APPENDIX 3

TA PROJECT REPORT

(see following pages)

TA PROJECT REPORT PACKAGE

- The completed and signed forms included in this package should be sent by email to jerico.ta@marine.ie and **jerico**-s3**@ifremer.fr** within **one month after the completion of the TA project** by the User Group Leader.
- **Refunding of the TA reimbursement to the user group will be processed as soon as these forms will be submitted**.
- The TA project report will be published in the JERICO-S3 website. The report, as well as other information collected with the attached forms, will be used to report to the European Commission.
- **Please note that any publication resulting from work carried out under the JERICO-S3 TA activity must acknowledge the support of the European Commission – H2020 Framework Programme, JERICO-S3 under grant agreement No.871153.**

1. Project Information

Proposal reference number[1]	22/1002923
Project Acronym (ID)[2]	GOOM
Title of the project[3]	**Glider Cooperation Mission in Eastern Gotland Basin**
Host Research Infrastructure[4]	**Finnish Meteorological Institute - FMI Baltic Sea Glider**
Starting date - End date[5]	2022-07-01 - 2022-11-30
Name of Principal Investigator[6] **Home Laboratory** **Address** **E-mail address** **Telephone**	Lars Arneborg SMHI Sven Källfeltsgata 15, 42671 Västra Frölunda, Sweden lars.arneborg@smhi.se 0046 31-751 8982

2. Project objectives[7] (250 words max.)

The main objectives of this glider mission are related to the central Baltic Sea water exchange and circulation. The main reason for using the glider is to obtain three-dimensional data on circulation and vertical structure of the sea. The period of the observations is selected so that it will support the fixed ADCP-mooring observations carried out in the Estonian EUROFLEETS study, CABLE.

Specific scientific objectives related to circulation and water exchange in the Central Baltic Sea:

a) What are the horizontal current patterns at the selected cross-section? What are the mean meridional transports through this cross section during the experiment? What is the quantified contribution of forcing factors (particularly wind) in driving the sub-surface currents?

[1] Reference number assigned to the proposal by the TA-Office.

[2] User-project identifier used in the proposal.

[3] Title of the approved proposal. The length cannot exceed 255 characters

[4] Name of the installation/infrastructure accessed with this project. If more than one installations/infrastructures are used by the same project, please list them in the box.

[5] Specify starting and end date of the project (including eventual preparatory phase before the access).

[6] Fill in with the full contact of the Principal Investigator (user group leader).

[7] Write the short-term, medium and long-term objectives of the project. Use no more than 250 words.

b) What is the spatial variability of the temperature and salinity structure?

3. Main achievements and difficulties encountered (250 words max.)[8]

The aim of our glider project, GOOM, is to get a broad spatial coverage of the water masses east of Gotska Sandön.

One of the difficulties was to get permission for the Finnish Glider to enter into Swedish territorial waters. FMI applied for a permit to access the waters close to Gotska Sandön, in order to be able to measure the transect all the way into shallower waters.

The Swedish Coastguards granted access for the Finnish glider within the Swedish EEZ but not on territorial waters (<12 nm from Gotska Sandön).

The Glider deployment period was successful with a total number of 1948 dives during the whole period of 20 days and 330 km.

The mission started on September 22th with the vessel "Ocean Poet'' of VOTO (Voice of the Ocean, Swedish Foundation) and the glider was recovered with the same vessel on October 12th.

Reference CTD casts were made on RV Aranda at the end of the mission on October 10th on the station NBP2.

4. Dissemination of the results[9]

- Raw data from the project will be available on open source after quality control.
- Data obtained during the project will be part of an open access paper comparing data from different projects in the area within the same time frame.
- Results and processed data will be part of an open access paper by the project partners SMHI and FMI.
- Results and data will be discussed together with scientists participating in the Cable project and employees from the organisation VOTO. Both Cable project and VOTO have done measurements in the project area during the project period.

[8] Describe briefly the main achievements obtained and possible impacts, as well as possible difficulties encountered during the execution of the project. Use no more than 250 words.

