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# D 6.7 Report on Access and Exchange Programmes including Case Studies





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# **1** Introduction

The Eurofleets+ "Education and Training" programme aims to consolidate, advance and expand the successful activities of the previous Eurofleets project to prepare the next generation of marine scientists and professionals and to open up world-class marine infrastructures beyond the research communities. Actions will focus on bridging the gap between highly developed and less developed regions to facilitate collaboration and global interoperability. The training and education activities will take place in a unique setting, using state-of-the-art communication tools and digital technologies, and will be geared towards the different needs and experiences of the users.

In this context, a number of training programmes have been implemented under the Access and Exchange Mechanism to provide wider access to Eurofleets+ research vessels and funded cruises. Four different programmes were planned:

- 1. Co-Principal Investigator
- 2. Marine Internship
- 3. Teacher at Sea
- 4. Personnel Exchange

The Access and Exchange programmes have been implemented in cooperation with the Eurofleets+ Work packages "Transnational and Virtual Access" (WP2) and "Call Management and proposal Evaluation" (WP4) and in collaboration with the "Partnership for Observation of the Global Ocean", leading the Ocean Training Partnership and funded by the Nippon Foundation (NF POGO), to achieve the objectives to:

- Facilitate knowledge and technology transfer through staff exchanges and staff mobility;
- Increase the participation of women in ocean science
- Increase the participation of users from less well-resourced countries
- Engage teachers and educators in ocean exploration to inspire future marine scientists.







# 2 Co-Principal Investigator (PI)

The Co-Principal Investigator (PI) Programme (<u>https://www.eurofleets.eu/access/co-pi/</u>) was specifically aimed at early career researchers or researchers with no experience in leading a research cruise, to conduct their own research alongside experienced scientists in EUROFLEETS+ scheduled cruises. Applicants for the Co-PI programme were able to apply for all research vessels (RVs) and advanced mobile marine equipment (ME) offered under Eurofleets+. Under the programme the successful applicant were granted access to an RV and ME for one to a maximum of three days.

This has allowed for the continuous submission of proposals for funding of ship-time to conduct shipbased research activities in all areas of marine science.

This ongoing call was open from 21 November 2019 to 31 of January 2022.

Ten projects were positively evaluated over 11 proposals submitted; four were implemented together with the SEA Programme cruises CABLE, GRACE, FIGURE and OASIS.

This activity has been managed by WP4 and WP2 and extensively reported in **Deliverable 4.14 Report** on cruise implementation, post cruise assessment and lesson learned.

# 3 Marine Internship

The Eurofleets+ Marine Internship Programme offers internships to students or technicians in marine science and technology on Eurofleets+ partner research vessels, using vacant berths. The internships can take place on specific research investigations conducted by the vessels or during funded research cruises with PIs. The internships are primarily aimed at graduates, postgraduates, early career researchers and technicians. The programme offers a great opportunity to gain offshore experience, develop new skills and learn on the job with established scientists and research leaders.

Interns will not conduct their own research, but they will have the opportunity to learn how an international cruise works and what happens on board Eurofleets+ TA.

Research cruises were severely impacted by the Covid 19 pandemic in 2020 and 2021, resulting in cruise cancellations and restrictions on crew and travel. It was expected that places on board would become available at shorter notice than usual. Eurofleets+ has issued an open call for applications from scientists, technicians, PhD students and post-docs working in the field of marine sciences.

The Eurofleets Marine Internship open call has been published on the Project website (<u>https://www.eurofleets.eu/education/marine-interneship/</u>) on April 2022 and was closed on 31 of March 2023.

Eurofleets+ maintains a database of all qualified, interested applicants and selects them based on their suitability for the project in question as training opportunities become available.

41 applications were received in response to the open call for applications for the Eurofleets+ Marine Internship: 22 Master students, 6 PhD students, 3 technicians, 3 research assistants, 2 graduates, 1 young researcher, 1 senior lecturer and 1 ship operator, from 25 different countries.









The POGO Secretariat issues annual Open Calls for Shipboard Training Fellowship for applications from any early career scientists, technicians, postgraduate students (PhD or MSc) and Post-doctoral Fellows involved in oceanographic work at centres in developing countries and countries with economies in transition (<u>http://www.oceantrainingpartnership.org/opencall2023</u>).

The shared infrastructures offered by Eurofleets+ together with the reimbursement of travel and accommodation expenses incurred by the participants offered by NF POGO facilitated young researchers from less-equipped countries to apply.

The evaluation of the applicants from the two open calls of Eurofleets+ and NF POGO was carried out by the coordinator of the Eurofleets+ Education and Training work package together with the coordinator of NF POGO and the PI of the research cruise that will host the applicants.

The evaluation is based on the following criteria:

- Quality of the application
- Curriculum of applicant
- Sustained capacity building
- Recommendation letter from applicant's tutor
- Relevance.

Seven candidates from 6 nationalities were selected from both the Eurofleets+ Marine Internship open call (1) and NF POGO Open Call (6).









They have been hosted on the following Marine Research cruises:

- "Baltic International Trawl Survey (BITS)" cruise on board the RV DANA from 2 to 17 November 2021. Organized by the National Institute of Aquatic Resources (DTU-Aqua), the voyage covers the central Baltic Sea and constitutes the Danish contribution to the "Baltic International Trawl Survey". (See report in Annex 1)
- The cruise has been organized by the DTU-Aqua as the Danish component of the "International Acoustic Survey in the Nordic Seas (IESNS)", on board RV DANA from 22 April to 6 May 2022. (See report in Annex 2)
- "Coupling onshore and offshore tsunami record: complementary tools for a broader perspective on tsunami events", on board RV Belgica, from Cádiz to Portimao, 1-8 June 2022. (see case study in Annex 3)
- Cruise "Monitoring the population of herring and sprat in the North Sea and adjacent waters" organized by the DTU-Aqua on board RV DANA, 22 June to 7 July 2022. (See report in Annex 4).
- Cruise "International Bottom Trawl Survey (IBTS)" organized by DTU-Aqua in the North and Baltic seas, 15 August to 2 September 2022 (see report in Annex 5).
- Eurofleets+ funded cruise "Climate Change impact on Ocean fronts ecosystems: the case of the Iberian Upwelling System (SINES)", on board the RV Sarmiento de Gamboa, 1 September to 20 October, included also a pre and post cruise internship (see report in Annex 6).
- Cruise IBTS, organised by DTU-Aqua, will take place from 17 August to 4 September 2023, and will host a PostDoc student from Argentina. (http://www.oceantrainingpartnership.org/node/397).

