



<b>Topic</b>	H2020 – INFRAIA-2018-2020
<b>Short Title</b>	EurofleetsPlus
<b>Title</b>	An alliance of European marine research infrastructures to meet the evolving requirements of the research and industrial communities
<b>Project Number</b>	824077
<b>Delivery Date</b>	31 January 2022
<b>Deliverable No</b>	D9.11
<b>Lead Beneficiary</b>	MARIS
<b>Dissemination Level</b>	Public

## En-Route data collection exploitation and promotion interim report



Document information	
<b>Document Name</b>	En-Route data collection exploitation and promotion interim report
<b>Document ID</b>	D9.11 En-Route data collection exploitation and promotion interim report V1 MARIS
<b>Revision</b>	V1.0
<b>Revision Date</b>	
<b>Authors</b>	Dick M.A. Schaap – MARIS; Susana Diez Tagarro – CSIC; Christian Autermann – 52North
<b>Security</b>	Public

Approvals			
	Name	Organisation	Date
<b>Coordinator</b>	Aodhán Fitzgerald	Marine Institute	31.01.2022
<b>Activity Coordinator</b>	Dick M.A. Schaap	MARIS	25.01.2022
<b>WP Leader</b>	Sandra Sa	EUROCEAN	26.01.2022

History			
Revision	Date	Modification	Author
V1.0	25 January 2022	First draft	Dick M.A. Schaap, Susana Diez Tagarro, Christian Autermann

This document contains information, which is proprietary to the EUROFLEETS+ consortium. Neither this document nor the information contained herein shall be used, duplicated or communicated by any means to any third party, in whole or in parts, except with prior written consent of the EUROFLEETS+ Coordinator.

The information in this document is provided as is and no guarantee or warranty is given that the information is fit for any particular purpose. The user thereof uses the information at its sole risk and liability.

## TABLE OF CONTENTS

### Contents

1	Introduction .....	1
2	Summary of Eurofleets+ data management workflow and position of EVIOR.....	1
3	Maintenance and status of current EVIOR components .....	3
	Cruise Programme db system .....	5
	Cruise Summary Reports db system .....	7
	Dashboard for information from sailing vessels .....	9
4	Further planned activities for Task 9.4 .....	17

## 1 Introduction

Eurofleets+ facilitates open free of charge access to a unique fleet of state-of-the-art research vessels, AUVs and ROVs from European and international partners. This is arranged by competitive transnational access calls which are published at the Eurofleets+ portal. A Data Policy has been adopted which aims at making Eurofleets+ research data to be findable, accessible, interoperable and reusable (FAIR). Therefore, data management is an integral part of the Eurofleets+ workplan, and different aspects can be found in several work packages, in particular WP3, WP4 and WP9. The latter WP has a focus on dissemination and promotion and includes a Task 9.4 - Exploitation and Promotion of the scientific data. This task aims to ensure that the research data collected during the funded cruises, and the en-route data collected by the vessels are made widely available in line with FAIR and Open Research Data principles. The Eurofleets+ **EVIOR - European Virtual Infrastructure in Ocean Research** platform plays an important role in this process by publishing and giving access to information about research vessels (RV), cruise programmes, completed cruises, and underway information and data.

This **D9.11** document provides an overview of progress up till January 2022 with maintenance of information components of the EVIOR platform. The information gathering for this maintenance is done by partners MARIS, CSIC, RBINS, HCMR, OGS, IFREMER and EuroOCEAN, in cooperation with research vessel operators, SeaDataNet network of NODCs, and TA cruise scientific teams.

Remarks: The ultimate aim is to provide at EVIOR also discovery and public access to research data sets of TA funded cruises as collected and processed by their research teams in cooperation with Eurofleets+ assigned NODC data centres. This will be done by adding to EVIOR a new component '**Eurofleets+ data sets catalogue**' which has been specified in **D9.5**. It will focus on information and data access, explicitly concerning Eurofleets+ TA funded cruises. This extra component will be deployed in the coming months as data sets from cruises are becoming available thanks to the Data Management follow-up activities which are reported up till January 2022 in Deliverable **D4.9**.

## 2 Summary of Eurofleets+ data management workflow and position of EVIOR

A major objective of the Eurofleets+ data management plan is to ensure that metadata and data of TA cruises will become available for publishing and wide dissemination. For that purpose, the research vessels of the Eurofleets+ fleet are being equipped with a shipboard system (EARS) to gather and transfer metadata and data as acquired during TA cruises. Moreover, there is interaction with the TA cruise scientific teams about planning and deployment of Data Management Activities for all collected and processed cruise data sets.

Since the Eurofleets+ project start several research vessels have been equipped with EARS V2 and lately with EARS V3 as part of the EARS development and testing and consecutively in the framework of deploying Data Management activities for Eurofleets+ TA cruises. This process is ongoing for the coming TA cruises, expanding the number of EARS equipped research vessels. The process for installing and configuring the EARS system at research vessels is led by partners CSIC and RBINS in contact with technical teams of the vessel operators and by training the TA cruise scientific teams.

The EARS system is instrumental for gathering the full set of cruise data that is acquired during the operations of an Eurofleets+ TA cruise. This comprises metadata and data from:

- En-route (underway) data acquisition by fixed sensors on the platform: location, meteorology, thermosalinometry, FerryBox,
- Human operations: physical measurements such as a CTD profile or water transparency; measurements and observations derived water, sediment or biota samples; occurrence observations
- Long-term timeseries by sensors deployed on frames, ROVs, AUVs or floats

The Data Management follow-up is done by three NODCs (RBINS, HCMR, and OGS) who are project partners. They work together with the TA cruise scientific teams to prepare Data Management Plans (DMP). In the next step, they coach the TA cruise scientific teams for deploying those DMPs, aiming at using EARS facilities during the cruises and at retrieving afterwards metadata and data sets for long term stewardship and publishing of the Eurofleets+ cruise results by these NODCs. For wider dissemination of the results also several catalogues of leading European infrastructures such as SeaDataNet, EurOBIS, and EMODnet are populated with metadata and data. The Deliverable D4.9 reports on these Data Management follow-up activities by the three NODCs for funded Eurofleets+ cruises from the project start till January 2022.

The overall Eurofleets+ Data Management workflow is illustrated in the following image from sailing vessel to the EVIOR platform.