[9] Describe any plan you have to disseminate and publish the results resulting from work carried out under the Transnational Access activity in JERICO -S3: scientific articles, books - or part of them -, patents, as well as reports and communication to scientific conferences, meetings and workshops. Highlight peer-reviewed publications. **Note that any publications resulting from work carried out under the JERICO -S3 TA activity must acknowledge the support of the European Commission – H2020 Framework Programme, JERICO -S3 under grant agreement No. 871153.**

Mission planning, glider preparation and piloting

We got permission to run a glider mission in Swedish EEZ east of of Gotska Sandö on between August 15. and end of October. We planned the mission to use two waypoints 19°41.76E 58°24.60N (Western) and 20°24.60E 58°24.60N (Eastern).

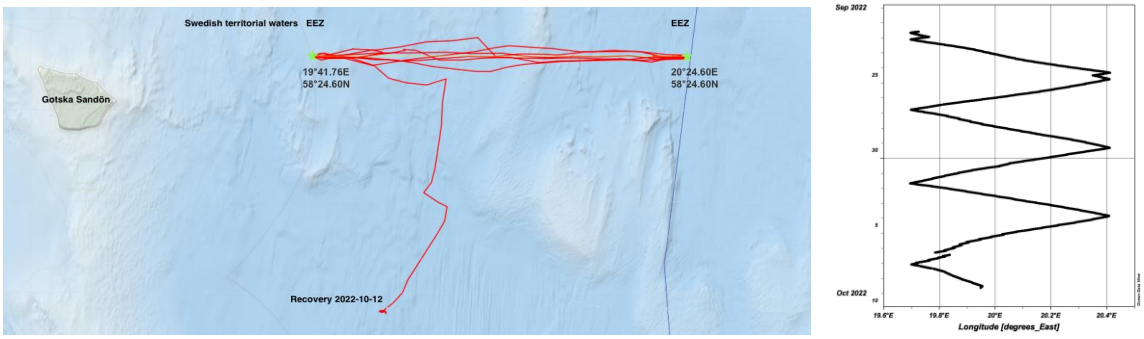

Figure 1. Uivelo's GOOM mission path 2022-09-22 - 2022-10-12, map. EMODNet Bathymetry.

The mission started late September, when the surface water had cooled enough. Otherwise, the difference in water density would have exceeded the adjustment possibilities of the buoyancy engine of the "Slocum G2 200m" glider. In the first section we limited the diving depth to about 80 meters. After that, we increased the maximum depth of the dives to about 120 meters. In deeper dives, the vertical speed decreased slightly. At the end of the mission, we had to reduce energy consumption, at first, by regulating buoyance engine movements, and finally also measurements with the optode and the fluorometer.

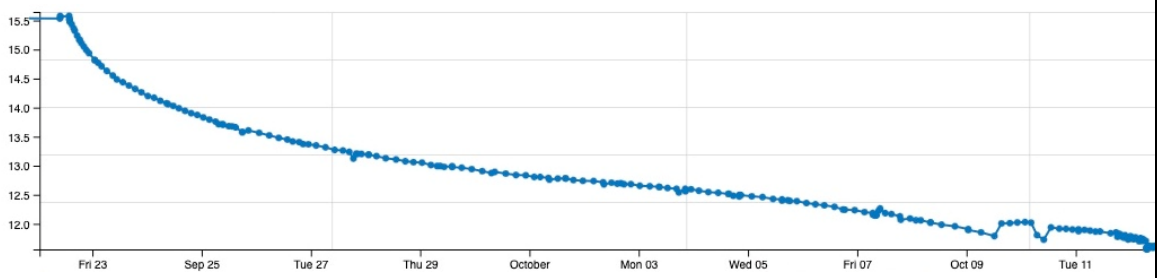

Figure 2. Voltage drop [V] of Uivelo during the GOOM mission.

The deployment and the recovery of the mission

We deployed Uivelo in cooperation with VOTO on September 22, 2022. Uivelo was recovered by VOTO researchers with their vessel on October 12 2022, with FMI researchers controlling the glider via satellite. The operations ran quite smoothly, although, both had to be postponed from planned until the weather conditions were sufficiently favourable. The final length of the mission was 20 days and 330 km with a total number of 1948 dives. Uivelo managed to reach the Eastern waypoint 3 times and measure the ca. 41km section 6 times.

[10] Describe in detail results and main findings of your experiment at the present stage.

