FINAL REPORT ON POGO PROJECT

Contractor's Report

Project Title: POGO Project "Open access Marine Observation Devices (OpenMODs)" – Phase 3
Project start date: 1st February 2023
Project end date: 31st March 2024

Name of Contractor:

- Dr. Cosimo Solidoro, Oceanography Division, Istituto Nazionale di Oceanografia e di Geofisica Sperimentale – OGS
- Prof. Karen Wiltshire, Alfred Wegener Institute Helmholtz Centre for Polar and Marine Research, Germany

Names of Participants:

- Dr. Riccardo Gerin, Oceanography Division, Istituto Nazionale di Oceanografia e di Geofisica Sperimentale – OGS
- Dr. Eva-Maria Brodte, Alfred Wegener Institute Helmholtz Centre for Polar and Marine Research, Germany

Total expenditure:

- please see separated financial report (with copies of receipts) by OGS and AWI

1) Please provide a brief description of the activities undertaken by the project.

The OpenMODs 3 project aims to continue working on the platform (drifter mode) realized within the previous phase (OpenMODs 2) with the goal of having a system to deploy during the 2023 NF-POGO Centre of Excellence (NF-POGO CofE) training.

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A low-cost device able to determine the position and send it toward the satellite will be identified on the market, purchased, programmed and installed on the platform and used during the training.

A new OpenMOD training module will be conducted in March 2023 at Helgoland to instruct people to the use of the platform and give them all the tools and elements to realize their own system to be used in their waters. Within the training module the concept of the cost efficient / low cost sensors and drifter instruments will be addressed, the testing of the second-version-system will be prepared and conducted in the laboratory and in open waters conditions at position off Heligoland.

The project also proposes to realize a completely disassembled drifter platform and a 1:10 scale drifter to be used in an aquarium to demonstrate the effectiveness of the instrument in following the currents.

Finally, a three-dimensional file of the complex elements of the system (that are currently made on the lathe by specialized personnel) will be created. The end user then will be able to realize independently these parts using a 3D printer.

2) Please describe the milestones and deliverables achieved.

Platforms repair

Two OpenMODs platforms (drifters) severely damaged during the construction testing phases of OpenMODs2 were repaired.

OpenMODs drifter damaged during the previous phase of the project.

Transmission/localization system

The platforms were equipped with a satellite transmission system to guarantee a full offshore coverage all around the world. The system was chosen from the existing low-cost products currently available on the market for recreational purposes. A one-year subscription to the data plan was also provided.

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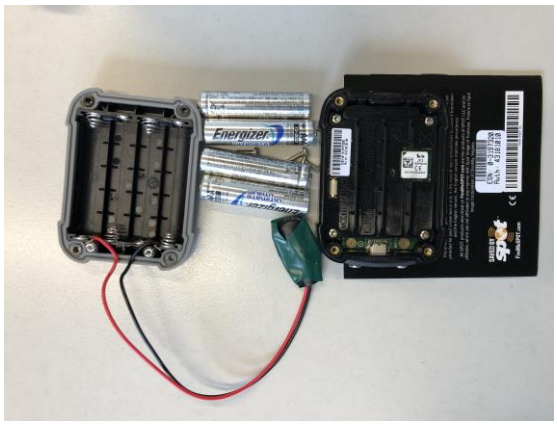

The SPOT transmission/localization system used in concert with the OpenMODs platform.

Disassembled OpenMODs platform

One completely disassembled OpenMODs platform (drifter) was realized for educational purposes.

OpenMODs platform fully disassembled.

