Eurofleets+
An alliance of European marine research infrastructure
to meet the evolving needs of the research and industrial communities

Shipboard data management and access

EARS, Eurofleets Automatic Reporting System

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UTM CSIC

RVs data

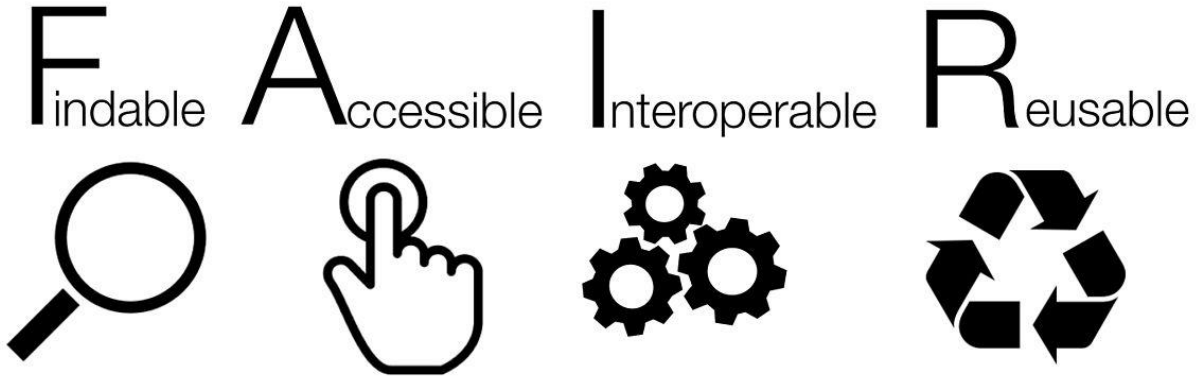
This comprises underway data acquisition systems, human operations and by (un)deploying (a group of) sensors like frames, ROVs, AUVs or floats.

- En-route data acquisition by a platform: navigation, meteorology, thermosalinometry
- Human operations: physical measurements such as a CTD profile, sediment or biota samples; multibeam data, etc
- Long-term timeseries by deployed sensors

Category	Platform	Science	Matrix	Measurement type	spatiotemporal geometry	format at acquisition time	format at submission time	final format
En-route data acquisition	R/V, ROV, AUV, Float	Physics		Location	trajectory	Proprietary output files/network message	csv/ODV/NetCDF	ODV/NetCDF
En-route data acquisition	R/V, ROV, AUV, Float	Physics	air	Meteorology	trajectory	Proprietary output files/network message	csv/ODV/NetCDF	ODV/NetCDF
En-route data acquisition	R/V, ROV, AUV, Float	Physics, chemistry	water	Thermosalinometry	trajectory	Proprietary output files/network message	csv/ODV/NetCDF	ODV/NetCDF
En-route data acquisition	R/V, ROV, AUV, Float	Physics, chemistry	water	AUMS/FerryBox	trajectory	Proprietary output files/network message	csv/ODV/NetCDF	ODV/NetCDF
Long-term timeseries by deployed sensors	compound sensor	Physics, chemistry	water	Frame with multiple sensors	Point timeseries	Proprietary output files	csv/ODV/NetCDF	ODV/NetCDF
Long-term timeseries by deployed sensors	Single sensor	Physics, chemistry	water	Any single sensor (current meter, sea level,..)	Point timeseries	Proprietary output files		
Human operations	R/V	Physics	air, water, sediment	CTD profiles	Profile	Proprietary output files	csv/ODV/NetCDF	ODV/NetCDF
Human operations	R/V	Physics	air, water, sediment	Ad hoc physical observations	Single point in time and space	Proprietary output files/spreadsheet	csv/ODV/NetCDF	ODV
Human operations	R/V	Physics, Chemistry, Geology, Biology	water, sediment, biota	Water, sediment or biota samples	Single point in time and space	spreadsheet	csv/ODV	ODV
Human operations	R/V	Geology, Biology	Sediment, ecology	Human observations	Single point in time and space	spreadsheet	csv	ODV
Imagery data	R/V, ROV, AUV, Float	Geology, Biology	Sediment, ecology	Images	Single point in time and space	Image	n/a	n/a

Open Data Management Strategy

To ensure that the research and underway data collected by RVs are made widely available in line with FAIR and Open Research Data principles



In order to have FAIR Data -- > **metadata**

- Information about the cruise: who, when, what, how, …
- Information about the events

Use of controlled vocabularies + rules & relations → **Ontologies**

BODC vocabularies

C17 Platform Code
L06 Platform Class
L05 Instrument
L22 Sensor Model
P02 Parameter

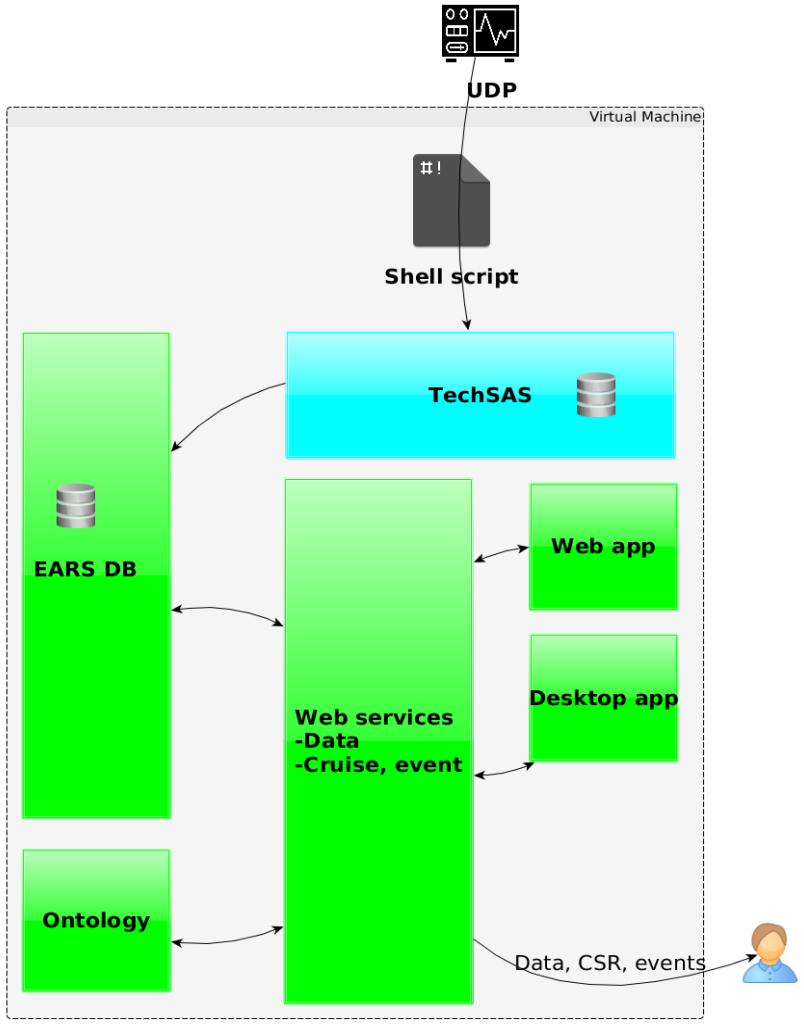
Event is defined by the triplet:

