

EARS : Repositioning data management near data acquisition



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

(1) Ifremer - BREST - France (jmsingui@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)

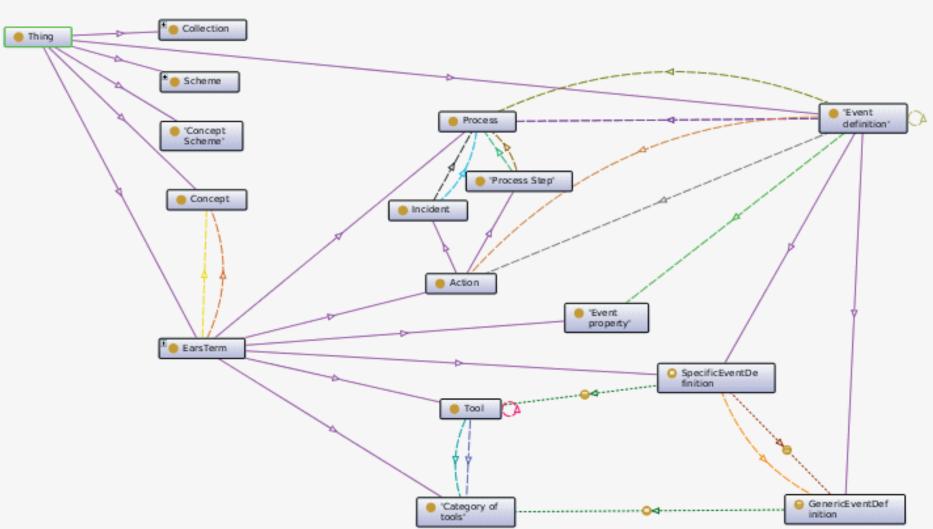
ABSTRACT

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 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.

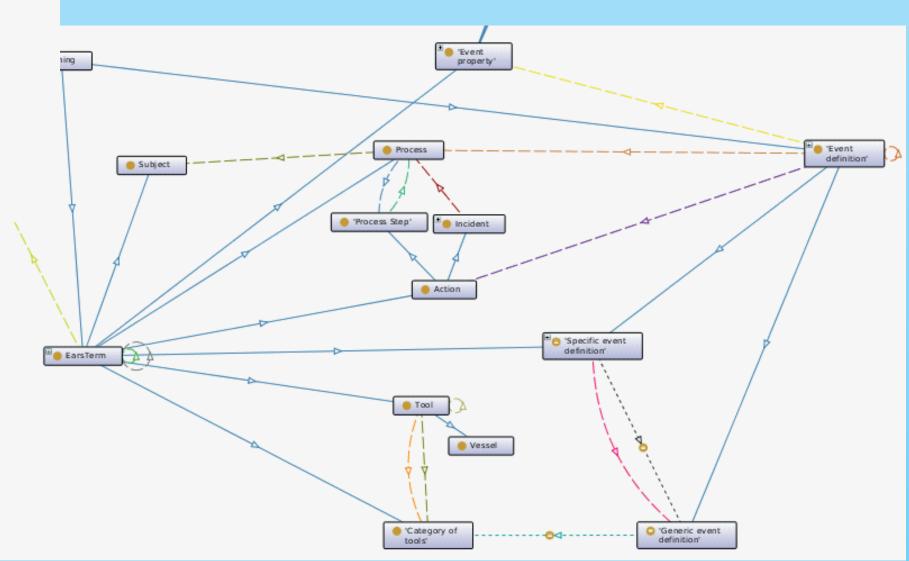
1. GENERAL REQUIREMENTS / ONTOLOGY



Event: An event is something that happens at specific

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



2. IMPLEMENTATION

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

Terms Registry

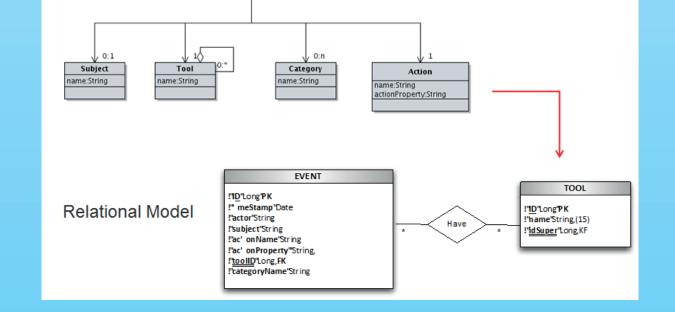
Web application Modify terms and their relationships Publish ontology (rdf, json, owl) and create doc NamedIndividuals (=class instances)

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/

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".