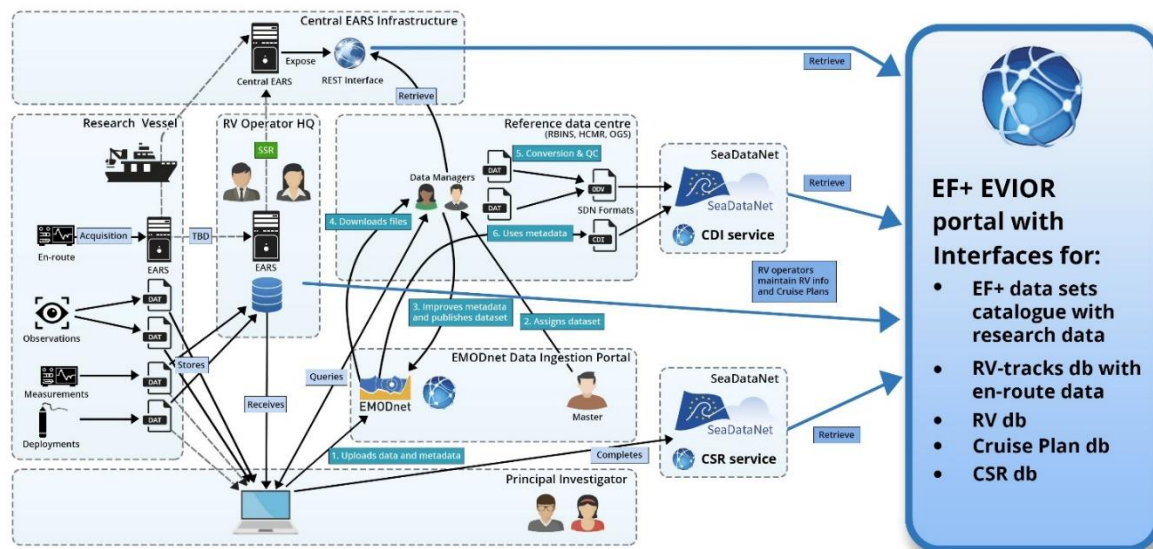


Image 1. Complete Eurofleets+ data management workflow as planned and being applied

**En-route metadata and data** from the EARS system at research vessels is transferred to a Hub managed by CSIC who ensures publishing of the received information by means of a **Dashboard** at the **EVIOR portal**.

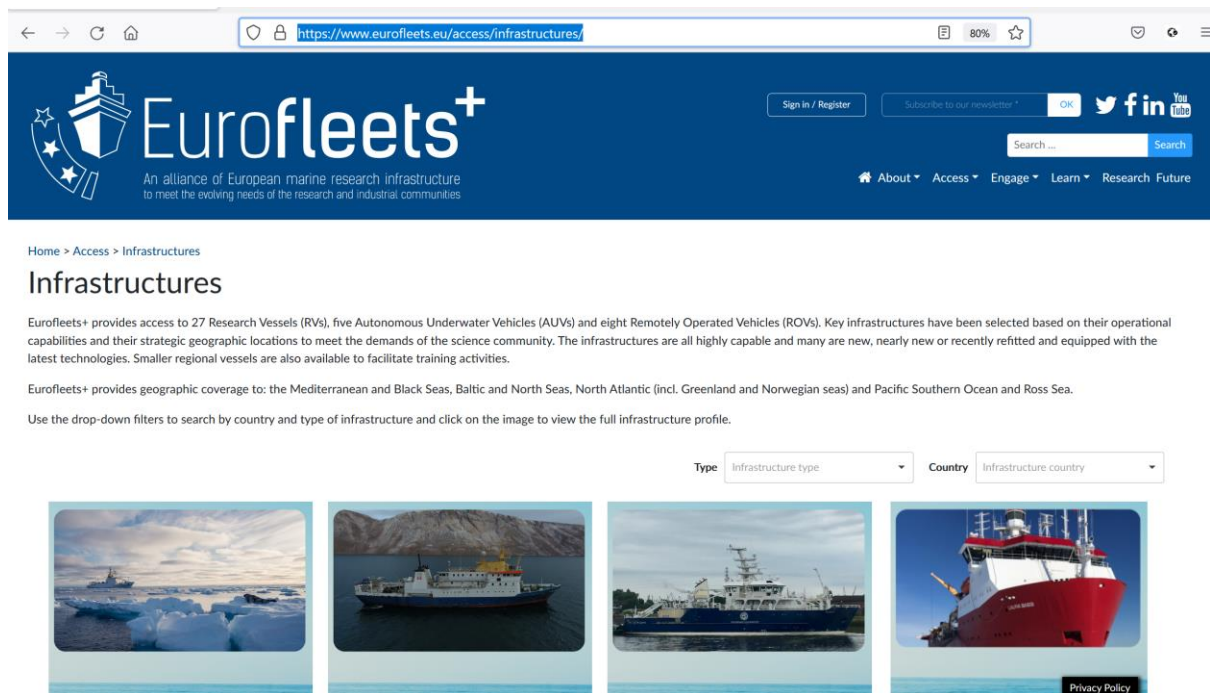
**Cruise plans** are gathered from all Eurofleets+ vessel operators and managed by MARIS for publishing through a **Cruise Plan catalogue** at the **EVIOR portal**.

**Cruise Summary Reports (CSR)** are prepared by Principal Investigators of cruises with coaching by SeaDataNet NODCs and managed by BSH and IFREMER for publishing through the **SeaDataNet Cruise Summary Report catalogue** and by MARIS at the **EVIOR portal**.

**Processed data sets, including metadata**, from the Eurofleets+ TA funded cruises are retrieved by assigned NODCs (RBINS, HCMR, and OGS) from the Principal Investigators, possibly using **EMODnet Ingestion** as submission service. The NODCs elaborate the received metadata and data to common standards for long term stewardship at their data centres and publishing through the SeaDataNet CDI service and possible other leading European marine data infrastructures, such as EurOBIS, EGDI, depending on data types. The results will be published at the EVIOR portal by means of a new component '**Eurofleets+ data sets catalogue**', which is planned for development and launch in the coming months, now that progress is being made with following up TA cruises (see also Deliverable D4.9).

### 3 Maintenance and status of current EVIOR components

The EVIOR platform and its components have been restyled and upgraded in the first months of the Eurofleets+ project. Recently, the position of EVIOR in the Eurofleets+ website has been re-arranged. It is now part of the navigation menu option 'Infrastructures' which lists and displays all Eurofleets+ research vessels, AUVs and ROVs and at EVIOR: <https://www.eurofleets.eu/access/infrastructures/>



Home > Access > Infrastructures

## Infrastructures

Eurofleets+ provides access to 27 Research Vessels (RVs), five Autonomous Underwater Vehicles (AUVs) and eight Remotely Operated Vehicles (ROVs). Key infrastructures have been selected based on their operational capabilities and their strategic geographic locations to meet the demands of the science community. The infrastructures are all highly capable and many are new, nearly new or recently refitted and equipped with the latest technologies. Smaller regional vessels are also available to facilitate training activities.