tool, process, action

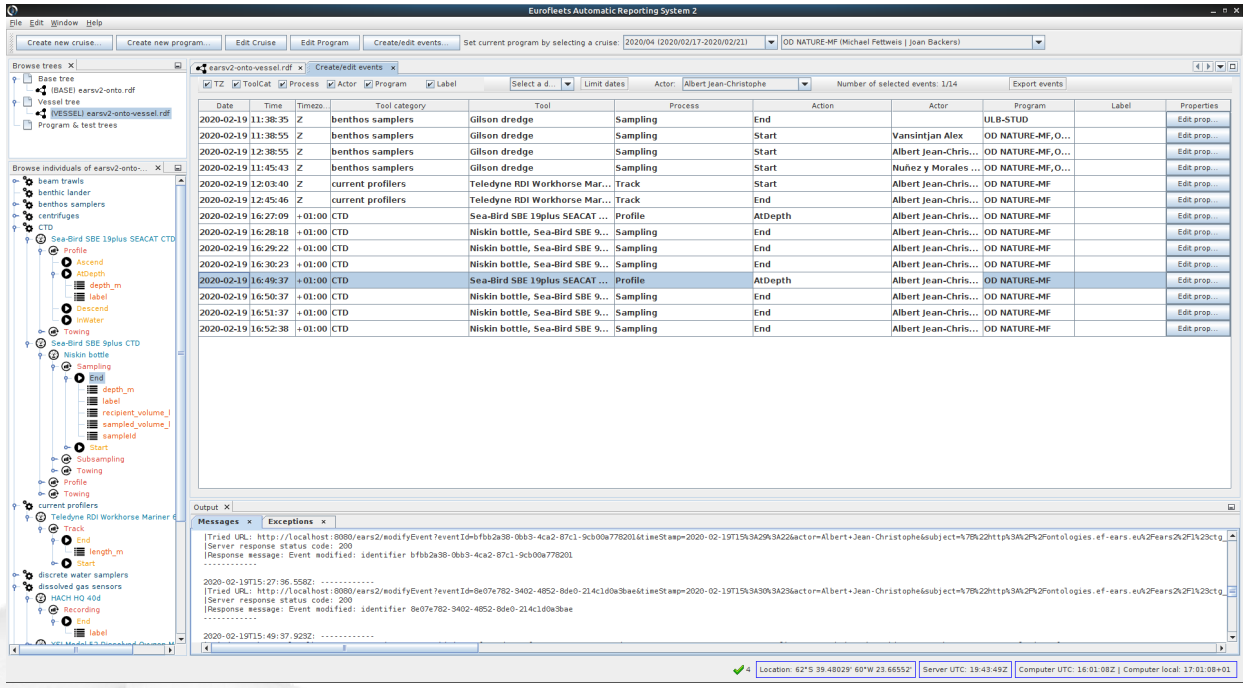
EARS: Eurofleets Automatic Reporting System

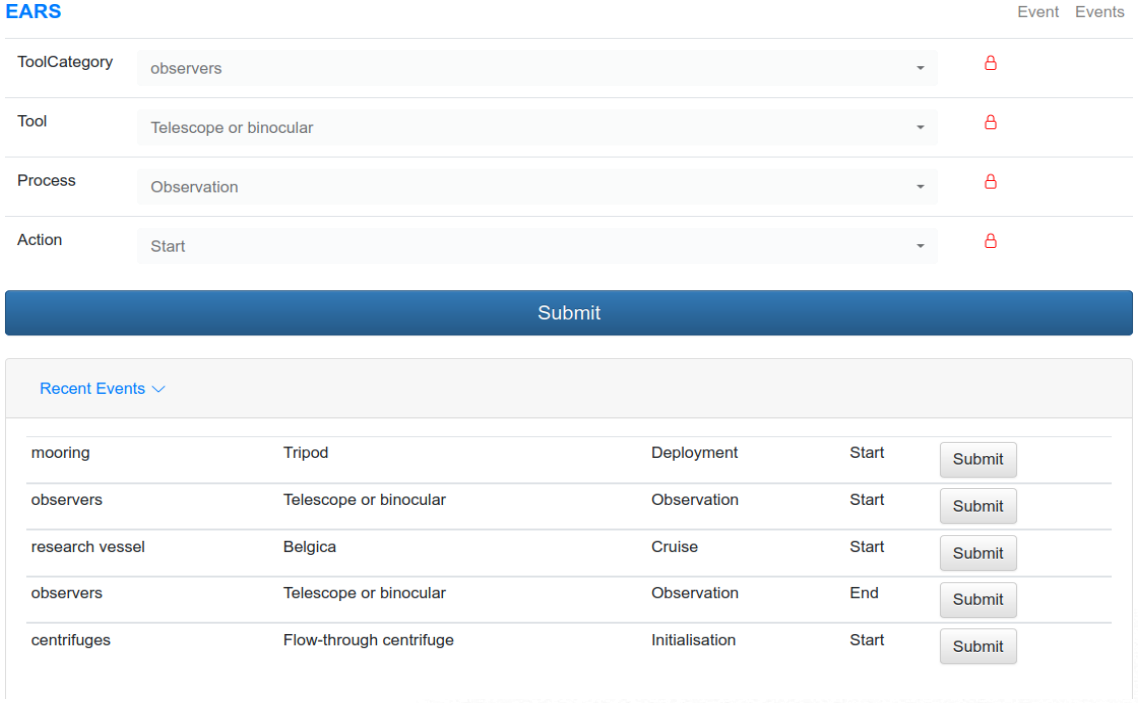
Advancing the shipboard data management system for:

- registering underway and events data
- (near) real-time transfer to shore and EVIOR portal
- Generating CSR (Cruise Summary Report) metadata files