# 4 Teacher at Sea

The "Teacher at Sea" programme aimed at providing opportunities for **primary and secondary school teachers** to participate in Eurofleets+ TA cruises and to communicate their experiences to **pupils**, thereby engaging and attracting young people to careers in marine science. The teachers will immerge themselves in the experience of life at sea and research with the guidance of onboard scientists. Their







students will get involved in the cruise activities by sending emails, participating in blogs, and journaling about the daily exploits of those onboard. Teachers will disseminate their experience in ocean science research and exploration to their students through a series of blogs, online interactions and classroom-based teaching to contribute to the formation of future generation of marine scientists. Teacher at Sea will further develop a similar program initiated by Eurofleets2, in cooperation with the European Geosciences Union (EGU). In Eurofleets 2 it was possible to establish almost daily reports of the scientific progress of the cruise and to send regular logs to the participating land-based teachers in different schools mainly in Europe and the USA, taking advantage of a database of teachers having participated to the Geosciences Information for teachers (GIFT) workshops of the European Geosciences Union. This brought science into the classroom, and indeed we received enthusiastic responses from many teachers. This task will be in collaboration with the Chairman of the Committee on Education of EGU (see Letter of Support, Annex 7).

Travel restrictions, delays and limitation of personnel allowed to board RVs as a result of the COVID19 pandemic led to uncertainty regarding the possibility of accepting guests on board. In this context and given the concrete possibility of having only a limited number of places available, we preferred to leave the places on board the research vessels to young researchers and technicians and to provide educational material to teachers and schools through the following actions:

- Eurofleets+ Ocean Classroom Portal
- Ship to Shore Programme

# 4.1 Eurofleets+ Ocean Classroom

The Ocean Classroom portal can be found on the Eurofleets website (<u>https://www.eurofleets.eu/classroom/</u>) and provides access to a wide range of marine education resources. It currently contains 83 resources for people of all ages, from young children upwards.



How does a ROV float? Heteric Centre for Marine Research - ROV team ROV Sampling methods

The resources available can be used by teachers to motivate and inspire young learners, and by parents and members of the public to increase their knowledge of marine science and infrastructure. The Ocean Classroom has been widely disseminated through mailing lists, at conferences such as European Maritime Day and European Marine Science Education Association (EMSEA) and through EU4OCEAN, of which Eurofleets is a member.







# **Eurofleets+ Ship to Shore**

Eurofleets+ piloted a 'Ship to Shore' expedition programme using telepresence communications technology which enabled live broadcasting from several Transnational Access surveys on-board research vessels. Use of this innovative technology facilitated dynamic, modern and innovative interactions with both public broadcasts and in classroom live tutorials from the ocean.

Two ship to shore classroom broadcasts have been organized from the RV Belgica during the GRACE cruise (https://express.adobe.com/page/H33cJ1K363l24/):

- Skype meeting using ships VSAT Connection with 30 students in Ireland. Pre-recorded video 1 followed by a Q&A with scientists.
- Skype meeting using ships VSAT Connection with 30 students in Spain. Pre-recorded video 2 followed by a Q&A with scientists.

This activity has been extensively reported in Deliverable 6.5 Report on Pilot Study of Ship to Shore Programme.

# **5** Personnel Exchange

The Personnel Exchange Programme aimed to promote knowledge and technology transfer and the sharing of research infrastructures by facilitating the exchange and mobility of personnel and targeted training utilizing specific equipment and technologies on board Eurofleets+ vessels.

This task organized opportunities for exchange by:

Check whether ship and maritime infrastructure operators are able to accommodate external 1 personnel and what kind of training could be provided.

In April 2021, we were contacted by a junior ROV – engineer from the Flanders Marine Institute's (VLIZ) Marine Robotic Team, who asked for options in the Eurofleets+ programme to request an ROV service provider to join their ROV team during Eurofleets cruises.

Two EF+ ROV cruises were scheduled for summer 2021:

OASIS aboard RV Thalassa utilising ROV Ariane (https://www.eurofleets.eu/vessel/rov-<u>ariane/</u>); 10-20 June 2021.





• Benchmark on the G.O. Sars utilising the ROV Aegir (https://www.eurofleets.eu/vessel/rov-aegir-6000/); 1-10 August 2021.

The ROV and ship operators of both cruises were willing to take the young ROV engineer on board, but had to assess the feasibility due to the constraints of the COVID19 pandemic on board.

Due to the short notice of the cruise OASIS (which was later cancelled), we received positive feedback from the operators of the Benchmark cruise.

(See case study on Annex 8)









# 2 Eurofleets+ Technical Staff Exchange Transnational Access

Interoperability of equipment and staff exchange are key elements of the call for proposals procedure: It allowed applicants to choose which equipment and vessel they wanted to select in their proposal to achieve their research objectives, allowing the exchange of technical staff (see table below). This programme was managed by WP2 and WP4 and reported in **Deliverable 4.2 Overview of interoperability between Eurofleets+ RVs and the offered marine equipment**.









Vessel/ infrastructure	Cruise Name	No. of EF+ Funded Days	Scientific disciplines	Geographical Area	Dates	Technical Staff Exchange
UGOT Hugin AUV	Focus-AUV	29	Geology, Marine Biology, Sedimentology	Kaikōura Canyon, New Zealand	September/October 2020	Implementation of the Hugin AUV onboard the RV Tangaroa by 2 expert technicians from UGOT. Vessel operator do not own an AUV so the experienced gained was in valuable to inform what would be required to acquire and operate an unmanned vehicle such as the Hugin. Shipping, logistics, Installation, launch and recovery, calibration, best practice and general operation and maintenance.
Celtic Explorer	PORO-CLIM	12	Climate dynamics, Geophysics, Sedimentology, Training	NE Atlantic (S Rockall Plateau; Eriador Seamount; Porcupine Basin & Ridge; East Thulean Rise)	May 2021	Four technicians from the University of Arhus and GEUS, Denmark operated Shipboard and towed seismic equipment and Ocean Bottom Seismometers during the cruise providing exchange of knowledge in the areas: Shipping, logistics, Installation, launch and recovery, calibration, best practice and general operation and maintenance.
GO Sars_ROV Aegir	BENCHMARK	10	Marine Biology, Physical Oceanography	Denmark Strait, between 64 and 68.5°N	August 2021	Dives using an ROV (Remotely Operated Vehicle) were carried out successfully in 25 stations located along three transects running in a NW-SE direction across the Denmark Strait. Marine Technician Exchange from VLIZ joined the cruise got experience of operations, piloting, maintenance and mobilisation/demobilising the ROV.