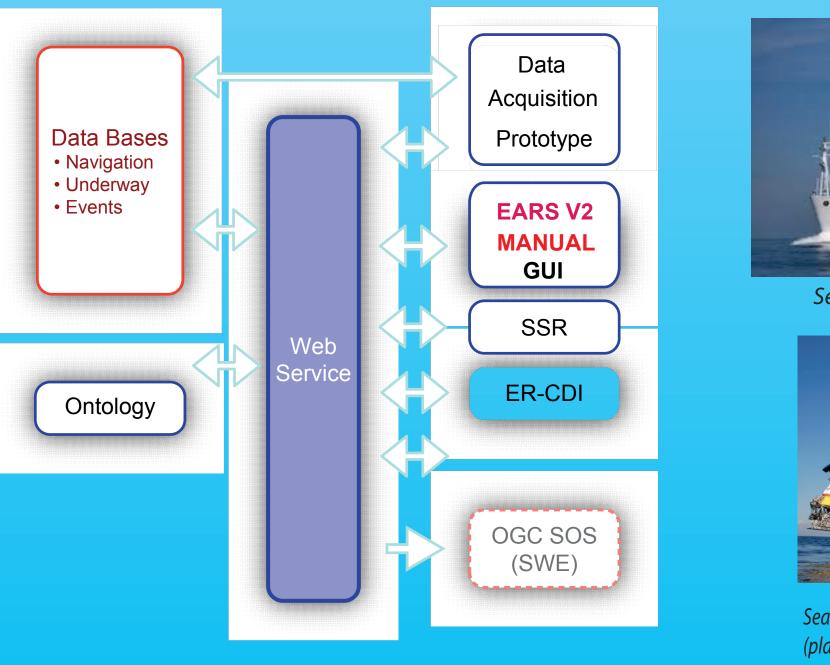


Event id: String timeStamp: Date actor: String

Map to existing vocabularies (SeaDataNet, R2R, ongoing)

Ease data entry

3. EARS Log Book at sea





Seatrials on Belgica vessel - 2013



(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"

4. EARS GUI & functionnalities

<u>V</u> iew <u>W</u> indow						
a 🗄 😑			<u>F</u> ile <u>E</u> dit <u>V</u> iew <u>W</u> indow <u>H</u> elp			
ate Cruise on Aade 🛛 🗱			:			
			Browse ontologies Browse individuals of earsv2-onto ×	dediting earsv2-onto-belgica ×		Inspect individual
ruise Ide Informatio		Date		Visual Extra button Extra information	BE	Alfa Laval suspended matter centrifuge
Antartica Cruise Nan	ne * Antartica	Start Date * 2016-03-2	 anemometers 	beam trawls		Undefined
			bathythermographs	beth down		ondenned
Chief Scientist			💌 🏠 beam trawls	current profilers		http://ontologies.ef-ears.eu/ears2/1#dev_771
			CEFAS 4m survey beam trawl	discrete water samplers		
Country	Organisation	Code	Olympic With the second sec	high-speed plankton samplers		ears:dev::07802030-0682-11e4-87f2-525400d08514
Belgium	Royal Belgian Institute of Natur		SenthicLander	particle sizers		Validated
oeigiam	Royal Deigian Institute of Natu	arsen son como. 2200	 benthos samplers Bottom plankton sampler - Macer (1867) 	Particulates samplers		
			Bottom plankton sampler - Macer (1867) Trawling	O Alfa Laval suspended matter centrifuge O Sampling		Tue Feb 09 17:06:36 CET 2016
	EARS V2 for Webser	vices 201411181905	O End	End		
	File View Window		O Start	Start		
			🕨 🕲 Bottom plankton sampler - Omori (1969)	Sediment grabs		
			Bottom skimmer - Frolander and Pratt (1962)	🔻 🏠 sound velocity sensors		
				Applied Microsystems Sound Velocity Profiler model 16		
ollate Centre	CreateProgramSetup Wir	ndow 88	General Epi-benthic plankton sampler - Clutter (1965)	💌 🏠 thermosalinographs		
elgium			HOrizontal PLAnkton SAmpler - Ruetzler et al. (1980)	Sea-Bird SBE 21 Thermosalinograph		
cigium	Cruise Identifier		 Mechanically opening-closing epi-benthic plankton sled - Wick Planktonbenthos dredge - Beauchamp (1932) 			
			 Planktonbenthos dredge - Beadchamp (1932) Planktonbenthos sampler - Hensen (1895) 	 Sequoia Laser In-Situ Sediment Size Transmissometer water temperature sensor 		
tarting Harbor	CRUISE4ID1		a centrifuges			
elgium			▼ 🏠 CTD			
	Program Identifie	er	Ø Applied Microsystems CTD-12 plus			
rrival Harbor	Belgica01		Ø Applied Microsystems Micro CTD			
elgium			▶ ⑧ BIOMAPER-II - Wiebe et al (1999, 2002)			
-			 BIONESS 1m - Sameoto, Jaroszynski and Fraser (1979, 1980) Bissett-Bermann 9006 STD system 			
Platform		-	 Bissett-Bermann 9006 STD system Bissett-Bermann 9040 CTD system 			
Belgium Centrel		2	 Bisselt-Bernann 9040 CTD system Chelsea Technologies Group Aqualog CTD 			
Code : Aade			 Chelsea Technologies Group Aquapack CTD 			
	The program des	relation	Chelsea Technologies Group MINIpack CTD-F			
bjectives	The program des	cipuon	Ohristian Albrechts University of Kiel Multisonde CTD profiler			
			Generation of the second			
			Generation Scientific Instruments NXIC CTD			
			 Guildline Model 8770 Digital CTD Howaldtswerke-Deutsche Werft Bathysonde CTD profiler 			
			 Howaldtswerke-Deutsche werrt Bathysonde CTD profiler Idronaut Ocean Seven 304 CTD 			
ea Area ID :			 Idronaut Ocean Seven 304 CTD Idronaut Ocean Seven 320 CTD 			
			 MAFF-Guildline high-speed samplers - Milligan and Riches (1983) 			
Choose Sea Area	ID Originator Code		Meerestechnik OTS-1200 CTD			
Antarctic freshwater bod	Choose your o	rountry, plansa	B Weil Brown MK2 conductivity temperature and depth system			

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

5. CONCLUSION & PERSPECTIVES

- Assoc	red Project Image: Second second		
Alg			
Cro	a Andrija Mohorovicic Geophysical Institute - University Ea	ast Adriatic Coastal Circulation Experiment SDN:EDMERP::7884	Remove
			Save

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



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