Eurofleets+ provides geographic coverage to: the Mediterranean and Black Seas, Baltic and North Seas, North Atlantic (incl. Greenland and Norwegian seas) and Pacific Southern Ocean and Ross Sea.

Use the drop-down filters to search by country and type of infrastructure and click on the image to view the full infrastructure profile.

Type: Infrastructure type Country: Infrastructure country

Privacy Policy

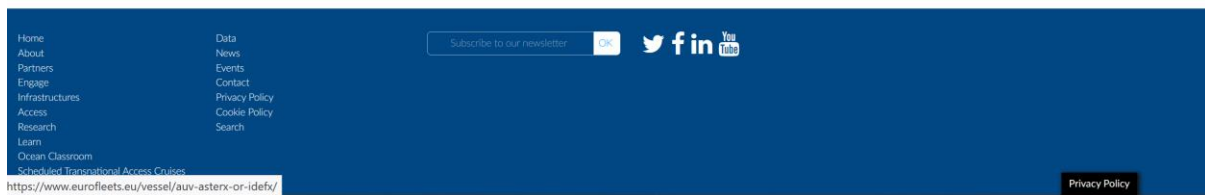
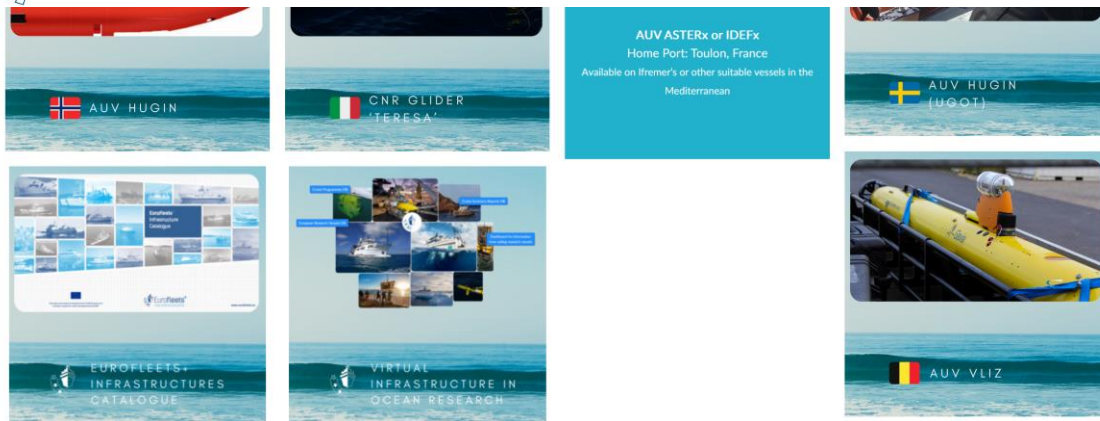
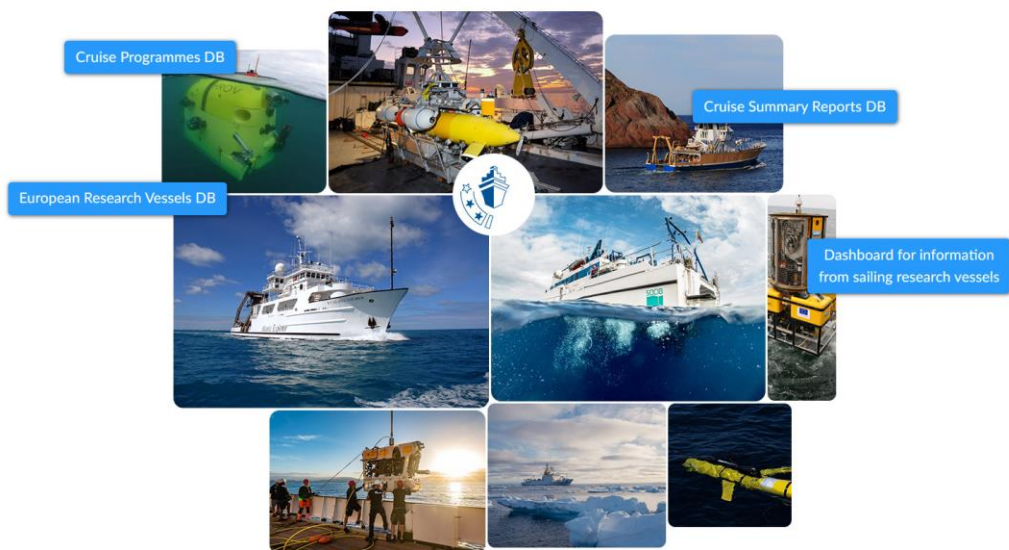


Image 2. Eurofleets+ web page for Infrastructures with EVIOR at the bottom

Clicking on each infrastructure image gives a section with details on each infrastructure, while clicking on the EVIOR image leads to the EVIOR platform at: <https://evior.eurofleets.eu/>



## European Virtual Infrastructure in Ocean Research (EVIOR)



Sharing information on planned, current and completed cruises and on details of European research vessels and specialized equipment. Giving e-access to underway events information, sailing tracks and current position of European research vessels

Image 3. Eurofleets+ EVIOR platform, giving access to the EVIOR information components

## Cruise Programme db system

The Eurofleets Cruise Programme database is being populated with Cruise Plans for as many research vessels as possible from European operators (all RVs) and international operators (ocean-going RVs). This also includes Cruise Plans for Eurofleets+ TA cruises. For preparing and submitting CPs use is to be made of the Eurofleets standard format, tools and procedure. The CP database itself is managed by MARIS.

Due to the COVID crisis many cruises have been postponed since early 2020. For that reason, it was decided to postpone also the information gathering activities for the Cruise Programme database for quite some time. However, early August 2021, MARIS in dialogue with MI, has restarted this activity by sending out a request and forms to all EF+ RV operators (26) for collecting info on their planned Cruises for 2021 and possibly beyond. A number of operators responded on short term and delivered input. Early September 2021, a reminder was sent, again resulting in contributions. This was repeated in October and November 2021 for outstanding operators.