SOCIB	GRASSMAP	7	New technologies, Marine Biology	Mallorca and Cabrera islands	September 2021	2 x AUV and 1 x Lagrangian drifter were utilised during the GRASSMAP cruise. Shipping, logistics, Installation, launch and recovery, calibration, best practice and general operation and maintenance for each of the pieces of equipment were gained by SOCIB technicians.
Belgica_AUV Barabas	GRACE	11	Geology Geophysics Physical Oceanography Sedimentology	Ceuta Canyon and adjacent areas (West Moroccan Mediterranean margin)	April/May 2022	2 x AUV technician from VLIZ. The RV Belgica had not operated an AUV on board as it was a new vessel so the experienced gained was invaluable to inform future operations. Shipping, logistics, Installation, launch and recovery, calibration, best practice and general operation and maintenance.
Belgica_AUV Barabas	SEAQUAKE (Co-PI on GRACE)	3	Geology, Geophysics, New Technologies, Sedimentology	Ceuta Canyon and adjacent areas (West Moroccan Mediterranean margin)	During GRACE cruise	2 x AUV technician from VLIZ. The RV Belgica had not operated an AUV on board as it was a new vessel so the experienced gained was invaluable to inform future operations. Shipping, logistics, Installation, launch and recovery, calibration, best practice and general operation and maintenance.
RV Tangaroa	HYDEE-OBS	6	Geophysics	Hikurangi Margin, North Island, New Zealand	March/April 2023	GEOMAR Seismic Equipment and technician. Equipment shipped from Germany for both the VISIT and HYDEE – OBS cruises onboard the RV Tangaroa. Shipping, logistics, Installation, launch and recovery, calibration, best practice and general operation and maintenance.
RV Tangaroa	VISIT	12	Geophysics	East coast of North Island, New Zealand	March/April 2023	GEOMAR Seismic Equipment and technician. Equipment shipped from Germany for both the VISIT and HYDEE – OBS cruises onboard the RV Tangaroa. Shipping, logistics, Installation, launch and recovery, calibration, best







						practice and general operation and maintenance knowledge exchanged.
RV Pelagia_ROV MAX Rover	OASIS	12	Geology New technologies, Marine Biology, Physical Oceanography	SE Alboran Sea (W Mediterranean)	April 2023	ROV Max Rover operated by HCMR shipped to Spain for interoperations onboard the RV Pelagia. Shipping, logistics, Installation, launch and recovery, calibration, best practice and general operation and maintenance knowledge exchanged.
RV Pelagia_ROV MAX Rover	UNSEEN (Co- PI on OASIS cruise)	1	Biological Oceanography, Pollutants or aerosols, Sedimentology	SE Alboran Sea (W Mediterranean)	April 2023	ROV Max Rover operated by HCMR shipped to Spain for interoperations onboard the RV Pelagia. Shipping, logistics, Installation, launch and recovery, calibration, best practice and general operation and maintenance knowledge exchanged.
RV Aegeo_ROV Max Rover_AUV Barabas	ERODOTO	12	Deep Sea Research, Geology, Geophysics	Squillace Canyon, Italy	July 2023	2 x AUV technician from VLIZ. Shipping, logistics, Installation, launch and recovery, calibration, best practice and general operation and maintenance knowledge exchanged. AUV Technicians (VLIZ) and ROV Technicians (HCMR) gained experience of joint operations onboard one vessel.

This programme was managed by WP2 and WP4 and reported in **Deliverable 4.2 Overview of interoperability between Eurofleets+ RVs and the offered** marine equipment







# 6 Final Remarks

- The applications received for the Co- PI programme showed that the opportunity to undertake their own research trip aboard RVs for a few days, accompanied by an experienced scientific team, met with great interest among young researchers. These experiences offered the participants of Co- PI the opportunity to collect data for their research projects and gain experience in leading a scientific team on board and skills that are otherwise not so readily available.
- The naval internship was very successful in terms of the number of applications and gender balance. The task of providing research vessels for junior marine scientists provides practical training opportunities not otherwise readily available and facilitates knowledge transfer through wider access to research vessels and marine equipment. The collaboration with NF POGO was very useful in attracting young researchers from less equipped countries. This should be reflected in terms of increased support in logistic (Visa, certificates, ...) and a dedicated budget for training.
- The opportunity to offer free berths to young engineers/technicians on board Eurofleets+ RVs provided the opportunity to host a young ROV engineer on board the Benchmark EF + cruise. Nevertheless, only 3 technicians/engineers applied to the open call for a marine internship out of a total of 41 applications (7%!). The difficulties in providing "field training" for young technicians are mainly due to the following factors:
  - It is difficult to organise training by external technical experts due to the long lead time and lack of budget.
  - Training young technicians in the field requires more support in terms of logistics.
  - Operators make considerable use of in-house training opportunities, relying on the experience and knowledge normally available among their staff.





Deliverable No. 6.7



Annex 1 NF-POGO-Eurofleets Shipboard Report 1







# 2021 NF-POGO-Eurofleets + Visiting Fellowship for Shipboard Training

Fellowship Report

Name of Trainee: Joseph Sebastian

Name of Supervisor (Parent Institution): Dr. K. Ajith Joseph

Supervisor (Host Institution): Dr. Marie Storr Paulsen and Dr. Hans Jakob Olesen

Dates of Training: 02/11/2021to 17/112021

### Section A (To be completed by the fellow)

It is the responsibility of the trainee to forward this form to the host and parent supervisor, and to submit a fully completed version to the POGO Secretariat. Please note that the complete report will be made public on the OTP website; Private comments should be included in a separate confidential form.

# 1) Please provide a brief description of activities during the training period:

The primary aim of BITS (Baltic International Trawl Survey) is to provide independent data collection of different categories of fish especially Codfish. An initial introduction was conducted by the host supervisors to identify fish from the fish stock and to take individual samples of cod to determine age composition, sex, and maturity as well as various growth parameters. During the entire course of the survey, we found twenty-two different species like cod, herring, sprat, plaice, icing, flounder, etc.

I tookpart in acoustic observations before each trawling started. With regard to trawling, routine acoustic measurements are made of all fishing stations as well as stations with a low oxygen concentration where, no fishing takes place for that reason. Acoustic integration is done as a standard procedureat all stations to verify any fish biomass over bottom areas.

The onboard acoustic observations helped to determine temperature, salinity, and oxygen concentration at fishing stations. These determinations are made with the CTD (Conductivity, Temperature, and Depth) instrument. We have taken CTD calibration samples at selected stations identified by ICES (International Council for the Exploration of the Sea).



These are stations where the oxygen content measured at the associated CTD station is lower than 1.5 ml  $O_2$  / l. The acoustic measurement is made in the same trawling track as originally planned i.e., a distance equivalent to half an hour trawling at normal speed.