EARS3



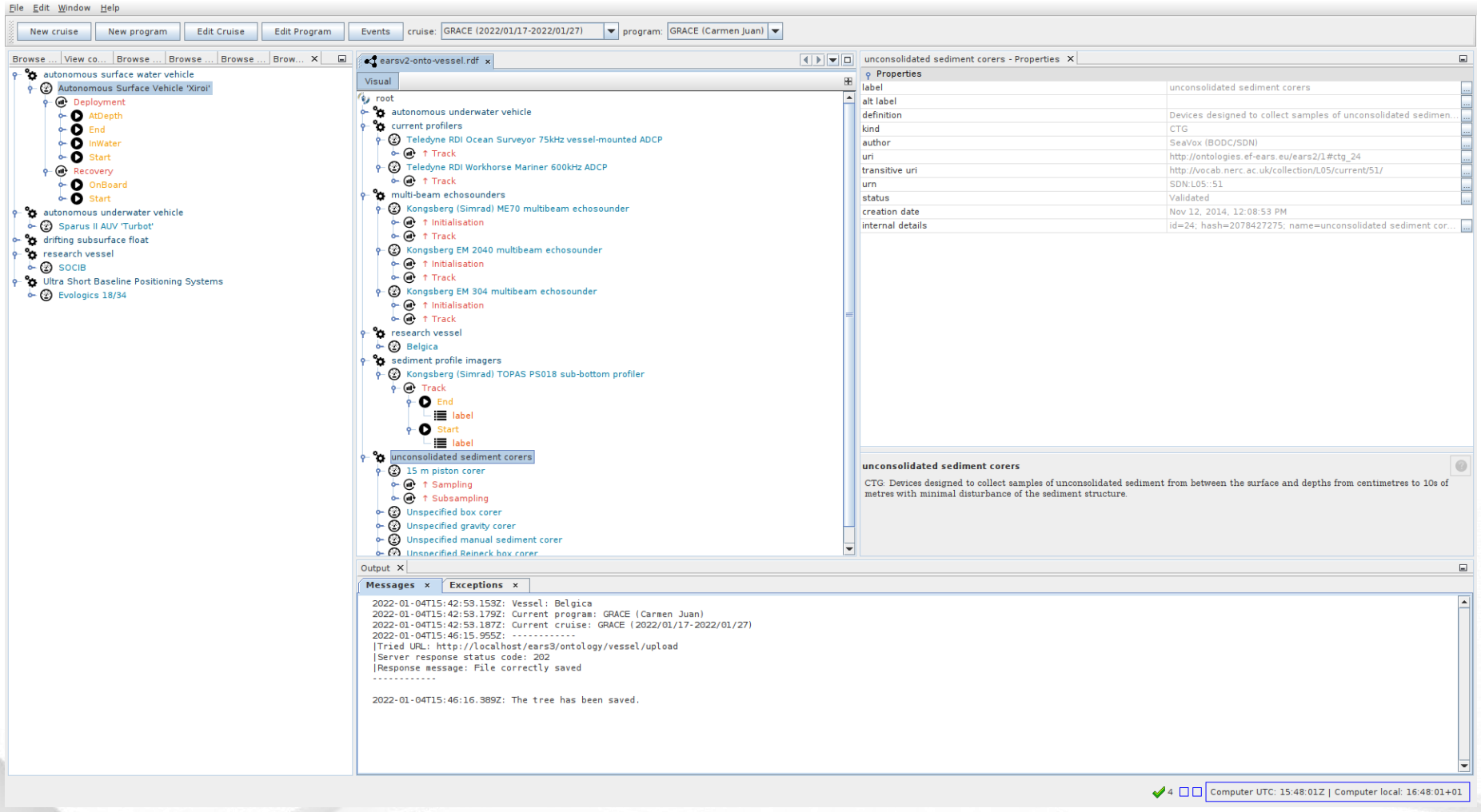


Desktop application – master view
Install on one PC

Simple, mobile-friendly web application – fast entry
Browser

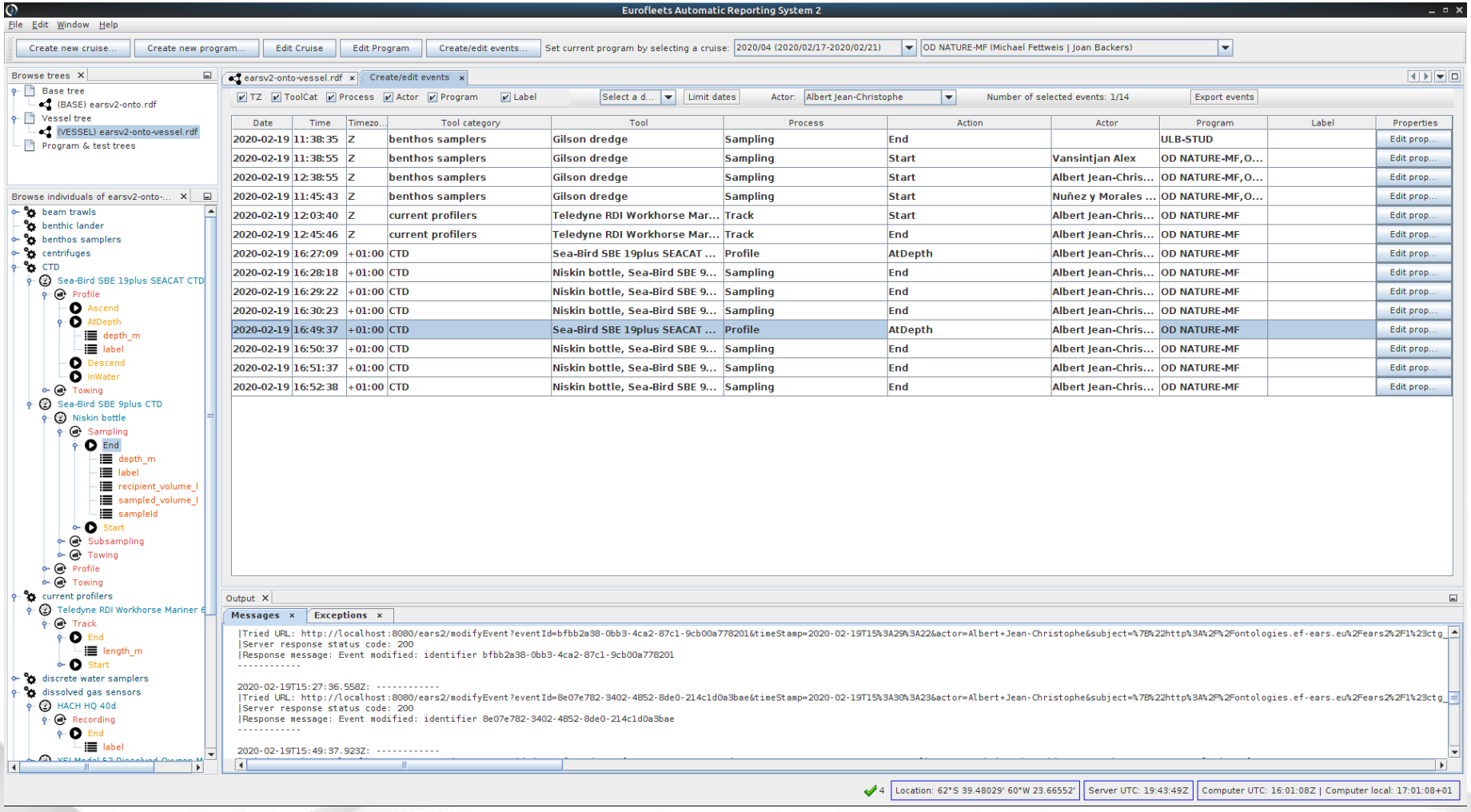
Desktop application

- Create cruise & program
- Build scenarios



Desktop application

- Create events



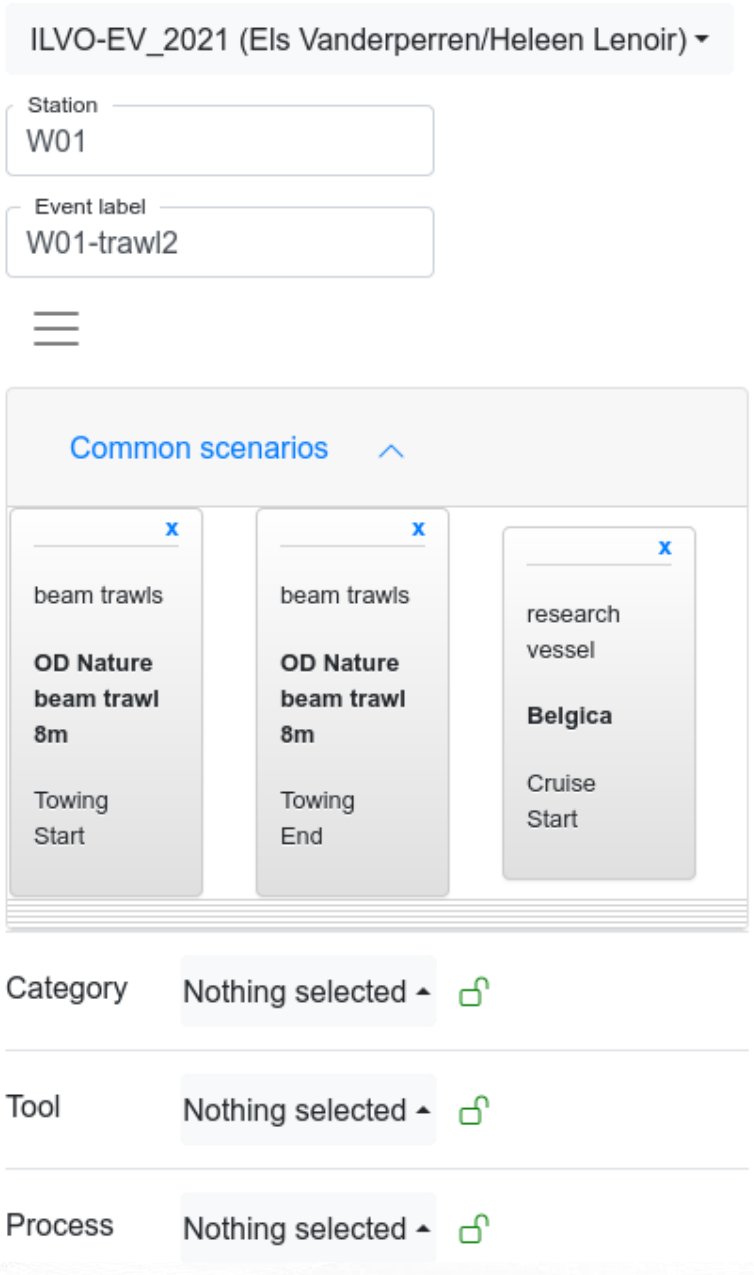
- Cruise overview
  - Download event list (csv)