At present, a response was received from 22 RV operators out of 26 of which 4 indicating NULL entries (RBINS, FAMRI) have indicated no input due to transition to new vessel). Programme input has been received from 18 RV operators from 14 countries: France, Norway, Spain, Germany, Ireland, Greece, Romania, Finland, Italy, Turkey, New Zealand, Denmark, Belgium, and Portugal. In addition, UK (NOC-BODC) has indicated to undertake action to bring in UK RVs. The overall result is given in the following table.

Country	Operator (EDMO)	Operator (EDMO)	Ship	ICS-Shipcode	EF+ partner	Entries
Belgium	RBINS	3325	Belgica (new)	11BU	YES	0
Belgium	VLIZ	422	Simon Stevin	11SS	YES	15
Denmark	DTU-AQUA	2195	RV Dana	26D4	YES	7
			Havfisken II	26HF		2
			Holger Danske	26HD		9
Faroe Islands	FAMRI	3084	Magnus Heinason	26MH	YES	0
Finland	SYKE	1104	Aranda	34A3	YES	15
France	Ifremer	848	Alis	35AY	YES	5
			Antéa	35A8		3
			Cotes de la Manche	35C4		6
			Haliotis	35HL		4
			L'Atalante	35A3		3
			Marion Dufresne	35MV		5
			Pourquoi pas?	35PK		5
			Thalassa	35HT		9
			Thalia	35TC		14
			Thetys II	35TT		7



Country	Operator (EDMO)	Operator (EDMO)	Ship	ICS-Shipcode	EF+ partner	Entries
Germany	AWI	1368	FS Polarstern	06AQ	YES (AWI)	11
	Briese Schifffahrt	1569	Heincke	06HK		20
	DFG	1365	Maria S Merian	06M2		10
	DFG	1365	Meteor	06M3		11
	PtJ, RC Juelich	1366	Sonne	06SN		15
	Thunen Institute	1570	Solea	06SL		14
	Thunen Institute	1570	Walther Herwig III	06NI		10
Greece	HCMR	164	Aegaeo	36AE	YES	15
			Philia	36PH		7
Greenland	GINR	2807	Sanna	GLSW	YES	0
Iceland	MFRI	4766	Arni Fridriksson	46AS	YES	0
			Bjarni Saemundsson	46BS		0
Ireland	MI	396	Celtic Explorer	45CE	YES	8
			Celtic Voyager	45CV		16
Italy	CNR (SO.PRO.MAR SpA)	2802	Dallaporta	48DP	YES	29
Italy	OGS	120	Laura Bassi	487A	YES	7
Italy	NATO CMRE	4514	CRV Leonardo	48LE	YES	9
			NRV Alliance	06A4		8
Netherlands	NIOZ	630	Pelagia	64PE	YES	0
Norway	IMR	1351	Dr. Fridtjof Nansen	58KC	YES	13
			G.O.Sars	58G2		13
			Kristine Bonnevie	58UO		25
			Kronprins Haakon	58US		15
			G.M. Dannevig	58D2		17
			Hans Brattström	58HB		46
			Johan Hjort	58J3		13
Portugal	IPMA	3288	Mario Ruivo	68R6	YES	3
Romania	GeoEcoMar	850	Mare Nigrum	73AA	YES	10
			Istros	73IS		7
Spain	IEO	353	Ángeles Alvaríño	29AJ	YES	20
			Francisco de Paula Navarro	29FN		8
			Ramon Margalef	29RM		30
			Lura	29LU		16
			Mytilus	29MY		16
Spain	CSIC	2489	Garcia del Cid	29GD	YES	5
			Hesperides	29HE		4
			Sarmiento de Gamboa	29AH		11
Spain	SOCIB	3410	SOCIB	29SO	YES	1
Sweden	UGOT	4756	New Skagerak	7720	YES	0

Country	Operator (EDMO)	Operator (EDMO)	Ship	ICS-Shipcode	EF+ partner	Entries
Turkey	TÜBITAK	217	TÜBITAK Marmara	89XL	YES	19
Bermuda	Bermuda Institute of Ocean Sciences	1383	Atlantic Explorer	33H4	YES	0
Canada	Reformar	5127	Coriolis II	18OL	YES	0
New-Zealand	NIWA Vessel Management Ltd	1993	Tangaroa	61TG	YES	18

Table 1: Overview of received Cruise Programmes for 2021 and onwards (status January 2022)



## Cruise Programmes

[RETURN TO EVIOR HOME](#)

**Geographical box**

**Research Vessel**

- Hans Brattstroem (46)
- Ramon Margalef (30)
- G. Dallaporta (29)
- Kristine Bonnevie (25)
- Angeles Alvarino (20)
- ... More

**Country operator**

- Norway (142)
- Spain (111)
- Germany (91)
- France (61)
- Italy (53)
- ... More

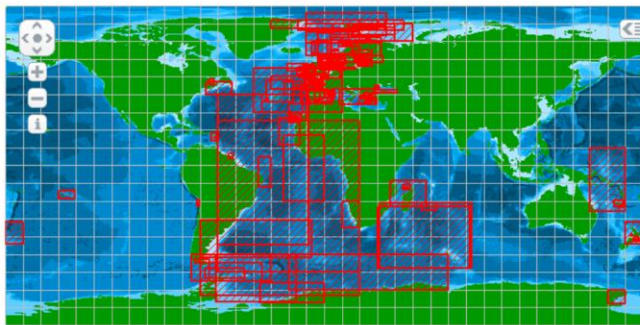
**Status**

- Scheduled (368)
- Completed (203)
- Current (26)
- Cancelled (8)

**Discipline**

- Physical oceanography (111)

Start » Date from: 20210101 to: 20221231



Zoom in to selected 20 50 100 records Go

| Found 611 | Show (1-20) | Previous | Next 20

Cruise name	Vessel name	Country operator	Departure	Arrival	Berths	Status	Show
RADIAL VIGO 1222	Mytilus	Spain	2022-12-19	2022-12-19	Unknown	<span style="color: green;">●</span>	→
RCAN	Ramon Margalef	Spain	2022-12-15	2022-12-17	Unknown	<span style="color: green;">●</span>	→
CANZEC_1170_2022_leg2	Angeles Alvarino	Spain	2022-12-05	2022-12-23	Unknown	<span style="color: green;">●</span>	→

Image 4: User Interface for Cruise Programmes for 2021 and onwards (status January 2022)

In total, so far 611 entries have been included for cruises in 2021 and onwards. It is planned to repeat this gathering activity again in March – April 2022 for 2022 cruises, once operators most probably have finalised their new cruise plans.