When the oxygen content at the bottom is lower than  $1.5 \text{ ml O}_2$  /l, visual observation is made on the echo sounder about how the fish are positioned at the bottom. If there are no fish within ten meters above the bottom, we performed an acoustic measurement in the same haul where we are fishing. If there are fish at the bottom or up to ten meters above the bottom, this can result in catching fish. In case there is no trawling, only acoustic survey, the operation is registered as a zero move. This is done by introducing the acoustic station in the SIS (Ship Information System).

## 2) What applications of the training received do you envision at your parent institution?

I used one hydrographic instrument (Echosounder) and one oceanographic instrument (CTD) during the shipboard training. Both instruments are essential in my profession. The training was an excellent platform to apply the theoretical knowledge that I received from the current course. The professional experience I gained will be extremely helpful in my professional studies in the field of hydrography.

CTD is an oceanographic instrument used to determine the physical properties of water. The unit consists of sensors to measure Conductivity, Pressure and Temperature. The goal of descriptive physical oceanography is to obtain a clear and systematic description of the oceans - sufficiently quantitative to permit us to predict with reasonable certainty, some aspects of their behaviour in the future. During the training, I understood how to obtain a systematic, quantitative description of the character of the ocean waters, their geographic distribution, and their movements. In the field of hydrographic surveying, it is very important to understand before deploying any underwater equipment, the physical properties of the water.

I have done further investigation on the research topic 'How does change in oxygen level in the water affect the marine species?' using the CTD data.

The other hydrographic instrument I used onboard is an echosounder (scientific echosounder). It is an instrument used for measurement of the physical and biological components of water. We collected the sounding data with an echosounder at each acoustic station. This is the data I used for identifying the objects in the water column (fish and plankton). I used the sounding data for analyzing the presence, abundance, distribution, and acoustic characteristics of different variables. Echosounder data is the tool I used for understanding the ocean terrain. The sounding data was useful to understand the bottom substrate class (e.g., sand, mud, rock). The resulting analysis can be used to generate GIS data layers for these variables.



## 3) Please provide your comments on the Fellowship Programme.

The expedition onboard RV DANA was an astounding opportunity during my studies and provided me with a deep knowledge of hydrographic/ oceanographic equipments CTD and Echosounder. Also, it is a great opening for me to do research in the future. I am grateful to my university Professor Dr. Harald Sternberg (HafenCity University), parent supervisor Dr. K. Ajith Joseph (Director, NERCI), onboard scientists Dr. Marie Storr Paulsen and Dr. Hans Jakob Olesen (DTU), and the great support of POGO members. I would like to point out, there wasexcellent rapport between POGO and me during the entire period of the fellowship. The training environment onboard RV DANA was outstanding– friendly, supportive and motivating.

The training helped me explore and enhance my skill and professional knowledge. Moreover, I strongly believe that the training and the experience I gained during the shipboard training fellowship program will be a milestone in my career. I am grateful to everyone who supported my professional endeavours.

**PRINT NAME** 

JOSEPH SEBASTIAN Date:16/12/21

#### **Section B**

(To be completed by the host supervisor and returned to the trainee)

Please note that the complete report will be made public on the OTP website; Private comments should be included in a separate confidential form.

## 1) Please provide your comments on the performance of the trainee.

The activities the trainee participated in during the Baltic international trawl survey (BITS) included:

Fish lab.: Sorting catch at the conveyer belt, weighing, cutting otoliths and measuring fish.

CTD room: Participating in running the CTD (from control room), withdrawing CTD data from the system.

Acoustic/Sonar room: Participating in recording and withdrawing data from the echo sounder/sonar system.

The Trainee also started analysing on the CTD data and the sonar recordings while on board Dana.

The Trainee participated in all activities with great enthusiasm and also joined in the social activities on board.



# 2) Is this exchange likely to lead to future collaboration with the trainee's parent institution? If so please give example(s) of how this collaboration may be pursued.

It is possible that the exchange could lead to a future collaboration on observation technology. However, the Observation Technology group on DTU Aqua has not yet confirmed this.

## 3) Please provide your comments on the Fellowship Programme.

I am positive about the program that makes it possible for students to come to other countries and institutes getting new insights and inputs thereby increasing their knowledge and at the same time opening the doors for possible future collaboration between institutes.

## **PRINT NAME**

Dr.Hans Jakob Olesen, Denmark Technical University

Date: / /

# SECTION C

(To be completed by the parent supervisor and returned to the trainee) Please note that the complete report will be made public on theOTPwebsite; Private comments should be included in a separate confidential form.

# 1) Do you agree with the above comments and do you have any additional feedback you wish to provide?

Yes, I fully appreciate and agree with the above comments as such training programmes would definitely help and motivate the trainees to utilise the skills they learned for successful adoption in their ongoing higher studies. Additionally, the trainee has developed a confidence to get engaged in field studies and observations using oceanographic equipments.

## PRINT NAME

Dr.Ajith Joseph Kochuparampil, Nansen Environmental Research Centre India (NERCI)

Date: 28/04/2022

Deliverable No. 6.7



Annex 2 NF-POGO-Eurofleets Shipboard Report 2







# 2022 NF-POGO-Eurofleets+ Visiting Fellowship for Shipboard Training

Fellowship Report

Name of Trainee: Luiza Reis de Souza

Name of Supervisor (Parent Institution): Abilio Soares Gomes

Supervisor (Host Institution): Susan Mærsk Lusseau

Dates of Training: 22 April 2022 to 06 May 2022

# Section A (To be completed by the fellow)

It is the responsibility of the trainee to forward this form to the host and parent supervisor, and to submit a fully completed version to the POGO Secretariat. Please note that the complete report will be made public on the OTP website; Private comments should be included in a separate confidential form.

## 1) Please provide a brief description of activities during the training period:

On board of RV-Dana, I watched the work of both the fish lab and the acoustic lab. In the first, I was able to compare different species of fish and help to measure them (length and weight), and observed the extraction of the otolith, used to determinate the age of the fish. In the acoustic lab, we used monobeam acoustic device to get paraments of fish schools such as their size and density. I also worked with some previous data of International Ecosystem Survey in Nordic Sea (IESNS), trying to understand the relationship between the size and age of blue whiting and their numeric occurrence in the sea.

#### 2) What applications of the training received do you envision at your parent institution?

I hope to apply the knowledge in working with fishes in my PhD thesis, fishing for them to understand their use of seagrass banks here in Brazil. I also already have some experience with geoacoustics, and now I can apply my new knowledge to also work with schools and plankton.