EARS_export_events_SINES (1)

Tool category	Tool category c	Tool	Tool code	Process	Action	Station	Label	Description	Acquisition Timestamp	Latitude	Longitude	Depth	Heading
meteorological packages	SDN:L05::102	Campbell Scientific CR1000 data logger	SDN:L22::TOOL1541	Track	Start		MET	MET Startup	2022-09-11T09:00:37Z	38.7018888	-9.1575185	9.94	75.91
thermosalinographs	SDN:L05::133	Sea-Bird SBE 21 Thermosalinograph	SDN:L22::TOOL0667	Track	Start		TSS	TSS Startup	2022-09-11T09:01:09Z	38.7018883	-9.1575187	10.16	75.96
current profilers		Teledyne RDI Ocean Surveyor 75kHz vessel-m	SDN:L22::TOOL0362	Track	Start		ADCP75kHz	ADCP75kHz Startup	2022-09-11T09:02:33Z	38.7018885	-9.1575155	9.94	76.23
current profilers		Teledyne RDI Ocean Surveyor 150kHz vessel-(	SDN:L22::TOOL0363	Track	Start		ADCP150kHz	ADCP150kHz Startup	2022-09-11T09:04:10Z	38.7018902	-9.1575077	10.16	74.65
CTD		Sea-Bird SBE 911 CTD	SDN:L22::TOOL0035	Profile	Start	ST01	CTD001		2022-09-11T18:21:52Z	37.2585302	-9.0768038	143.58	296.36
multinet	SDN:L05::68	Vertical multinet	ears:concept::42331b99-4165	Towing	Start	ST01	MN001		2022-09-11T19:10:31Z	37.2585285	-9.0768102	143.0	296.44
unconsolidated sediment corers		Unspecified box corer	SDN:L22::TOOL1177	Deployment	Start	ST01	BC001		2022-09-11T19:53:43Z	37.2585357	-9.0767942	142.55	295.87
CTD		Sea-Bird SBE 911 CTD	SDN:L22::TOOL0035	Profile	Start	ST02	CTD002		2022-09-11T22:10:44Z	37.3425125	-9.2955215	186.62	311.06
multinet	SDN:L05::68	Vertical multinet	ears:concept::42331b99-4165	Towing	Start	ST02	MN002		2022-09-11T23:27:51Z	37.3425105	-9.2955375	828.29	310.3
unconsolidated sediment corers		Unspecified box corer	SDN:L22::TOOL1177	Deployment	Start	ST02	BC002		2022-09-12T00:45:53Z	37.3425052	-9.2955335	829.02	164.11
CTD		Sea-Bird SBE 911 CTD	SDN:L22::TOOL0035	Profile	Start	CCMAR	CTD003		2022-09-12T12:20:32Z	36.8513008	-8.9280555	170.79	193.33
CTD		Sea-Bird SBE 911 CTD	SDN:L22::TOOL0035	Profile	Start	FARO1	CTD004		2022-09-13T06:21:50Z	36.9021393	-7.9066672	103.15	236.02
unconsolidated sediment corers		Unspecified box corer	SDN:L22::TOOL1177	Deployment	Start	FARO1	BC003		2022-09-13T06:40:45Z	36.9022888	-7.9068797	102.73	229.03
CTD		Sea-Bird SBE 911 CTD	SDN:L22::TOOL0035	Profile	Start	FARO2	CTD005		2022-09-13T08:14:39Z	36.8580265	-7.9067107	339.82	223.75
CTD		Sea-Bird SBE 911 CTD	SDN:L22::TOOL0035	Profile	Start	FARO3	CTD006		2022-09-13T09:39:52Z	36.799441	-7.9067352	763.79	230.34
multinet	SDN:L05::68	Vertical multinet	ears:concept::42331b99-4165	Towing	Start	FARO3	MN003		2022-09-13T10:33:30Z	36.7994527	-7.9067198	763.92	232.4
CTD		Sea-Bird SBE 911 CTD	SDN:L22::TOOL0035	Profile	Start	FARO4	CTD007		2022-09-13T12:46:27Z	36.762818	-7.906234	653.91	229.47
water temperature sensor	SDN:L05::134	Sea and Sun Technology Microstructure Profil	SDN:L22::TOOL0453	Profile	Start	FARO4	PF001		2022-09-13T13:32:05Z	36.763111	-7.90493	653.59	134.81
plankton nets		Vertical phytoplankton net	ears:concept::abc6d4be-6d5	Towing	Start	FARO4	PS001		2022-09-13T14:48:59Z	36.7619057	-7.9060037	656.17	235.63
multinet	SDN:L05::68	Vertical multinet	ears:concept::42331b99-4165	Towing	Start	FARO4	MN004		2022-09-13T15:27:38Z	36.761897	-7.9060252	656.41	235.35
unconsolidated sediment corers		Unspecified box corer	SDN:L22::TOOL1177	Deployment	Start	FARO4	BC004		2022-09-13T16:35:54Z	36.7619028	-7.9060038	656.46	249.83
multinet	SDN:L05::68	Vertical multinet	ears:concept::42331b99-4165	Towing	Start	ST03	MN005		2022-09-14T15:23:10Z	37.9948028	-11.4276952	5092.79	296.41
CTD		Sea-Bird SBE 911 CTD	SDN:L22::TOOL0035	Profile	Start	ST03	CTD008		2022-09-14T17:02:42Z	37.994828	-11.4276675	5093.69	288.95
CTD		Sea-Bird SBE 911 CTD	SDN:L22::TOOL0035	Profile	Start	ST03	CTD009		2022-09-14T18:36:18Z	37.9950665	-11.4282468	5093.3	281.18
water temperature sensor	SDN:L05::134	Sea and Sun Technology Microstructure Profil	SDN:L22::TOOL0453	Profile	Start	ST03	PF002		2022-09-14T22:05:05Z	37.9942793	-11.4282563	5091.53	227.67
plankton nets		Vertical phytoplankton net	ears:concept::abc6d4be-6d5	Towing	Start	ST03	PS002		2022-09-14T23:32:41Z	37.9948103	-11.428734	5091.19	310.16
unconsolidated sediment corers		Unspecified box corer	SDN:L22::TOOL1177	Deployment	Start	ST03	BC005		2022-09-14T23:43:38Z	37.9949448	-11.4283537	5091.22	310.55
CTD		Sea-Bird SBE 911 CTD	SDN:L22::TOOL0035	Profile	Start	ST04	CTD010		2022-09-15T10:31:49Z	37.7415093	-10.6077805	4334.44	304.96
CTD		Sea-Bird SBE 911 CTD	SDN:L22::TOOL0035	Profile	Start	ST04	CTD011		2022-09-15T12:18:27Z	37.7410673	-10.6078063	4332.02	298.15
water temperature sensor	SDN:L05::134	Sea and Sun Technology Microstructure Profil	SDN:L22::TOOL0453	Profile	Start	ST04	PF003		2022-09-15T15:20:52Z	37.739995	-10.6071642	4317.76	238.24

