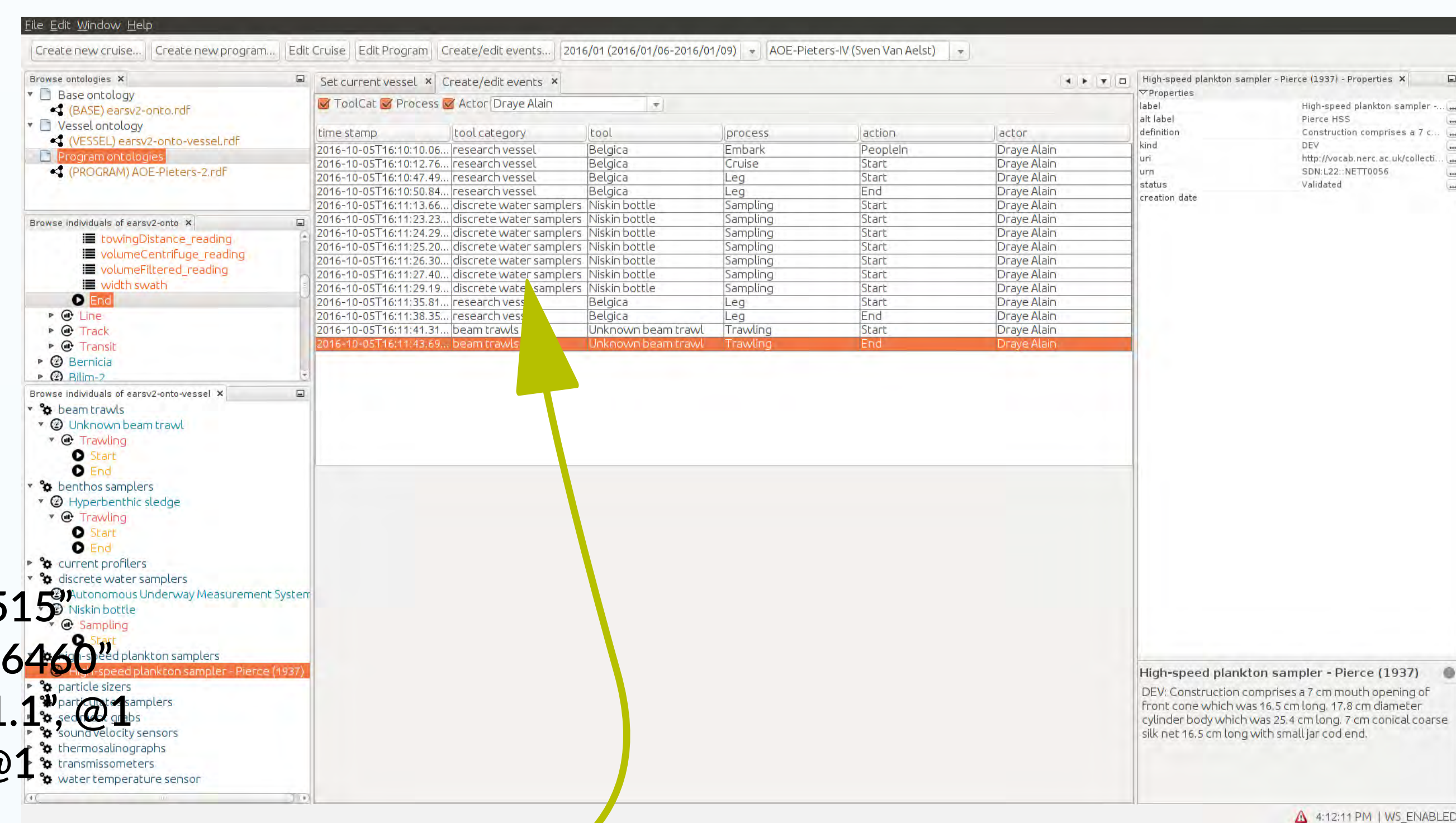


e-logging events



- 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@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

EARS2 front-end app



If metadata is created later than the acquisition moment, institutions tend to bias information after their own practice. EARS fills the gap between the different approaches and implementations while at the same time remaining flexible enough to accommodate specific needs. Metadata is made available in O&M and SensorML OGC standards. A ship status summary (SSR) is made available to other Eurofleets initiatives such as EVIOR. An interesting result of EARS2 is the development of a prototype schema (ER-CDI) that is a building block to provide remote data access to the vessels, ie. making data available from on-shore. In the event logs the links to the data are made available in a server-side set up (meaning without transferring large amounts of data but only a representation of what's recorded).



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