#### 3) Please provide your comments on the Fellowship Programme.

I am very grateful of the Fellowship Programme for the scholarship, and for all the help when I decided to come back earlier from the trip. I think it is a great opportunity for students to apply for it and learn new things, especially for students from countries in development, who not always have enough money in their parent institution to do research offshore.



Luiza Reis de Souza

Date: 31 / 05 / 2022

### Section B

(To be completed by the host supervisor and returned to the trainee)

Please note that the complete report will be made public on the OTP website; Private comments should be included in a separate confidential form.

#### 1) Please provide your comments on the performance of the trainee.

We were very pleased with the performance of Luiza. As a trainee she was curious and attentive and quick to grasp the concepts at hand and many interesting discussions were had. She got on very well with the scientific team as well as the ships crew and got engaged in some of the crews activities as well as all of the science aspects. Luiza was easy to instruct and lovely to work with all around. She is very studious and will do very well in her further degree work I am sure. Once she was familiar with the different tasks we carry out onboard she soon gravitated towards data analysis where she independently researched background material on the fish stocks we monitor and started looking at various aspects of their biology from our historical data collection. Because of her dedication, Luiza came away with a greater understanding of fish and their biology and how to monitor their abundance using fisheries acoustic techniques.

# 2) Is this exchange likely to lead to future collaboration with the trainee's parent institution? If so please give example(s) of how this collaboration may be pursued.

No formal collaboration has been initiated with the trainee's parent institution and it is unlikely it will at institutional level.

#### 3) Please provide your comments on the Fellowship Programme.

This was the first exchange through the Fellowship Programme that I hosted, but it will not be the last. The Programme is a great way to give opportunities for hands-on practical training for researchers at all levels of their career who may not otherwise have access this kind of experience. Apart from being a unique way to get to experience hands on some practical research at sea it is also providing a platform for wonderful cultural, scientific and social exchanges and experiences. This benefit goes both ways. We certainly felt enriched by having someone from a different culture and scientific background join us for the trip and are all looking forward to the next exchange.

#### Susan M Lusseau

Date: 23 / 6 / 2022



## SECTION C

#### (To be completed by the parent supervisor and returned to the trainee)

Please note that the complete report will be made public on the OTP website; Private comments should be included in a separate confidential form.

# 1) Do you agree with the above comments and do you have any additional feedback you wish to provide?

Regarding the specific tasks Mrs. Luiza carried on during her participation on board of Dana, we have no expectation of starting a collaboration directly linked with Louiza's dissertation project. However, since Luiza is going to be engaged in her PhD project in the near future, the possibility of a joint project or any kind of cooperative work is open.

PRINT NAME

**Abilio Soares Gomes** 

Date: 18 / 07 / 2022

Deliverable No. 6.7







## Eurofleets+ Cruise RV Belgica Cádiz – Portimão, 01.-08.06.2022

I joined Eurofleets+ as an intern on a one week cruise from Cádiz, Spain, to Portimão in Portugal on the RV Belgica. Though never being on such a ship before I felt well prepared thanks to the many information I received in advance and all the questions I could ask.

The objective of the cruise was to collect geophysical subsurface data and if possible cores to detect tsunami deposits in the Algarve and eventually look for a possible correlation with previously collected onshore deposits. Due to the similarity between the research aim as well as the methods applied during the cruise and the methods and prospective of my PhD project the cruise provided me with a unique insight in how to collect offshore geo(physical) data.



The RV Belgica in the harbour in Cádiz

Joining the cruise in Cádiz was simple as the big white Belgica was easy to spot in the harbour and the ship crew well as the scientific crew as welcomed me warmly. Despite knowing beforehand that the Belgica is very new I was still positively surprised by the comfort (gym, lounge room, private cabins with private bathrooms, very good and a lot of food, mostly working internet) and the modern and nice interior. The start on the ship was still a bit confusing. Despite getting an extensive tour after boarding, being told from the crew that it is a "small ship" and everything being nicely labelled, I ended up more than once on the wrong deck.

However I always quickly found my way back to where I actually wanted to go – after all it is just a

"small ship". Luckily, these slight diversion only lasted the first days and would probably have past faster if I did not had to stay outside on the back deck most of the first day to keep my seasickness at bay – just like most members of the scientific crew. Thankfully, most of the first day was only transit to the research area and we did not have to work vet.

Work and life on board was bound by a regular schedule. As we continuously recorded data for 24h the scientific crew worked all around the clock in a shift system à two 4h shifts per day per group. I had the 4-8 shifts (in the morning and the afternoon) this meant for me waking up at 3.30 am and going to bed just after dinner at 8.30 pm. Despite *Sunrise along the Portuguese coastline* 





The "sparker" being taken out of the water

always food in the kitchen – joined the people on shift or just enjoyed the good weather on the back or front deck or even the view from the crows nest. If we asked nicely we were also allowed to have a look at the bridge and once we got a guided tour through the lower decks and learned a lot about the technique on board. This way we also got a good overview and idea about the non-scientific life and work on the vessel.

Generally the cruise went really well and we were lucky with the weather – despite quite a bit of swell on the first day – and the data sets look really promising. Still, despite perfect planning in advance not everything always works out as planned and so I did not just learned a lot in terms of data collection, monitoring and interpretation, but also on how to be flexible and adjust plans on the go and still make the cruise a success.

All in all I am really thankful to Eurofleets+ to be given this opportunity and I am sure all the experiences collected on board will help me a lot for my future research career.

Lauretta Kaerger, University of Florence

these hours being rather unusual for me they worked better than expected and the early shift at least gave us the benefit to enjoy the beautiful sunrise everyday.

During our shifts we had to monitor the data collection continuously, make sure all the systems were working fine and protocol the process of data collection regularly as well as any unusual circumstances e.g. a start of a new profile or when a diversion from the profile was necessary due to busy fishing vessels getting in our way. Sometimes manual labour was necessary as well as the "sparker" – the source for our seismic signals - had to be taken out of the water every 12h and the individual sparks needed to be cut. The sparker also needed to be taken out of the water when a CTD measurements (Conductivity Temperatur Depth) were taken which provided us with valuable information about the water conditions and this way helped adjust our measurements. The CTD was carried out by the ship crew as one of the large cranes on the ship was needed for it.

After or between our shifts we had some free time in which most people caught up on some sleep, enjoyed the food or cake in the mess – there was



The CTD probe is being lowered into the water by one of the ship cranes.