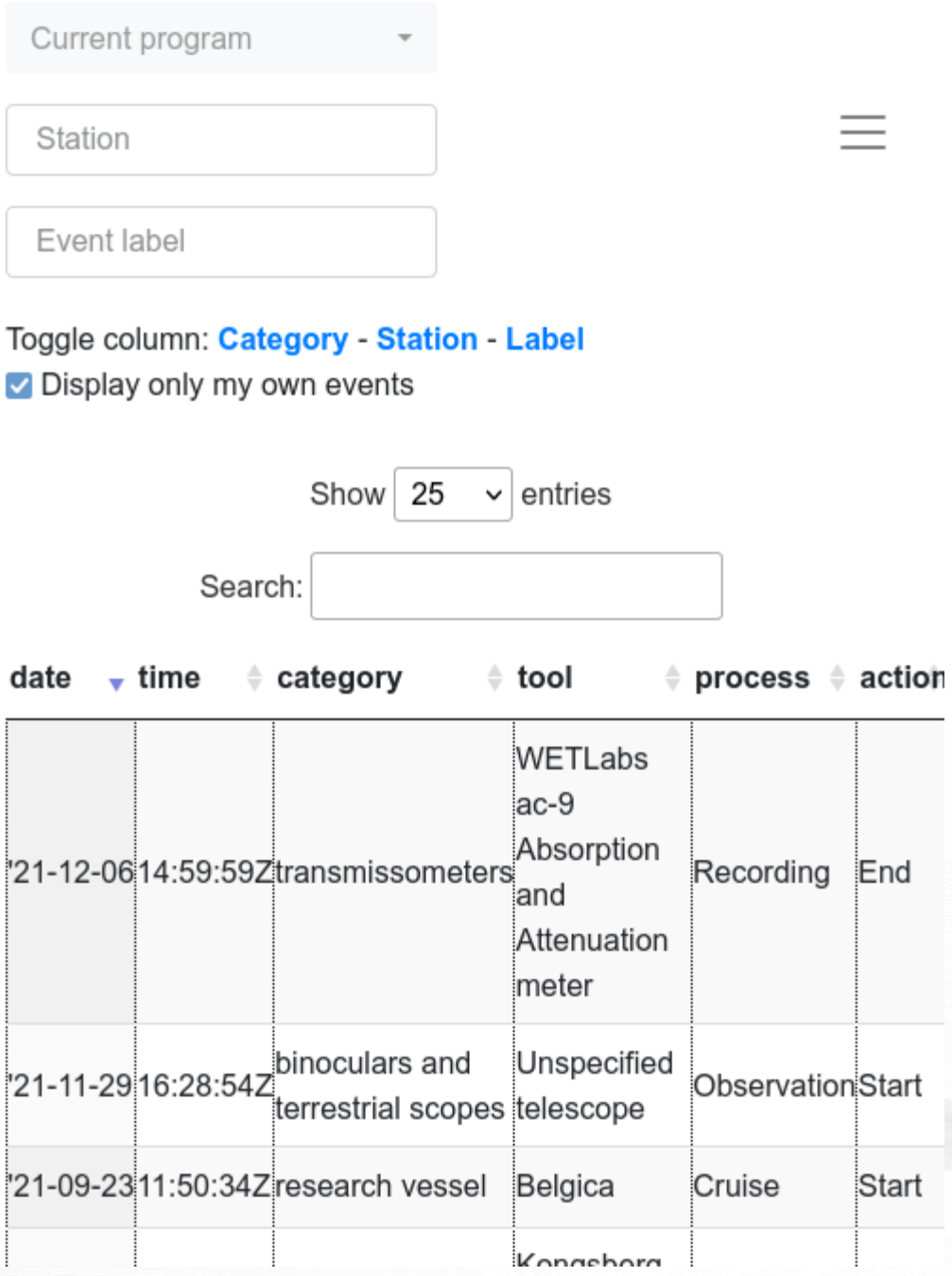
Web application

- Create events



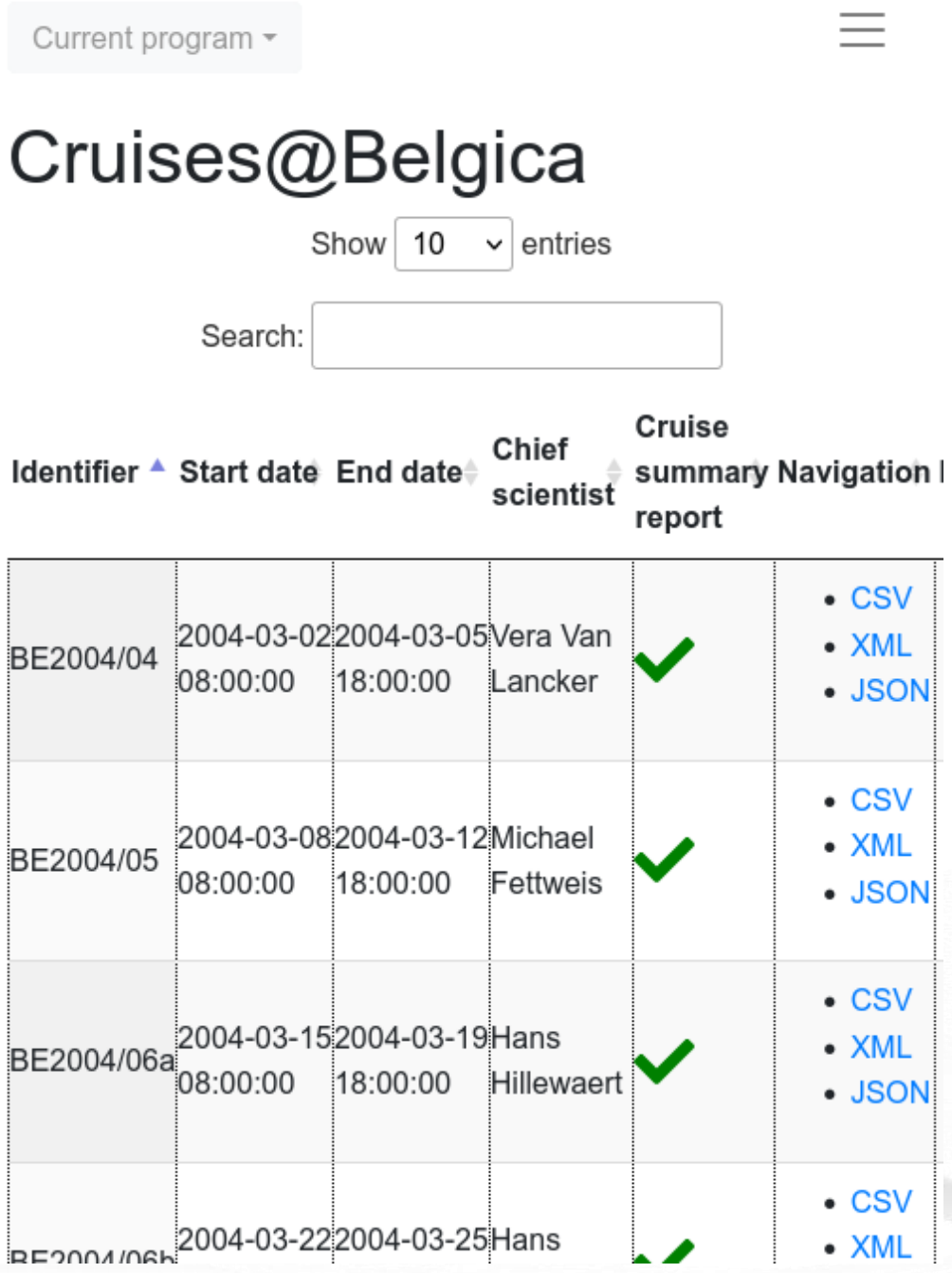
Web application

- Events overview
  - Modify, delete
  - Download event list



Web application

- Cruise overview
  - Download event list (csv)
  - Download cruise data (csv, xml)
  - Download Cruise Summary Reports