## Cruise Summary Reports db system

The long-time existing SeaDataNet Cruise Summary Reports database is regularly populated through the pan-European SeaDataNet network of NODCs, while the three assigned NODCs in Eurofleets+ (RBINS, OGS, and HCMR) work together with the PIs of the Eurofleets+ TA funded cruises to arrange CSR submissions. The CSR metadata for those cruises can be retrieved from the EARS registrations. For the CSR submission, use can be made of the SeaDataNet standard format, tools and procedure.

There is a change ongoing in the central management of the SeaDataNet CSR database. It used to be managed by BSH (Germany). However, the central management is being moved to IFREMER (France). IFREMER already is managing the CSR User Interface at the SeaDataNet portal and also can handle CSR submissions as XML files, while BSH currently still manages the CSR online CMS service. This implicates that IFREMER is receiving a monthly update from BSH for entries received through the online CMS in order to have the latest complete version. In the meantime, IFREMER is developing its own CSR online CMS which might be launched around summer 2022. From that moment, only IFREMER will have the central management. At the EVIOR portal there is a derived CSR interface which has been developed by MARIS and which uses a regular harvesting from nowadays IFREMER (used to be from BSH). Due to these interactions between BSH, IFREMER, and MARIS there are some delays in publishing CSR entries, once entered. After summer 2022, this will be more direct.

Currently, the CSR Catalogue service at the EVIOR platform counts 406 CSR entries for cruises from 1 January 2021 onwards. This concerns cruises with PIs from the following countries.

Country	No of cruises	Country	No of cruises
Belgium	1	Netherlands	3
Denmark	3	Norway	75
Finland	3	Poland	5
France	126	Portugal	1
Germany	71	Spain	69
Greece	1	Sweden	41
Iceland	5	Turkey	1
Italy	1		
<b>TOTAL</b>	<b>406</b>		

Table 2: Overview of number of CSR entries for cruises since 1 January 2021 per country of PIs

The following table gives the status of CSR entries for Eurofleets+ TA funded cruises so far. Aim is to make all CSRs available at EVIOR and SeaDataNet portals.

Vessel	Cruise	EVIOR CSR	SDN CSR	BSH CSR	CSR cruise name	CSR code
G.O Sars	BENCHMARK	yes	yes	yes	BENCHMARK	20213165
Tangaroa	FOCUS-AUV	no	yes	yes	FOCUS-AUV	20213027
SOCIB	GRASSMAP	yes	yes	no	GRASSMAP	21000608
Dana	GSHARK	no	no	yes	GSHARK	20213297
Pelagia	iMAR	yes	yes	yes	EF+SEA01-007_iMAR	20213136
Aegaeo	MYRTOON	yes	yes	no	MYRTOON	21000531
TUBITAK Marmara	PHYCOB	no	no	yes	PHYCOB	20213265
Celtic Explorer	PORO-CLIM	yes	yes	yes	CE21008	20213132

Table 3: Overview of publishing of CSR entries for EF+ cruises (status Jan 2022)



## Cruise Summary Reports results

[RETURN TO EVIOR HOME](#)

20 
  50 
  100 records

[Refine query](#) | [New query](#) | Found 20151 | Show (1-20) | [Previous](#) | [Next 20](#)

Platform/Ship Name	Country	Cruise name	From	To	Show
Cotes De La Manche	France	ORHAGO 21	20211117	20211214	<a href="#">→</a>
Albert Lucas	France	VIRAB	20211108	20211130	<a href="#">→</a>
Sarmiento de Gamboa	Spain	ECOSUMA	20211025	20211104	<a href="#">→</a>
KBV181	Sweden	2021K32	20211025	20211029	<a href="#">→</a>
Thalia	France	ESS_SOURCE_HR 2021	20211023	20211023	<a href="#">→</a>
Thalassa	France	EVHOE 2021	20211022	20211206	<a href="#">→</a>
Tethys II	France	TECNOSS 2021	20211020	20211024	<a href="#">→</a>
Pourquoi pas?	France	ALBACORE	20211014	20211115	<a href="#">→</a>
Elisabeth Mann Borgese	Germany	EMB278	20211013	20211018	<a href="#">→</a>

Image 5: User Interface for Cruise Summary Reports (CSR) at EVIOR platform

## Dashboard for information from sailing vessels

As earlier explained, it is instrumental to install and configure the EARS system at research vessels that are supporting the Eurofleets+ TA funded cruises. This way use can be made of the EARS system for logging information from shipborn instruments and from events such as data observation activities undertaken during the cruise by researchers on board. Moreover, the EARS system makes it possible to share underway information as collected by the shipborn instruments while sailing and to publish this at the EVIOR portal during and after the cruises. For that purpose, CSIC and RBINS have undertaken great efforts to interact with the vessel operators for installing and configuring the latest EARS system.

### EARS deployments at RVs including logs on contact moments

Each RV has been provided with:

- a specific VM including EARS server, the conversion of GPS RMC (or GGA as an alternative but information is missing) NMEA output to EARS format, VPN for remote access and sending data to CSIC datahub – dashboard
- Quick Installation Guide
- EARS client manual
- Training and support

Cruise Name	<b>PORO-CLIM</b>
-------------	------------------

Cruise dates	May 7-30 2021
RV	<b>Celtic Explorer</b>
EARS version	V2
Integrated to the EF dashboard	yes
Deployment follow-up	
Deployment summary	VM provided with: EARS server, conversion of navigation data to EARS format and VPN for remote access
Logs	10/06/2020 – First contact 05/02/2021 – VM provided 11/02/2021 – server running but without data 14/02/2021 – navigation data ok, EARS server and desktop ok 19/05/2021 – integration to the EF dashboard (declined at the beginning)

<b>Cruise Name</b>	<b>iMAR</b>
Cruise dates	18 May – 3 June 2021
RV	<b>Pelagia</b>
EARS version	V2
Integrated to the EF dashboard	yes
Deployment follow-up	
Deployment summary	VM provided with EARS server and VPN for remote access. NIOZ technicians made the datagrams conversion.
Logs	22/03/2021 – First contact and rejection at first to install EARS 04/05/2021 – VM provided 10/05/2021 – EARS server and client running 24/05/2021 – Agree to send data to CSIC datahub and dashboard. Integration to the dashboard