Deliverable No. 6.7



**Annex 4 NF-POGO-Eurofleets Shipboard Report 3** 







# 2022 NF-POGO-Eurofleets+ Visiting Fellowship for Shipboard Training

#### Fellowship Report

Name of Trainee: Toyosi Fadekemi IGEJONGBO

Name of Supervisor (Parent Institution): Dr. O.O Olawusi-Peters

Supervisor (Host Institution): Susan Maersk Lusseau

Dates of Training: 25/06/2022 to 8/07/2022

**Training topic:** Ship-board training on the acoustic monitoring survey of herring and sprat in the North Sea and Adjacent waters.

## Section A (To be completed by the fellow)

It is the responsibility of the trainee to forward this form to the host and parent supervisor, and to submit a fully completed version to the POGO Secretariat. Please note that the complete report will be made public on the OTP website; Private comments should be included in a separate confidential form.

## 1) Please provide a brief description of activities during the training period:

During the training period I was involved in offshore procedures and learnt about the use of a trawl net in fishing. Hydro acoustic measurements were taken along predefined transect, I was taught on how to use acoustic imaging to understand fish schools and how echo sounders are used in fishing.

I had practical and hands on experience on how to verify species and size composition of acoustic registration with trawl sampling. I was involved in in taking individual lengths, weight and otholiths of biological samples collected. Hydrographic measurements along fishing stations was carried out using the CTD for temperature, chlorophyll concentration, salinity and dissolved oxygen by depth. Software like the Ocean Data View was used to analyse hydrographic Data. Plankton samples were collected using the WP2 for water column integrated dry weight and habitat description.

# 2) What applications of the training received do you envision at your parent institution?

My host institution is located in a coastal state bounded by the Atlantic Ocean to the south. My Parent institution can initiate such surveys on a smaller scale to contribute to scientific knowledge for commercial fishery and policy makers. The training I get will the applied to the research work in my department at the undergraduate and postgraduate level, thereby improving the quality of our research output. I will propose that we seek for funding as research grants to embark on acoustic monitoring of our surrounding waters. My parent institution will also benefit from collaborations on interdisciplinary research with other experts.



## 3) Please provide your comments on the Fellowship Programme.

The fellowship program is great tool for career development and training in oceanographic observations. It is well organized and implemented and my host supervisor took time and effort to impact knowledge. The fellowship avails a life changing experience, I am grateful for the fellowship program.

#### PRINT NAME

Toyosi Fadekemi, IGEJONGBO

Date: 20 /07/2022

# Section B (To be completed by the host supervisor and returned to the trainee) Please note that the complete report will be made public on the OTP website; Private comments should be

included in a separate confidential form.

#### 1) Please provide your comments on the performance of the trainee.

Toyosi was a joy to have with us as a trainee. She was engaged and very motivated to gain knowledge from this experience from the very first interaction with the team. She involved herself in all practical aspects of the work being carried out and was actively seeking out opportunities to learn about all phases of the science program but also about vessel operations. Toyosi tirelessly showed up for work at all hours of the day to make sure she did not miss any opportunity for learning something new. Due to her ability to rapidly acquire knowledge and new skills she was soon able to contribute to the practical work being carried out as part of the team. She was directly involved in all parts of the acoustic survey. She participated in watch keeping on the acoustic instruments to detect and enumerate fish. On detection of fish she participated in monitoring and directing the fish capture with trawl nets. Once the fish was onboard she worked in the fishlab to sort the catch and identify the species present, weigh and measure the fish and extract otoliths for aging as well as keeping diligent notes for use in the analysis. She operated the CTD for measuring salinity, temperature, chlorophyll and oxygen concentrations through the water column and gained experience with open source software to make use of the hydrographic data collected. It is my opinion that through her dedication to being involved and her curiosity about all aspects of the work she gained a large amount of both practical and theoretical knowledge from the experience. She made it clear to us she wanted to obtain skills and knowledge to be able to teach these in her institute, and also give her the knowledge to initiate programmes to monitor fisheries resources in her home country. Although there is much to learn, I would say she is well on her way to be able to do both and I give her my best recommendations.

# 2) Is this exchange likely to lead to future collaboration with the trainee's parent institution? If so please give example(s) of how this collaboration may be pursued.

There is no formal agreements for future collaboration with the trainee's parent institution at this point.

3) Please provide your comments on the Fellowship Programme.



The fellowship programme provides great opportunity to experience first-hand and receive training in the practical use of advanced ship based marine science equipment and techniques. It provides not only training in specific skills, but also inspiration for projects and new approaches to tackle challenges in home institutes and countries. The exchanges through the fellowship programme is also a great way to promote greater international understanding and tolerance through developing personal relationships across sometimes very different cultures.

**PRINT NAME** 

Susan Mærsk Lusseau

Date: 02 / 09 / 2022

#### SECTION C

#### (To be completed by the parent supervisor and returned to the trainee)

Please note that the complete report will be made public on the OTP website; Private comments should be included in a separate confidential form.

# 1) Do you agree with the above comments and do you have any additional feedback you wish to provide?

I agree with the comments above. Also, I will say that she was eager to impart both the students and colleagues with the knowledge she acquired from the fellowship. She has greatly benefited from the training and is always available when related opportunities arises.

**PRINT NAME** 

**OLAWUSI-PETERS, OLAMIDE O** 

Date: 07 /09 / 2022

Deliverable No. 6.7



**Annex 5 NF-POGO-Eurofleets Shipboard Report 4** 







# 2022 NF-POGO-Eurofleets+ Visiting Fellowship for Shipboard Training

Fellowship Report

Name of Trainee: Julieta Rodriguez

Name of Supervisor (Parent Institution): Diaz, Marina Vera

Supervisor (Host Institution):

Dates of Training: 15 Aug 2022 to 02 September 2022

# Section A (To be completed by the fellow)

It is the responsibility of the trainee to forward this form to the host and parent supervisor, and to submit a fully completed version to the POGO Secretariat. Please note that the complete report will be made public on the OTP website; Private comments should be included in a separate confidential form.

## 1) Please provide a brief description of activities during the training period:

During the experience on board the RV Dana, I learned about sampling adult fish, and how to extract data such as length, weight, sex, and otolith extraction. I was able to observe the whole process from when the trawl enters the water and when it comes out. In addition, ichthyoplankton samples were taken, so it was very beneficial for me to collaborate in this, as I work with hake larvae.