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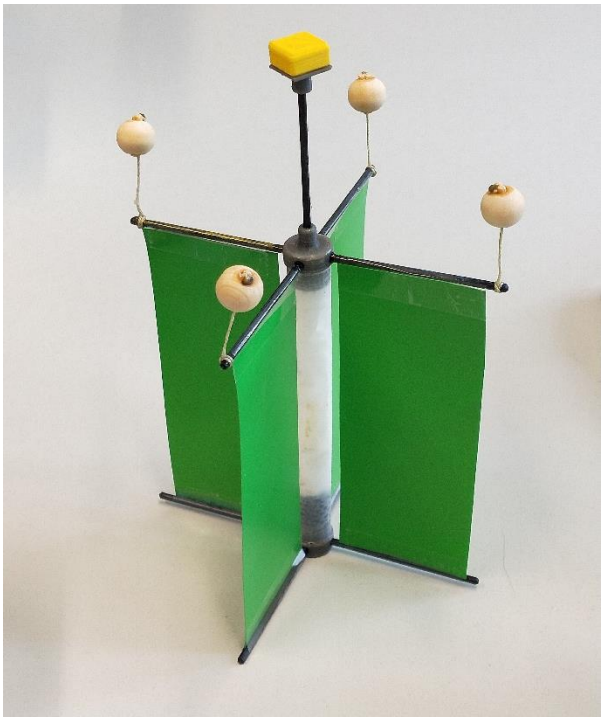
1:10 scale model and aquarium

A 1:10 scale model of the OpenMODs platform (drifter) was made for educational purposes. It was used in an aquarium with an aquarium pump to demonstrate the effectiveness of the instrument in following water currents and the minimized effect of wind blowing on the emerged part of the platform.



The 1:10 scale model of the OpenMODs platform.

NF-POGO CofE module

The two fixed OpenMODs platforms, two SPOT device for the transmission/localization system, the fully disassembled platform and the 1:10 scaled model were shipped to Helgoland (AWI) and then used in the NF-POGO Centre of Excellence (NF-POGO CofE) training held in Helgoland between 10 and 14 July 2023.

The scholars assembled a platform from scratch, understanding the principles of hydrostatic force and centre of mass. They also used the 1:10 drifter model in an aquarium to appreciate the resistance opposed by the drifter to artificial wind generated at the surface, learning the importance of the drag coefficient of different shapes.


Assembling phases of the OpenMODs platform.

The scholars then set up a GPS tracker with satellite transmission and a self-recording CTD sensor and equipped the OpenMODs platforms with these devices. The platforms were deployed at sea and successfully recovered in three occasions.

OpenMODs platform deployed at sea in front of Helgoland.

After the experiment at sea, the collected data were downloaded and processed. A preliminary version of dedicated videos on the platform assembling, the set-up of the GPS-satellite tracker and of the CTD, together with power point presentations of the analysed data were presented during the training.

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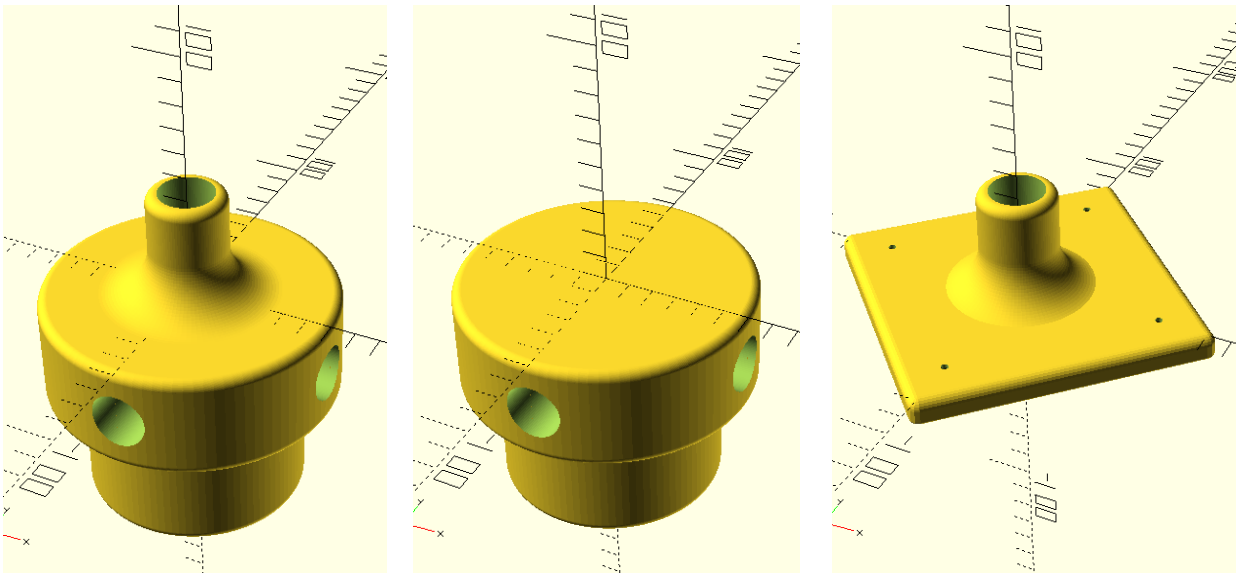
3D file

A 3D file of the most complex structures of the platform (joining elements) was realized. These elements until now were made on the lathe by specialized personnel and the 3D file allows all users to make these parts themselves using 3D printing technology.