<b>Cruise Name</b>	<b>GSHARK</b>
Cruise dates	July 31 – August 7 2021
RV	<b>Dana</b>
EARS version	V2
Integrated to the EF dashboard	yes
Deployment follow-up	
Deployment summary	VM provided with: EARS server, conversion of navigation data to EARS format, VPN for remote access and sending data to CSIC datahub – dashboard
Logs	10/06/2021 – First contact 17/06/2021 – VM provided 18/06/2021 – EARS server and client installed and running ok

Cruise Name	<b>BENCHMARK</b>
Cruise dates	August 1-10 2021
RV	<b>GO Sars</b>
EARS version	V2
Integrated to the EF dashboard	no
Deployment follow-up	
Deployment summary	VM provided with: EARS server, conversion of navigation data to EARS format, VPN for remote access and sending data to CSIC datahub – dashboard. It was no possible to integrate GO Sars data to the EF dashboard due to lack of time and vacations
Logs	22/03/2021 – First contact 17/06/2021 – VM provided 29/06/2021- EARS server ok and desktop installed 04/08/2021 – EARS desktop configured and running

Cruise Name	<b>PHYCOB</b>
Cruise dates	September 9-15 2021
RV	<b>Tubitak Marmara</b>
EARS version	V3
Integrated to the EF dashboard	no
Deployment follow-up	
Deployment summary	VM provided with: EARS server, conversion of navigation data to EARS format, VPN for remote access and sending data to CSIC datahub – dashboard. Unfortunately, they could not install EARS successfully
Logs	09/07/2021 – First contact 06/09/2021 – First reply 09/09/2021 – VM provided. There were different issues on board (EARS components not in the same LAN, no UDP data) that could not be fixed since there was not IT on board. Therefore EARS was not used

Cruise Name	<b>GRASSMAP</b>
Cruise dates	September 14-20 2021
RV	<b>Socib</b>
EARS version	V3
Integrated to the EF dashboard	no

Deployment follow-up	
Deployment summary	EARS 3 was already installed since it was use on the trials carried out from May 17 to 21, 2021. The installation and the datagram conversion were done by SOCIB technicians.
Logs	09/09/2021 – EARS client configured and running.

Cruise Name	<b>MYRTOON</b>
Cruise dates	September 29 – October 8 2021
RV	<b>Aegeo</b>
EARS version	V3
Integrated to the EF dashboard	yes
Deployment follow-up	
Deployment summary	VM provided with: EARS server, conversion of navigation data to EARS format, VPN for remote access and sending data to CSIC datahub – dashboard
Logs	03/05/2021 – First contact 14/09/2021 – VM provided 15/09/2021 – EARS server and desktop installed. After fixing some issues the system worked properly during the cruise

Cruise Name	<b>CALYPSO</b>
Cruise dates	February 16 – March 10 2022
RV	<b>Pelagia</b>
EARS version	V2
Integrated to the EF dashboard	yes
Deployment follow-up	
Deployment summary	They preferred to keep EARS V2 although the acquisition is not working properly due to changes made on board, we are trying to fixed it remotely
Logs	09/12/2021 – First contact

Cruise Name	<b>CABLE</b>
Cruise dates	March 22-27 2022
RV	<b>Aranda</b>
EARS version	V3
Integrated to the EF dashboard	TBC

Deployment follow-up	
Deployment summary	They have scheduled the deployment at the end of January
Logs	09/12/2021 – First contact

Cruise Name	<b>GRACE</b>
Cruise dates	March 22-27 2022
RV	<b>Belgica II</b>
EARS version	V3
Integrated to the EF dashboard	In process
Deployment follow-up	
Deployment summary	EARS 3 has been installed on the new RV Belgica using the docker installer on a physical server. Acquisition data is directly read from MDM500 and not doubly stored in the EARS database.
Logs	5-6/02/2022 - Installation

In addition, EARS 3 was installed on RV Laura Bassi (OGS) and RV Sarmiento de Gamboa (CSIC) for sea trials, carried out in May 2021.

### Transfer of EARS underway information and data to the shore – uptake of SeaDataNet SWE Toolkit

At a WP3.1 Eurofleets+ meeting in February 2020, it was discussed how to transfer the EARS underway information and data output to the shore for inclusion in the EVIOR platform. It was decided to adopt and adapt the SeaDataNet SWE toolkit package as earlier developed by 52North as part of the EU SeaDataCloud project. This package can be used for supporting a near real time (NRT), distribution, and publishing of underway data from the sailing vessels. A feasible concept was established at the meeting and activities were undertaken for further detailing, developing, and finally, implementing.

Adaptations were needed to the original SWE toolkit as embedding possibly dozens of events in the SensorML document would make the sensor descriptions hard to handle pretty fast. To add a new event the complete sensor description has to be fetched from the Sensor Observation Service (SOS), the event has to be added to the description and the document has to be sent again to the SOS. As the payload of these requests would increase with each new event, this approach was dismissed for performance reasons. Another argument against this technique is the development of a client that is able to display event data in near-real time: the client would need to regularly pull the ever-growing sensor description from the SOS just to be able to get to the latest events.

To overcome these limitations, another approach was chosen. The event data is processed the same way the observational data is handled: the feeder fetches the latest event data from the EARS server, encodes it as an observation and feeds it through MQTT to the SensorThings API. After this, the Helgoland-viewer based dashboard which interacts with users can subscribe to new events and is able to visualize them with minimum delay.



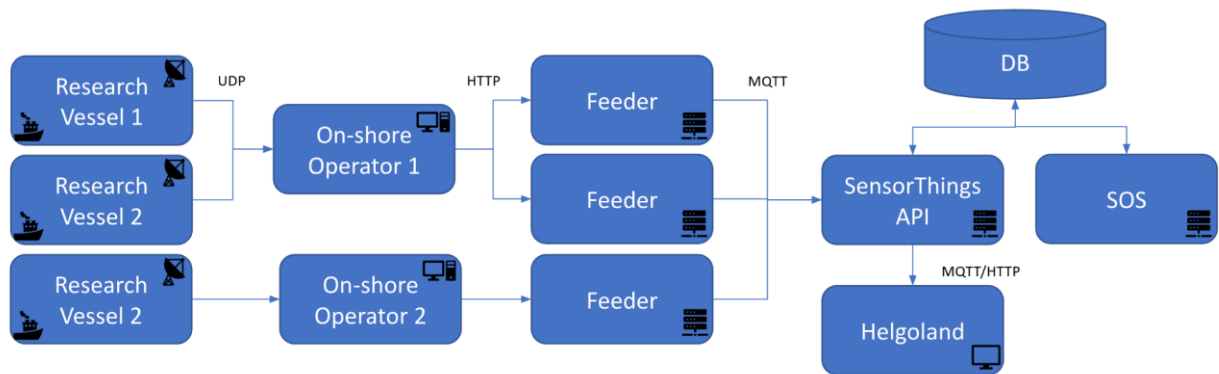


Image 5: Underway Data Flow from vessels to shore to clients, applying adapted SWE toolkit