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Scientific data

The glider was equipped with the sensors: SBE's glider CTD, Aanderaa's oxygen optode and SBE's SeaOWL fluorometer with channels for chlorophyll, backscatter and fDOM. We made a comparison to T & S climatologies, which were mean September-October values of CMEMS reanalysis of 1995-2020.

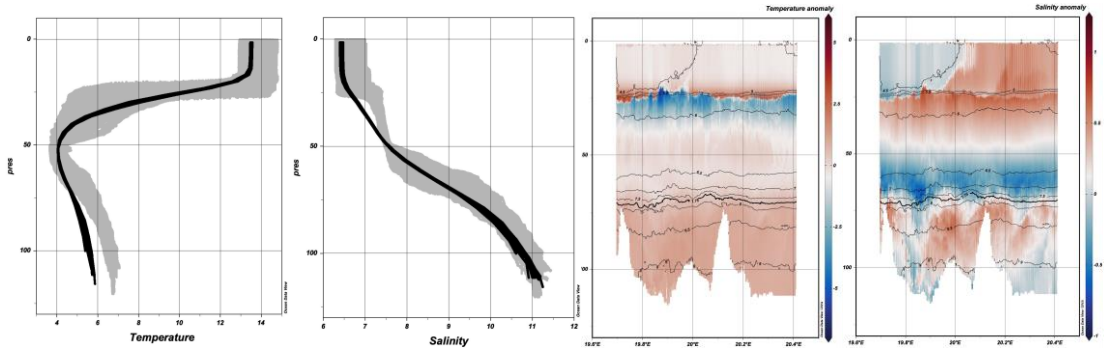

Figure 3. Salinity and temperature of Uivelo's measurements (gray) and CMEMS climatology (black) and anomalies along the path.

As expected, the climatology does not describe the sharper thermocline. Data from deeper waters, below halocline, are warmer than in climatology. In the western part of the transect surface waters were fresher than in the climatology.

In the area, waters are hypoxic below the halocline at ca. 75 m depth. Uivelo's fluorometer measured a spike just above and in the oxycline around 75 to 85 meters depth. The thickness of the maximum layer varied being thickest in the western end of the transect. This maximum may either be due to a bacterial decomposition processes or resuspended matter that interleaves the water column due to mixing and resuspension at the sloping bottoms. This needs to be investigated further.

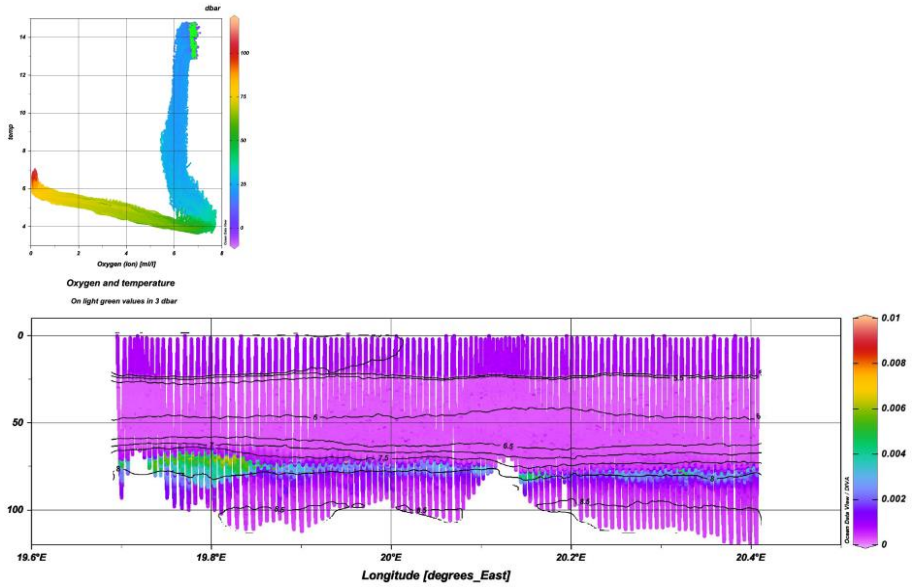

Figure 4. Oxygen concentration and backscattering (700 nm) along the 5th section (E-W) with isobar lines.

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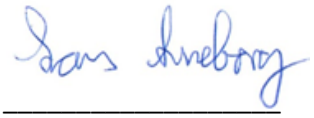
Gothenburg, 16/12 /2022



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Location and date	Signature of principal investigator

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