This file can be managed with openscad software, which is freely available on the web, and can be customised according to the user's needs. For example, the plastic tubes used to build the platform may have different diameters in different countries; these measurements can be entered into the file in order to generate a tailored element to be used for the 3D printing.



The three joining element of the OpenMODs platform generated by the 3D file.

Other actions

- The OpenMODs progresses have been reported in POGO Newsletter Issues from 52 to 55;
- The OpenMODs project was presented at the OCG-14 Low Cost Technologies & Data Workshop (2 June 2023, Cape Town and online);
- A letter of interest was sent (11 October 2023) to the special issue of Oceanography “A Vision for Capacity Sharing in the Ocean Sciences” for submitting a contribution entitled “OpenMOD – a fair approach to ocean observation: what did we learn the past six years”. The contribution has been chosen to be highlighted in the special issue (2 March 2024);
- The interim report was correctly submitted (25 November 2023);
- The OpenMODs project was presented at the 25th annual meeting of POGO (23 January 2024).
- During the ORCA workshop on the 24.04.2024 options to continue the OPENMOD idea within the NANO alumni network or future cooperations with SOOP (Shaping an Ocean Of Possibilities for science-industry collaboration, https://www.soop-platform.earth/) were discussed.
- Several outcome and products generated within the OpenMODs project (best practice/instruction videos, 3D file) were collected and made available for the community at https://prezi.com/view/Uxu3ImYn6vN1Onxo4xmX/.

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Summary

The following table resumes the tasks which were all completed. Please note that the shipment was completed earlier than originally planned in order to allow the NF-POGO CofE module to be conducted.

Task title	Start month	Duration (month)	Who	Deliverable	
Reparation of the 2 OpenMODs platforms (drifters) seriously damaged during construction test phases of OpenMODs2.	M0	4	OGS	Platforms ready	fullfilled
Identify a possible replacement for the transmission of the GPS position choosing between low-cost models available on the market for recreational purposes (e.g.: SPOT or Garmin satellite/GSM tracker with an approximate cost of 150-200 Euro)	M0	4	OGS+AWI	Device identified	fullfilled
Purchase of the transmission/localization system (+ eventual data transmission subscription) to be integrated on OpenMODs platforms	M4	4	AWI	Device	fullfilled
Realization of one completely disassembled OpenMODs platform (drifter) for educational purposes	M4	3	OGS	Disassembled platform ready	fullfilled
Production of a 1:10 scale drifter for educational purposes	M4	3	OGS	Scale drifter model ready	fullfilled
Procurement of a small aquarium including an aquarium pump for educational purposes (to be used with the scaled drifter)	M5	2	AWI	Material procurement	fullfilled
Second CofE module during which the OpenMODs platform will be used (drifter mode) without LoRa system and without TD probe, but with the satellite/GSM tracker	M6	1	AWI+OGS	Dissemination, Twitter and Instagram campaign, teaching materials, best practice fact sheet	fullfilled
Realization of the 3D files (*.stl format) of the most complex structures of the platform (joining elements) for 3D printing purposes	M8	4	OGS	files	fullfilled
Shipment of the material to AWI	M9	1	OGS	-	fullfilled
Financial reporting/closure	M14	1	OGS+AWI	Financial report	fullfilled

3) Is this project likely to continue beyond the dates outlined in the original proposal?

The objectives and content of the project will be continued after the project duration, currently follow up action between different institutions and companies are planned for 2024 and following.

4) Please provide your comments on the POGO-funded Initiative (e.g. has the funding made a significant difference in the progress of this project?).

Without funding, that have continued for 3 years, the OpenMODs project would not have been possible.

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