For this a new O&M Observation Type was defined (with the URI [http://www.52north.org/def/observationType/OGC-OM/2.0/OM\\_SensorML20Observation](http://www.52north.org/def/observationType/OGC-OM/2.0/OM_SensorML20Observation)) that has a SensorML document as its result value. This document contains the SensorML-encoded event that was recorded by the EARS system. As the SensorThings API uses a JSON-based encoding and the processing of XML in web clients like Helgoland can be cumbersome, a JSON encoding of SensorML was introduced. The feeding component losslessly transforms the events from XML to JSON and sends it to the SensorThings API, which in turn forwards it to Helgoland for easy parsing. However, when requesting these observations using the SOS the events will be encoded using XML.

This approach does not only allow to receive the event data in near-real time in a performant way, but also enables the client to filter (notably. temporal) historical events. Besides the productive deployment of this new development, future work will concentrate on how the event data can be visualized. In addition, for a “ticker” for live events, especially for the visualization of the historical data the Helgoland views have to be extended since as of now only numerical data is supported.

These SWE developments are done in synergy with the EMODnet Ingestion project which has a task for promoting uptake of SWE standards in the oceanographic community. This allowed to make use of the services of 52North for adapting the software kit for Eurofleets+ purpose and assisting in its deployment.

Following the adaptation developments, the 52North SWE Toolkit has been installed and configured at CSIC (Spain) which now runs the Eurofleets+ HUB for receiving underway data sets (navigation, meteo, and salinometer data) from research vessels, equipped with the EARS system and allowing underway data transfer. The received metadata and data are then made available by the HUB by means of SOS services for retrieval and display at the Eurofleets+ EVIOR platform. This is done by means of an online dashboard, derived from the 52North Helgoland viewer and customized for Eurofleets+.

Currently, further developments are underway by 52North together with RBINS and CSIC for including also events information which then also can be published through the dashboard at EVIOR.

### Dashboard population

At present there are 8 research vessels integrated to the EF dashboard, which is a component of the EVIOR platform: R/V Aegaeo (HCMR), R/V Belgica, R/V Celtic Explorer (MI), (RBINS), R/V Dana (DTU),

R/V Garcia del Cid (CSIC), R/V Hesperides (CSIC), R/V Sarmiento de Gamboa (CSIC) and R/V Pelagia (NIOZ).

CSIC includes in the Virtual Machine provided to RVs the facility for sending the data (EARS datagrams) to the CSIC datahub: <http://datahub.utm.csic.es/serie/>. The web service <http://datahub.utm.csic.es/ws/getLast/> feeds the SWE Ingestion toolkit for each vessel to be shown on the dashboard: <http://eurofleets.utm.csic.es/dashboard>

Not all of RVs continue to send data after the cruise is over since some of them turn off the server at the end of the cruise, which is unfortunate.

The following table shows the type of data sent and the period:

RV	Period	Data
Aegaeo	22/09/2021 → 29/12/2021	nav
Belgica	13/10/2020 → 17/12/2020 04/03/2021 → 25/03/2021	nav, met Work is ongoing on the new RV Belgica to send the ship's data to the dashboard
Celtic Explorer	19/05/2021 → present	nav
Dana	22/06/2021 → 06/08/2021	nav
Garcia del Cid	18/02/2020 → present	nav, met tss from now on
Hesperides	06/04/2020 → present	nav, met, tss from 19/01/2021
Sarmiento de Gamboa	03/09/2020 → present	nav,met tss from 09/12/2021
Pelagia	26/05/2021 → 05/06/2021	nav met and tss in progress