SINES

CSR REF-NO : 21027629 Download XML

0 ADD TO BASKET EXPORT

GENERAL INFORMATION

ID
21027629

Platform/Ship
Sarmiento de Gamboa

Cruise begin
11.09.2022

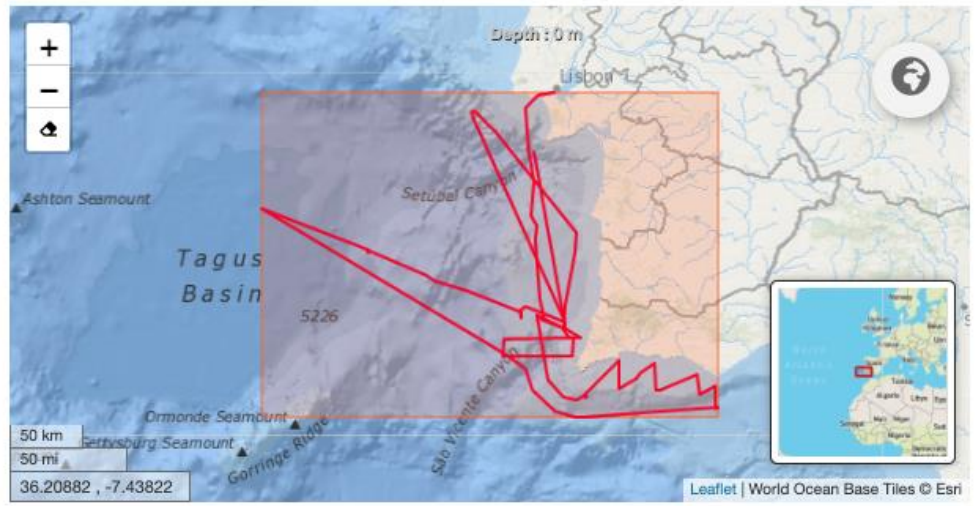
Cruise end
20.09.2022

Port of Departure
Lisbon, Portugal

Port of Return
Lisbon, Portugal

Chief Scientist(s)
Fontela, Marcos - University of Algarve, Marine Sciences Centre

Responsible(s) Laboratory
CSIC, Marine Technology Unit
University of Algarve, Marine Sciences Centre



DESCRIPTION

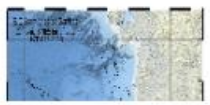
The overall objective of this study is to identify the changes and risks for marine ecosystem functioning and its biodiversity deriving from the potential impact of climate change on Iberian Upwelling fronts.

LOCATION

General Ocean Areas
North Atlantic Ocean

Specific Geographic Areas

Link to Charts



Marsden Squares (S, N, E, W)
-

ADDITIONAL INFORMATION

Parameters measured
Air pressure
Air temperature
Atmospheric humidity

Instruments used
ADVs and turbulence probes
CTD
Global Navigation Satellite System receivers

Outfitting the Eurofleets+ fleet

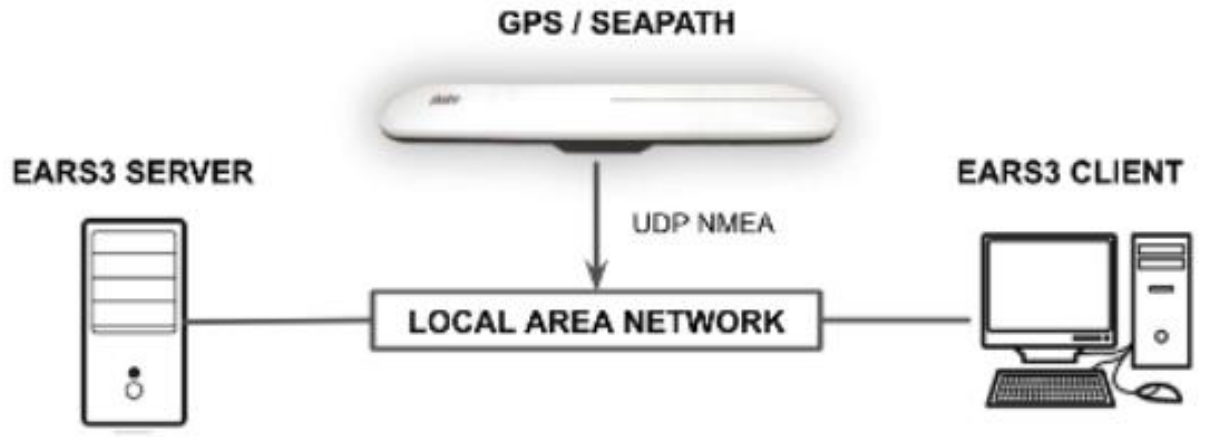
So far EARS has been installed on 14 RVs

EARS3 Installation

- **EARS Server** + web app (V3): (virtual) server
- **EARS Client**: client desktop application on PC

SERVER 🖬 Single Virtual Machine (or self-managed)

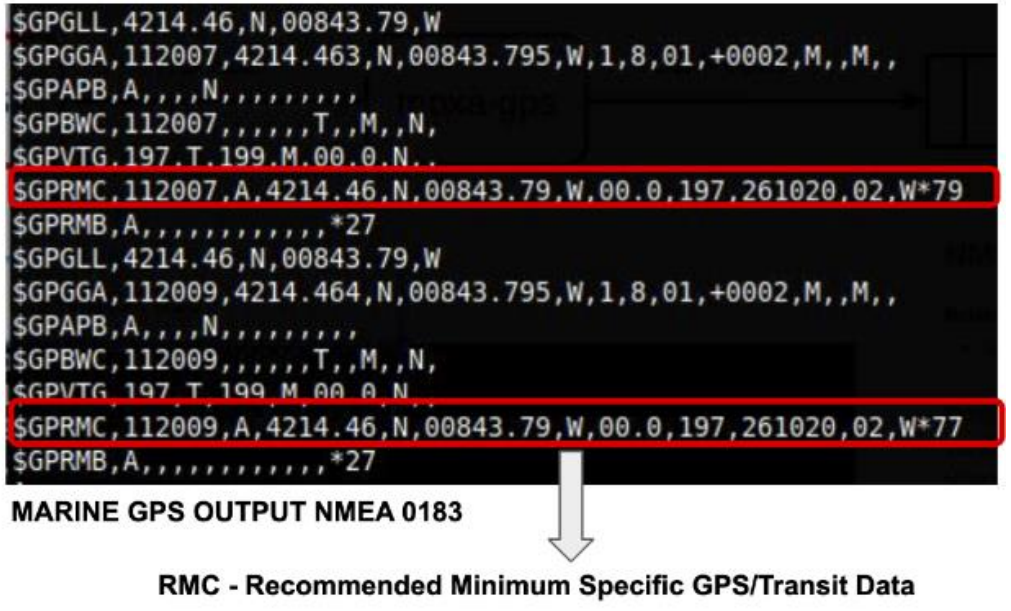
- VirtualBox/Hyper-V/VMWare running Ubuntu Linux (memory stick)
- Has all EARS Server components, transform UDP navigation datagram to EARS format, sending to shore, VPN for remote access
- Make available on LAN, specifically to computer that will host client application



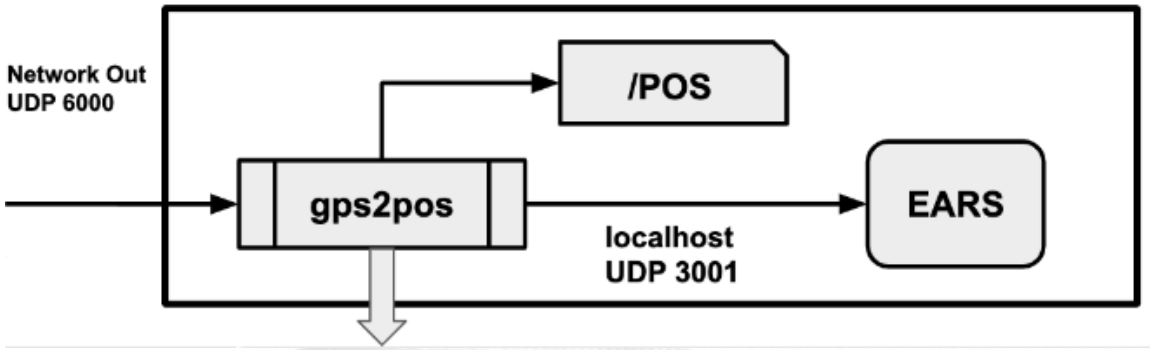
- Internet connection and SSH access is very useful for remote troubleshooting and updates

EARS datagrams

EARS needs NAV, TSS & MET datagrams put on the network (UDP not serial)
If serial then MOXA Nport