#### 2) What applications of the training received do you envision at your parent institution?

This training allowed me to acquire the technical knowledge for future sample collection that will be incorporated into my thesis work. The experience gained will allow me to become more involved in research campaigns in the collection of samples and environmental variables. Thanks to this experience I can perform a more complete analysis of my data related to the larval stage and integrate them with other environmental and biological variables. I will give a talk at INIDEP (my PhD institution) to explain the experience in the framework of the POGO training course and will publish a technical report of the commission. I also intend to train those people within the Institute who did not have the opportunity to access this type of scholarship and who, without being specialists in the subject, may have knowledge of how these data were obtained and how to interpret them in order to share the knowledge acquired in this course. I believe that in this way the data will be able to have a greater meaning in order to comprehensively address the problems within each line of research, which will allow me to publish my results in my final thesis report and subsequent scientific publications in high-impact international journals.



#### 3) Please provide your comments on the Fellowship Programme.

I am grateful to have had the opportunity to take this training to improve my scientific education. This will be of great importance for my Ph.D. work. I had the opportunity to work on a scientific cruise ship equipped with state-of-the-art instruments and to observe how they work in other countries. During the experience on board the RV Dana, my vision of how data is collected in the ocean became more complete. I only knew the methods from books, but thanks to the training I received, I can understand in a practical way how they are collected and how to interpret them. Now, when I work with the environmental and biological data obtained through the research campaigns conducted by the institute where I am doing my Ph.D., they are not just numbers to me. They now have another value for me and I can incorporate them into my studies with a deeper understanding that gives more meaning to my results.

#### **PRINT NAME**

Rodrìguez, Julieta

Date: 30 / 09 /2022

## Section B

#### (To be completed by the host supervisor and returned to the trainee)

Please note that the complete report will be made public on the OTP website; Private comments should be included in a separate confidential form.

#### 1) Please provide your comments on the performance of the trainee.

We were very pleased with the performance of Julieta during our survey. She got very fast integrated in the scientific team as well as with the vessel crew. She got engaged in all scientific and social activities. Although more experienced working with fish larvae she became very soon an essential help in the fish lab and independently search background material from the literature we had on board on species composition and fish biology. In addition to the work in the fish lab, she joined the recording of oceanographic data (CTD cast for measuring temperature, salinity, dissolved oxygen content and chlorophyll) as well as the plankton sampling and sorting of these samples for fish larvae and jellyfish.

# 2) Is this exchange likely to lead to future collaboration with the trainee's parent institution? If so please give example(s) of how this collaboration may be pursued.

There is no formal agreement for future collaboration with the trainee's parent institution now.

## 3) Please provide your comments on the Fellowship Programme.

This was my first experience with the fellowship programme. Despite the extra effort needed for the selection of the candidate and for the formal preparation of the survey, I appreciated having a trainee onboard very much. We felt enriched having a person from a non-European country with a different cultural joining us on our cruise.



**PRINT NAME** 

Kai Wieland

Date: 29 / 09 / 2022

#### SECTION C

#### (To be completed by the parent supervisor and returned to the trainee)

Please note that the complete report will be made public on the OTPwebsite; Private comments should be included in a separate confidential form.

# 1) Do you agree with the above comments and do you have any additional feedback you wish to provide?

I agree with the comments made in this note by Julieta and Kai. I am grateful to the training on board Pogo for this experience to enhance Julieta's scientific training. This will be of great importance in her Ph.D. training. She had the opportunity to work on a scientific cruise of great international relevance and had the opportunity to contact European researchers. I am sure that this scholarship will allow us to establish future inter-institutional collaborations. We hope that Julieta will participate in research cruises at INIDEP in the near future. I am sure that the experience in the POGO program provided a wealth of information and research experience in the field.

PRINT NAME

Diaz, Marina Vera (INIDEP-CONICET, Argentina)

Date: 30/ 09 /22

Deliverable No. 6.7



Annex 6 NF-POGO-Eurofleets Shipboard Report 5







# 2022 NF-POGO-Eurofleets+ Visiting Fellowship for Shipboard Training

Fellowship Report

Name of Trainee: Verynice Herman Temu

Name of Supervisor (Parent Institution): Dr. Blandina Robert Lugendo

Supervisor (Host Institution): Dr. Emilia Salgueiro, Dr. Marcos Fontela

Dates of Training: 01/09/2022 to 20/10/2022

## Section A (To be completed by the fellow)

It is the responsibility of the trainee to forward this form to the host and parent supervisor, and to submit a fully completed version to the POGO Secretariat. Please note that the complete report will be made public on the OTP website; Private comments should be included in a separate confidential form.

## 1) Please provide a brief description of activities during the training period:

Pre campaign activities includes reading and understanding sampling protocols, sample demonstration of treatment water sample for trace elements, grinding soil for analysis of total carbon, preparation and parking of sampling equipment for the campaign.

During the expeditions we spent 9 days collecting water samples, pre-treatment of the samples, and preservation for further analysis of biomarkers, trace elements, biotoxin, carbon, and oxygen isotopes (water sample from 0-5000 m depth. The Rosette Niskin bottles were used. The pre-treated samples were stored for further analysis. Other activities included collecting and preserving plankton samples from the multi net plankton, , samples were collected at different depth (0-700 m) and stations. We also collected sediment samples by box core involving samples for paleo reconstructions and another for macrobenthos abundances and genomics.

The lab work on post cruise included sediment sub sampling, washing foraminifera samples and picked some to observe under Scanning Electronic Microscope, weigh the filters from the foraminifera washing, view smears of each core at random, observe diatoms and pollens under microscope, piking refrozen foraminifera from plankton-net sample(s), analysis of biomarkers samples, observing and counting plankton (diatoms), and preparation of foraminifera samples for organic carbon analysis.



Moreover, I participated in IPMA Scientific virtual forums on Tuesday each week that connected me with different researchers and learned that to get an eminent picture in studies of climate change, multidisciplinary fields must join to come up with solutions/answers since not only I had a chance to interact with palaeoceanography expertise but also physical, chemical and biological oceanographers, all these explored chances for future collaboration.

## 2) What applications of the training received do you envision at your parent institution?

The training has equipped me with much skills that I will use in instructing and organizing practical classes for students on sediment sampling, sample preparation to study plankton organism, also helping researchers in benthic ecology. Currently, studies or research that are exploring the sediments in studying the plankton community are scarce in the region, therefore through networking and the knowledge gained in working on plankton organisms, diatoms, foraminifera, and preparing the sample for chemical analysis I aspire to be a link and influence collaborations for further research in these areas between my institution and other institutions, within and outside the Western Indian Ocean region.

## 3) Please provide your comments on the Fellowship Programme.

The training was very significant for the development of my career. I would like to thank POGO for this chance. Additionally, I recommend that the next training enhance the intake's capacity and allow ample time for preparation from selection to the beginning of the program and during all terms. Though the visa requirement is a trainee obligation but it will be very useful if POGO would advise and check to confirm that the visa requirement are met.