Table 4: Overview of research vessels feeding the dashboard at EVIOR

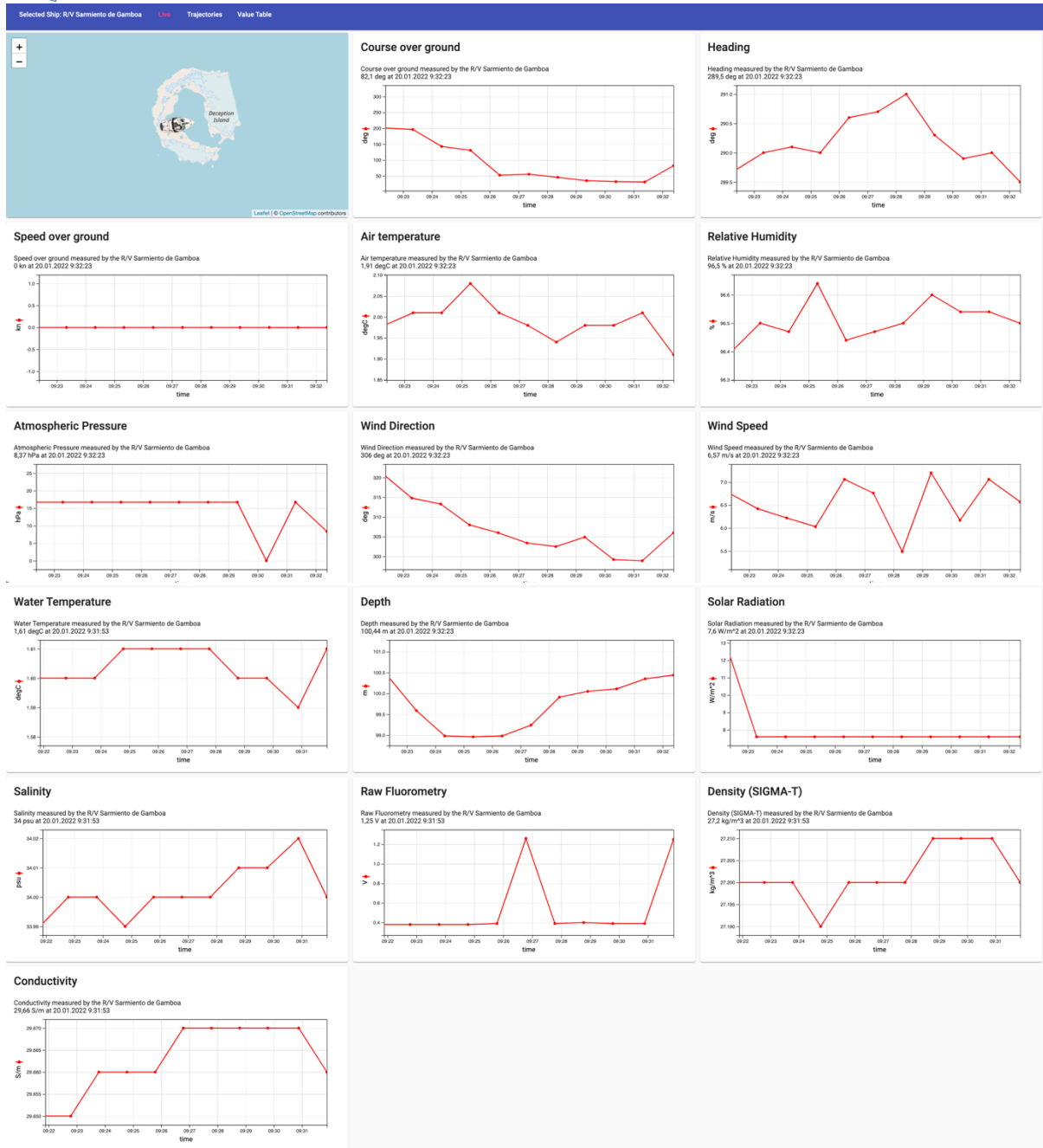


Image 6: Live Dashboard at CSIC and EVIOR platform for presenting Underway Data from research vessels, while sailing and in the port.

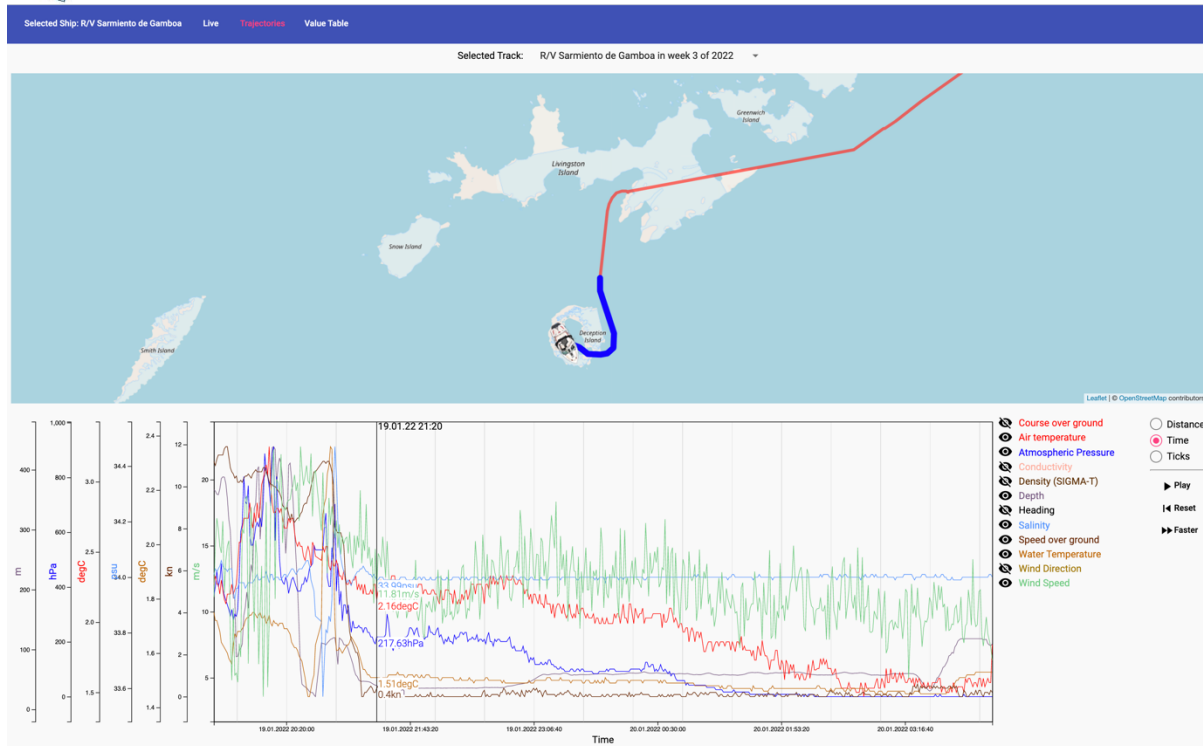


Image 7: Trajectory Dashboard at CSIC and EVIOR platform for presenting Underway Data from research vessels, while sailing and in the port.

#### 4 Further planned activities for Task 9.4

Activities by CSIC and RBINS for equipping Research Vessels, involved in Eurofleets+ cruises, with EARS V3 and connecting them to the dashboard for underway information and data sharing will continue. This concerns interacting with technicians of vessel operators. It also involves further work together with 52North on the inclusion of events information in the data streams and in the dashboard publishing. Furthermore, it concerns giving support and guidance to cruise scientific teams on how to make best use of the EARS system for registering events and generating overviews such as the CSR after the cruise.

Another activity is the ongoing data management follow-up by the three NODCs (RBINS, OGS, and HCMR) towards the PIs of the TA funded cruises which should lead to release of metadata and data for elaboration by the NODCs for long term stewardship in their data centres and population in the European SeaDataNet, EurOBIS, and EMODnet portals, although possibly with an agreed moratorium period for data access.

Another activity is the development and deployment by MARIS of the **Eurofleets+ data sets catalogue** as extra component at the EVIOR platform. This will consist of a dynamic overview table giving an overview of Eurofleets+ TA cruises. For each entry, links will be incorporated to relevant attributes, to be detailed by EVIOR components. The following table gives a draft overview of planned attributes.

Attribute	Links
Eurofleets+ TA Cruise ID	Unique ID per Eurofleets+ TA cruise
Cruise Plan	Dedicated link to retrieve details from <b>EF+ Cruise Programme database</b>
Research Vessel	Dedicated link to retrieve details from <b>EF+ Research Vessel database</b>
Cruise Summary Report	Dedicated link to retrieve details from <b>EF+ Cruise Summary Reports database</b>
En-route data	Dedicated link to retrieve details from <b>EF+ Dynamic underway dashboard</b>
Research data	Dedicated link to retrieve details from <b>SeaDataNet CDI data discovery and access service</b> (shortlist of CDI entries with data access)

*Table 5: Draft table of attributes of the Eurofleets+ data sets catalogue*

This way, users will have a direct overview of Eurofleets+ TA cruises and options for retrieving further details and ultimately, giving access to the data sets.