Transformation is needed, script included in VM



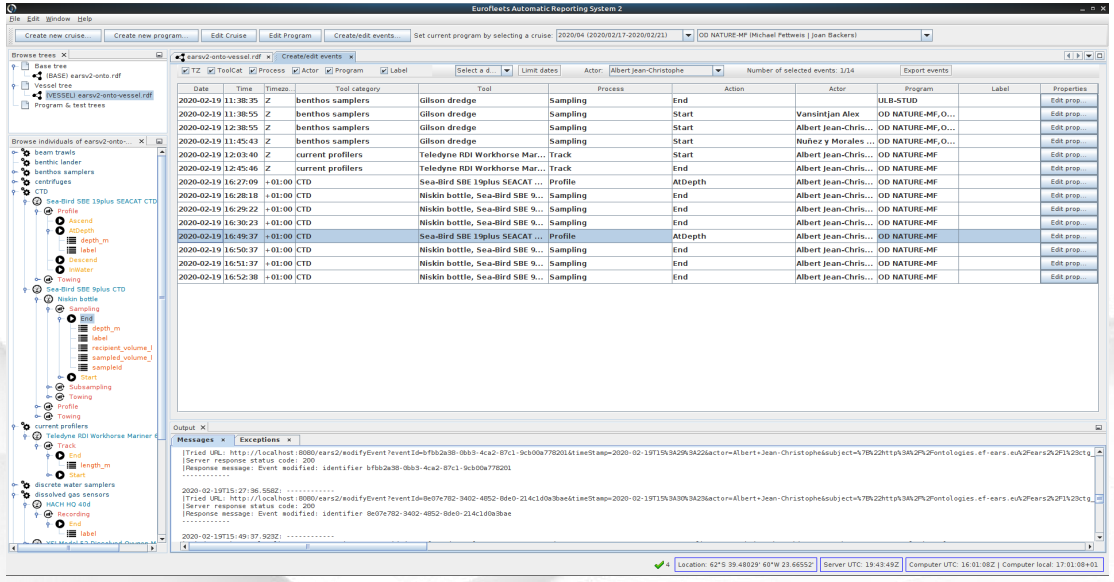
$EFPOS,131017,132035,3.01803,51.44738,216.2,8.9,-27.7,215.4,8.7

CLIENT = EARS FROND-END APPLICATION ON A PC JAVA 11 ENVIRONMENT

- Must have internet connection during setup; best continuously

✓ Check connection with the server

✓ Create a new vessel tree



Manuals:

- **Installation from docker:** https://github.com/naturalsciences/ears3-server/
- **Installation from CSIC VM:** http://datahub.utm.csic.es/files/wl/?id=VSdOEl6Opfl0HWcOE6irB8RJQVqzFDKt&path=EARS%20V3%2FEUROFLEETS_Guideline%20for%20easy%20installation%20%26%20configuration%20of%20the%20integrated%20shipboard%20system.pdf&mode=list
- **Desktop and web app:** http://datahub.utm.csic.es/files/wl/?id=VSdOEl6Opfl0HWcOE6irB8RJQVqzFDKt&path=EARS%20V3%2FEurofleets%2B_D3.9_manual_ears3_client_webapp.pdf&mode=list
- **Training video (03/2021):** http://datahub.utm.csic.es/files/wl/?id=VSdOEl6Opfl0HWcOE6irB8RJQVqzFDKt&path=Webinars_presentations%2FTechnicians_webinar_%2016032021&mode=list

Support:

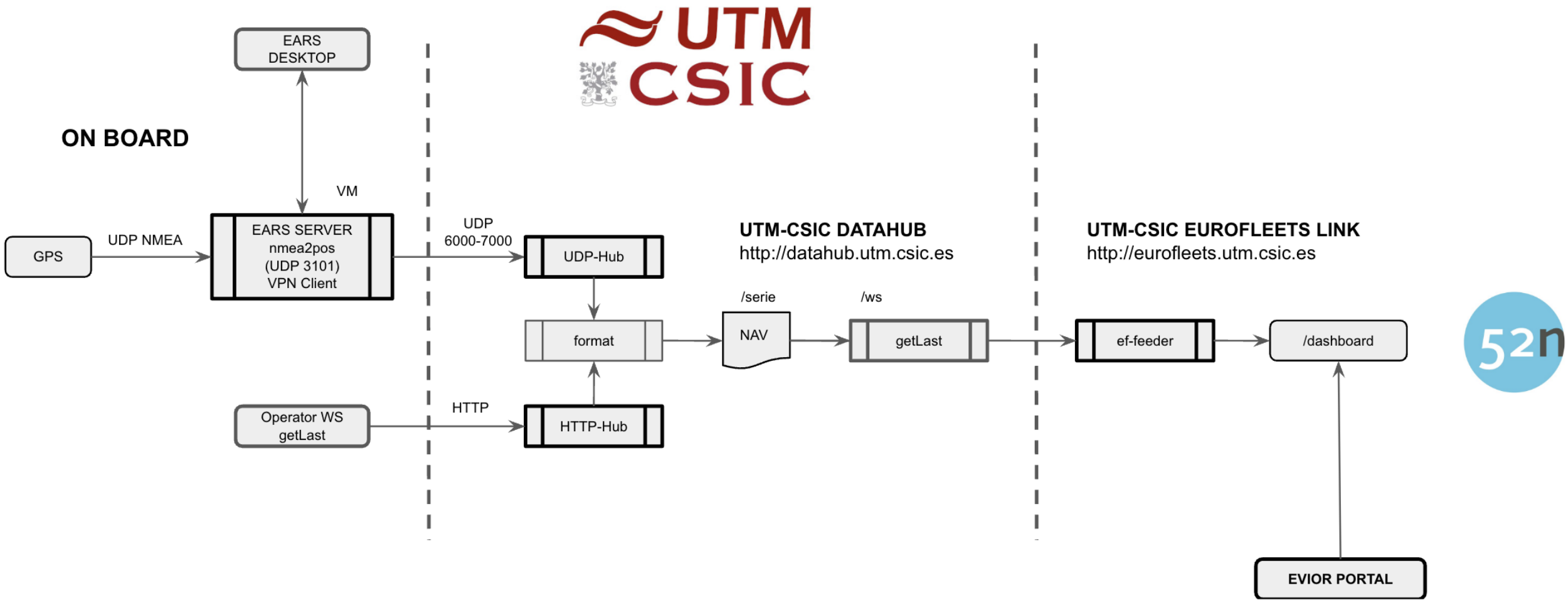
- Normally no Linux commands required
- Installation based on the manuals first, interventions only for emergencies

EF DASHBOARD

- The information exchange from EARS to the Dashboard is arranged by adoption and adaptation of the open-source SeaDataNet Sensor Web Enablement (SWE) toolkit developed by 52°N. The adapted SWE Toolkit has been installed and configured at UTM-CSIC

- An EF+ Data Hub for the underway data (nav, met, and tss)and events has been deployed at UTM-CSIC. Information from the Data Hub provides the input for the Dashboard.