#### PRINT NAME Verynice Herman Temu

Date: 06/11/2022

## Section **B**

## (To be completed by the host supervisor and returned to the trainee)

Please note that the complete report will be made public on the OTP website; Private comments should be included in a separate confidential form.

## 1) Please provide your comments on the performance of the trainee.

As PI of the EUROFLEETS+ SINES cruise, It was my pleasure to have Ms. Temu as a scientist aboard. Verynice made strong relationships with all the participants thanks to her innate curiosity for scientific research. Her creative skills were an asset to the team, and she often found new or creative solutions to the challenges that we faced on the vessel. The hard weather conditions during the first days of the cruise and the consequent seasickness did not decline her spirit, and she showed a strong commitment during those days. She was actively involved in a lot of different tasks: from multinet sampling to chemical oceanography determinations passing through all the observational operations that were done during the cruise.



# 2) Is this exchange likely to lead to future collaboration with the trainee's parent institution? If so please give example(s) of how this collaboration may be pursued.

Our intention is to keep and extend this networking collaboration in the future. In the short-term through joint virtual seminars for our respective groups/institutions. In the mid-term, through technical laboratory advice to solve common methodological problems. And in the long-term, co-designing new observational projects in the Southwest Indian Ocean. The last goal of co-design is essential within the Ocean Decade perspective to keep a healthy and resilient ocean in the future.

#### 3) Please provide your comments on the Fellowship Programme.

This fellowship provides a unique training opportunity in the field of observational oceanography. This Fellowship Programme is a contribution that helps to narrow the current gap between the Global North and the Global South with regard to oceanography. As there is only one Ocean, the ocean science observing system must play a key role for sustainable development within a global capacity-building effort.

I hope Ms. Temu memories and experiences of these months are as valuable and nurturing for her as it was for every one of us that have the chance of meet her. Once again, I feel so grateful for your support, thank you very much for your generosity.

#### **PRINT NAME**

#### **Marcos Fontela**

## Date:14/ 11 / 2022

#### SECTION C

#### (To be completed by the parent supervisor and returned to the trainee)

Please note that the complete report will be made public on the OTPwebsite; Private comments should be included in a separate confidential form.

# 1) Do you agree with the above comments and do you have any additional feedback you wish to provide?

I completely agree with above comments, and thank POGO for giving our Lab Scientist Ms Verynice Temu an opportunity to participate in the training. We believe that she has gained very important knowledge that can help her assist both students and researchers in the collection and analysis of samples. We would appreciate if other staff from the School of Aquatic Sciences and Fisheries Technology, University of Dar es Salaam are given such opportunities whenever possible.

## PRINT NAME Dr Blandina Lugendo

Dean, School of Aquatic Sciences and Fisheries Technology University of Dar es Salaam, Tanzania Date: / /



**Annex 7 EGU-WP6 Eurofleets+ Endorsement** 







36 Portway, Wells, Somerset, BA5 2BN, UK Email: <u>education@equ.eu</u> Mob: 0044 7753 602 279

14<sup>th</sup> April 2020.

## 'Teachers at Sea' Educational Programme

The 'Teachers at Sea' educational programme allows high school teachers to participate with research scientists in oceanographic cruises, supported by the EGU. The teachers involved share their experiences of scientific research and exploration with their students and the wider educational community, through blogs, online interactions and classroom-based teaching and so contribute to the development of future generations of marine scientists.

The structure of the regular Geoscience Information for Teachers (GIFT) workshops run for teachers by the EGU allows us dessiminate the information to all the teachers involved in the workshops from Europe and across the world, so that they too can share the excitement and information with their own colleagues and students.

In previous years, the EGU has supported the involvement of a number of teachers in the 'Teachers at sea' programme on several oceanographic cruises, and we have every intention of continuing this suport in the future.

For all these reasons, we plan to maintain the collaboration between the 'Teachers at Sea' programme and the EGU Committee on Education, and use this oportunity to thank all the other supporters of the programme and all those involved in this innovative and unique initiative.

Best wishes,

Chris King, Emeritus Professor of Earth Scienc eEducation, Chair, Committee on Education, European Geoscience Union.



Annex 8 Benchmark Cruise RV G.O Sars\_ROV Aegir





# Eurofleets Benchmark cruise

I had the great opportunity of joining the EurofleetsPlus Benchmark cruise, focusing on benthic habitat mapping in the Denmark Strait (1-10 August 2021).

As an engineer, I'm working at the Marine Robotics Center of the Flanders Marine Institute (VLIZ), where I deal with our ROV and other robotics. As I just started in this field, the opportunity to join this Eurofleets cruise with very experienced ROV technicians and pilots was the perfect fit for me.

The research took place from the G.O. Sars, a Norwegian research vessel, in the Denmark Strait, a sea strait between Iceland and Greenland. The ship was very comfortable, with a friendly crew, great food and most of all a nice group of scientists and ROV technicians.



The benthic habitat mapping was performed with an ROV from NORMAR, the Norwegian marine robotics department connected to the University of Bergen. The ROV was so big that it was hard to take a picture of it, unless it was almost in the water. Here are two pictures for scale. The first one showing only the ROV, the second one the ROV with its tether management system, as it goes underwater:



The sea was extremely calm for this part of the oceans. The lack of wind did mean that there was a lot of fog and most of the 10 days at sea there was plenty of fog and we could not see any sun. A very good trade-off considering no one got sea sick and the cruise went very smooth.

The initially planned 21 dives were completed on day 7 or 8, which allowed us to do 7 more. Dive depths varied between 400 and 1800 m. Seeing the life at such depths was intriguing, and the fact that the dive was live broadcasted on every TV screen on the ship made it enjoyable for everyone on board.

Before each dive, a CTD was cast and a multibeam grid was sailed, to identify areas of interest for the ROV dives.

Each dive, we ran a transect over the seafloor, stopping at interesting locations for a closer look or taking samples with the manipulator or suction sampler. After following the ROV crew around on deck and in the pilot room, I got the chance to copilot and control the manipulator myself. On one of the last dives I even got to pilot, following a fish as a way of training my maneuvering skills.



The manipulator arm grabbing a sample



Some sponges - and the surprising colors - on the seafloor

During the cruise, we had to do some minor maintenance, which taught me a lot. On the last day of the cruise, following the ROV crew during the demobilization was very insightful as well.

All in all, this cruise provided me with a kickstart in ROV engineering and an amazing experience aboard the G.O. SARS.

I would like to thank Eurofleets for this opportunity, the ROV crew for their knowledge transfer and the cruise and ROV leaders for their welcoming spirit.

Roeland Develter, Marine Robotics Center, Flanders Marine Institute