- Data transfer:
  - RV: EARS VM, RV sends datagrams to data hub or query from CSIC to RV WS


EARS
DESKTOP
ON BOARD
VM
GPS
UDP NMEA
EARS SERVER
nmea2pos
(UDP 3101)
VPN Client
UDP
6000-7000
UDP-Hub
format
HTTP
Operator WS
getLast
HTTP-Hub
UTM-CSIC DATAHUB
http://datahub.utm.csic.es
/serie
/ws
NAV
getLast
UTM-CSIC EUROFLEETS LINK
http://eurofleets.utm.csic.es
ef-feeder
/dashboard
EVIOR PORTAL

UTM-CSIC Data Hub - data@utm.csic.es

Name	Last modified	Size	Description
Parent Directory		-	
SDG/	2020-07-13 10:16	-	RV Sarmiento de Gamboa
PEL/	2022-02-01 14:14	-	RV Pelagia
JCI/	2022-01-20 12:35	-	AS Juan Carlos I
HES/	2020-07-13 10:16	-	RV Hesperides
GDC/	2020-07-13 10:14	-	RV Garcia del Cid
DAN/	2021-06-22 10:26	-	RV Dana
CEX/	2021-05-19 10:56	-	RV Celtic Explorer
BEL/	2020-10-13 10:50	-	RV Belgica
AEG/	2021-09-22 07:46	-	RV Aegaeo

UTM-CSIC Data Hub - data@utm.csic.es

Name	Last modified	Size	Description
Parent Directory		-	
TSS/	2022-03-21 00:01	-	Sea surface thermosalinograph data
POS/	2020-04-19 08:32	-	Autoindexed position data
NAV/	2022-03-21 00:00	-	Navigation data
MET/	2022-03-21 00:00	-	Weather station data
EVT/	2020-07-13 10:16	-	Events metadata

```
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```
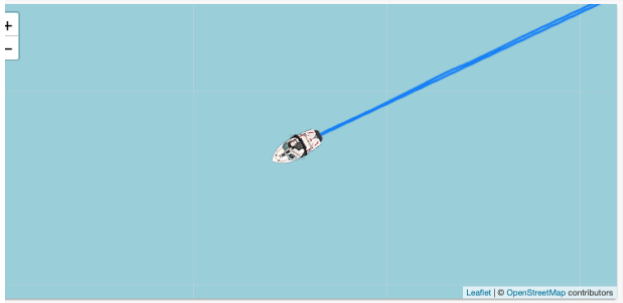

GetLast Web Service feeds the SWE Ingestion toolkit for each vessel to be shown by means of the dashboard

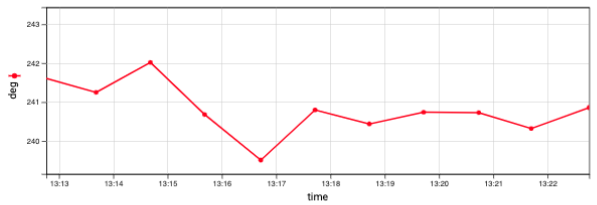
Select a ship:

- R/V Belgica
- R/V Dana
- R/V García del Cid
- R/V Hesperides
- R/V Ramón Margalef
- R/V Sarmiento de Gamboa
- R/V Aegaeo
- R/V Celtic Explorer
- R/V Árni Friðriksson
- R/V Pelagia



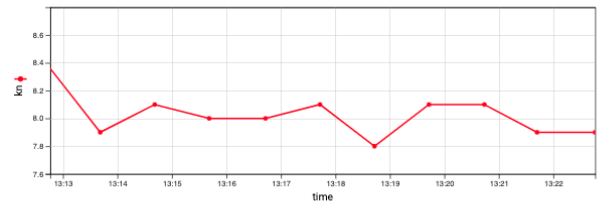
Heading

Heading measured by the R/V Sarmiento de Gamboa
240,86 deg at 14.11.2022 13:22:46



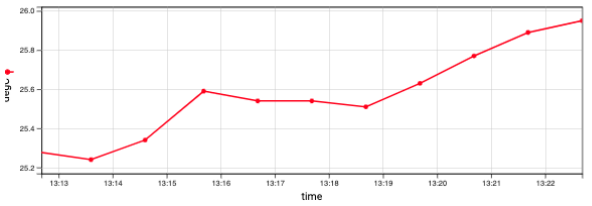
Speed over ground

Speed over ground measured by the R/V Sarmiento de Gamboa
7,9 kn at 14.11.2022 13:22:46



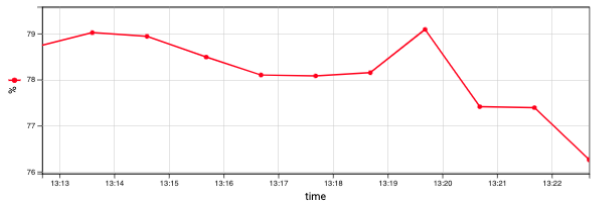
Air temperature

ir temperature measured by the R/V Sarmiento de Gamboa
5,95 degC at 14.11.2022 13:22:41



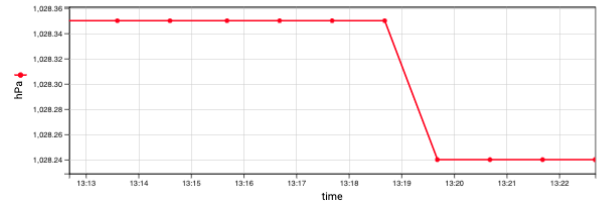
Relative Humidity

Relative Humidity measured by the R/V Sarmiento de Gamboa
76,26 % at 14.11.2022 13:22:41

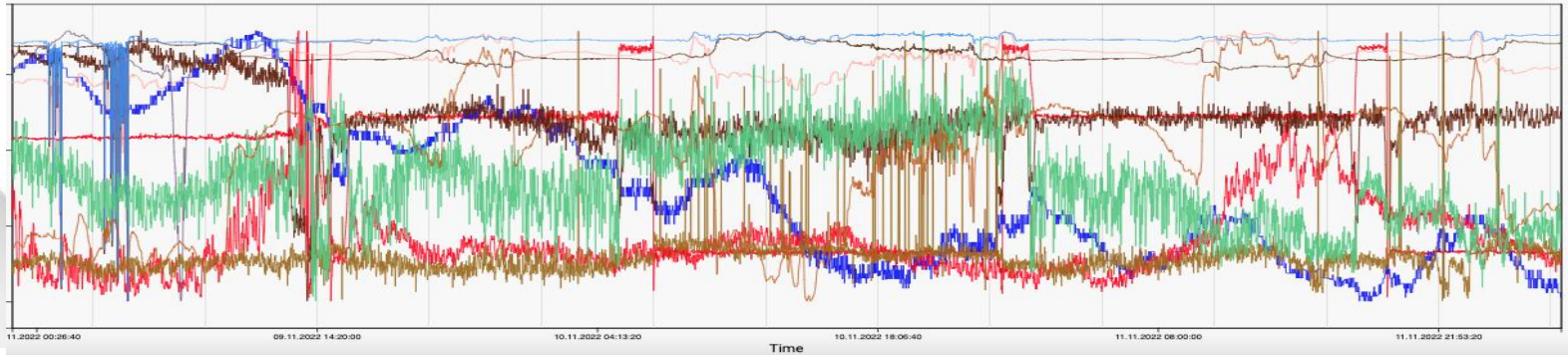


Atmospheric Pressure

Atmospheric Pressure measured by the R/V Sarmiento de Gamboa
1.028,24 hPa at 14.11.2022 13:22:41

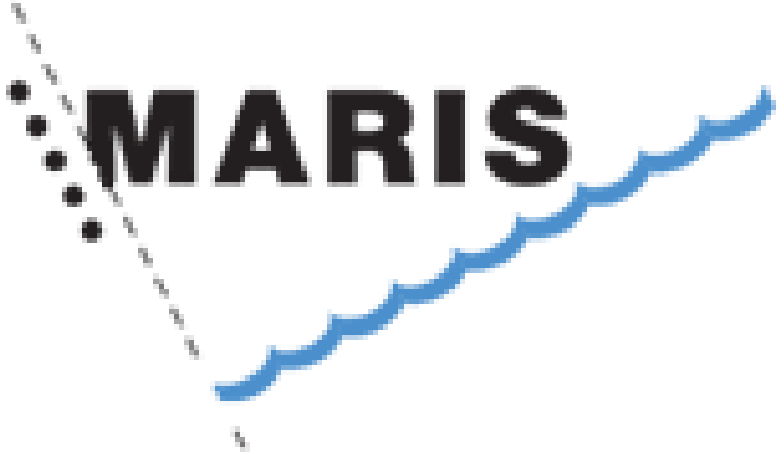


Selected Track: R/V Sarmiento de Gamboa in week 44 of 2022



museum
Royal Belgian Institute of Natural Sciences

UTM
CSIC


MARIS

Ifremer

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