

TNA PROJECT REPORT

1. Project Information

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| Proposal reference number | JN_CALL_3_1 |
| Project Acronym (ID) | DEFPAM-G |
| Title of the project | DEep-sea Fish Passive Acoustic Monitoring by using Glider technology |
| Host Research Infrastructure | SOCIB glider facility (SOCIB-GF) |
| Starting date - End date | 2018 - 2019 |
| Name of Principal Investigator | Eric Parmentier |
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| User group members | Eric Parmentier, Marta Bolgan Université de Liège, Laboratoire de Morphologie Fonctionnelle |

2. Project objectives

The specific objectives of DEFPAM-G are:

- 1) Testing the performance of the acoustic datalogger of property of the PI (i.e. BCB, Loggerhead) to pressure typical of depths of max. 970 m (**Work-package 1**)
- 2) Coupling PAM to the glider technology for mapping spatial and depth patterns of deep-sea fish vocal populations in the Balearic Sea (**Work-package 2**)
- 3) Sound description, characterisation of spatial and temporal occurrence of sounds, correlation of acoustic features with environmental factors (such as temperature) and inferring of the potential vocal fish species. Final sound library creation (**Work-package 3**).

3. Main achievements and difficulties encountered

1. WP1:

The acoustic datalogger (BCB) provided by the TNA-user-team (Prof. Parmentier and Dr. Bolgan) was pressure tested twice.

The user-team shipped the BCB to SOCIB during January 2019. SOCIB glider facility team (Marc Torner, Albert Miralles, Manu Rubio) tested the BCB, which was turned off, in the SOCIB pressure chamber (max pressure 100 bar). The BCB did not report any sign of mechanical damage.



From 29/01/2019 to 02/02/2019, the TNA-user-team travelled to Mallorca to i) further test the BCB; 2) take part to the launching and iii) provide a seminar at IMEDEA.

The BCB was turned on and tested again in the pressure chamber. The BCB reported no sign of mechanical damage and recorded important baseline information about the glider self-noise (Figure 1). The TNA-users and SOCIB glider facility team worked to find the most suitable solution for attaching the BCB to SOCIB's glider Unit-567 (aka SDEEP04) (Figure 2). Due to adverse weather conditions, the TNA-user team could not take part to the glider launching (postponed to 04/02/2019).

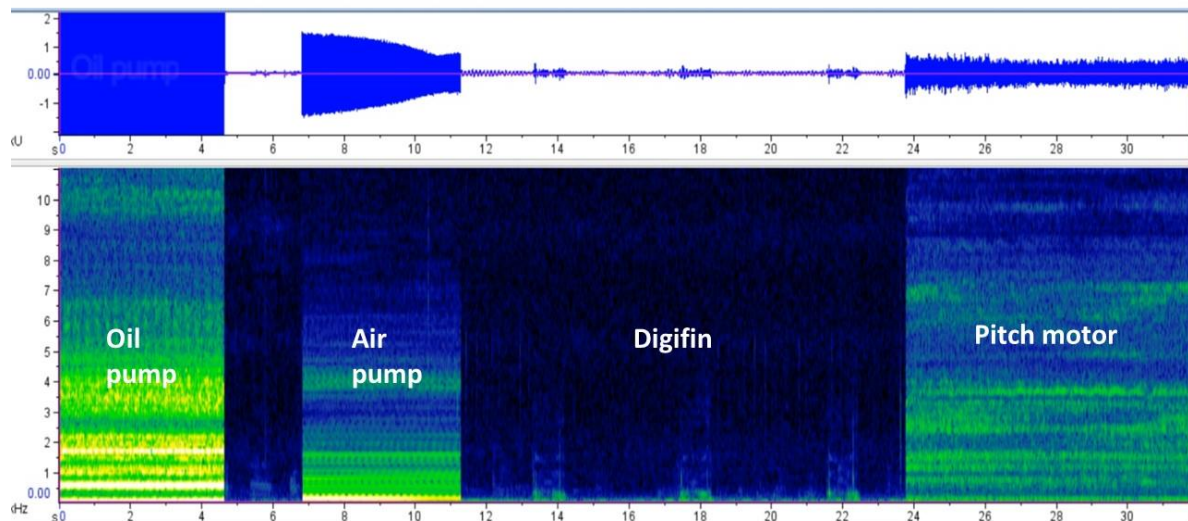


Figure 1- Glider self-noise successfully recorded during the tests conducted as part of WP1. The time scale of x-axis is seconds. The original files were cut to show the different kinds of sounds. The testing experiment lasted longer.



Figure 2- The acoustic datalogger (BCB, Loggerhead Instrument) was turned on following the selected schedule and attached to the SOCIB glider SDEEP04

2. WP2:

SDEEP04 was launched on 04/02/2019 in front of Palma's Bay (N39.3534° E2.4532°). SDEEP04 covered the Eivissa channel (6 transects) and Mallorca channel (1 transect) (Figure 3). Mission ended on 15-03-2019, when SDEEP04 was retrieved.

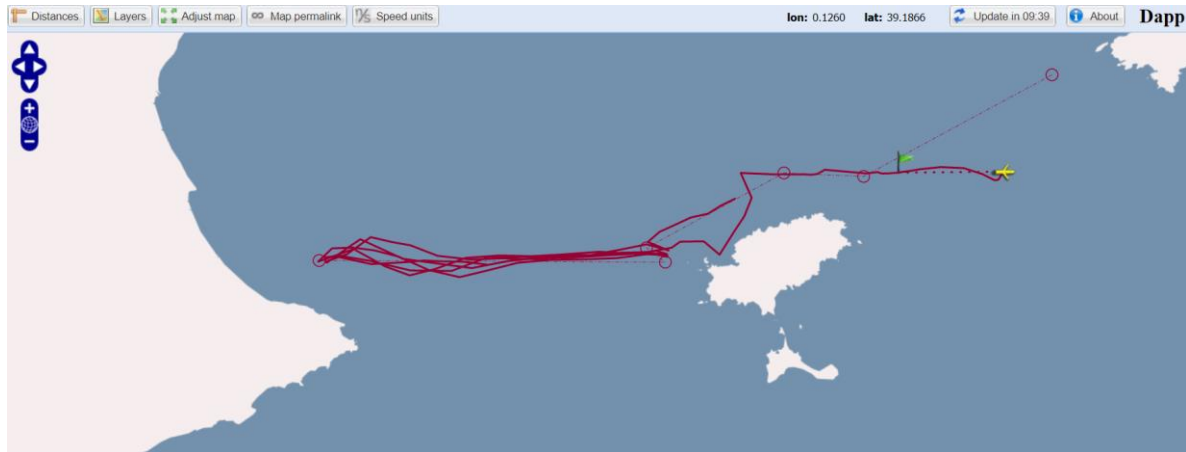


Figure 3- DEFPAM-G mission (WP2)

3. WP3:

Probably because the vibrations due to the water displacement and glider movements, the BCB lid unscrewed and salt water entered in the device (Figure 4). We retrieved the SD card but it is not possible to read it; no acoustic data have therefore been retrieved.



Figure 4- The damage reported by the BCB at the end of WP2

4. Dissemination of the results

A seminar, organised by Marc Torner, was provided by the TNA-user-team to scientists of IMEDEA and SOCIB on February 1st, 2019 (Figure 5).

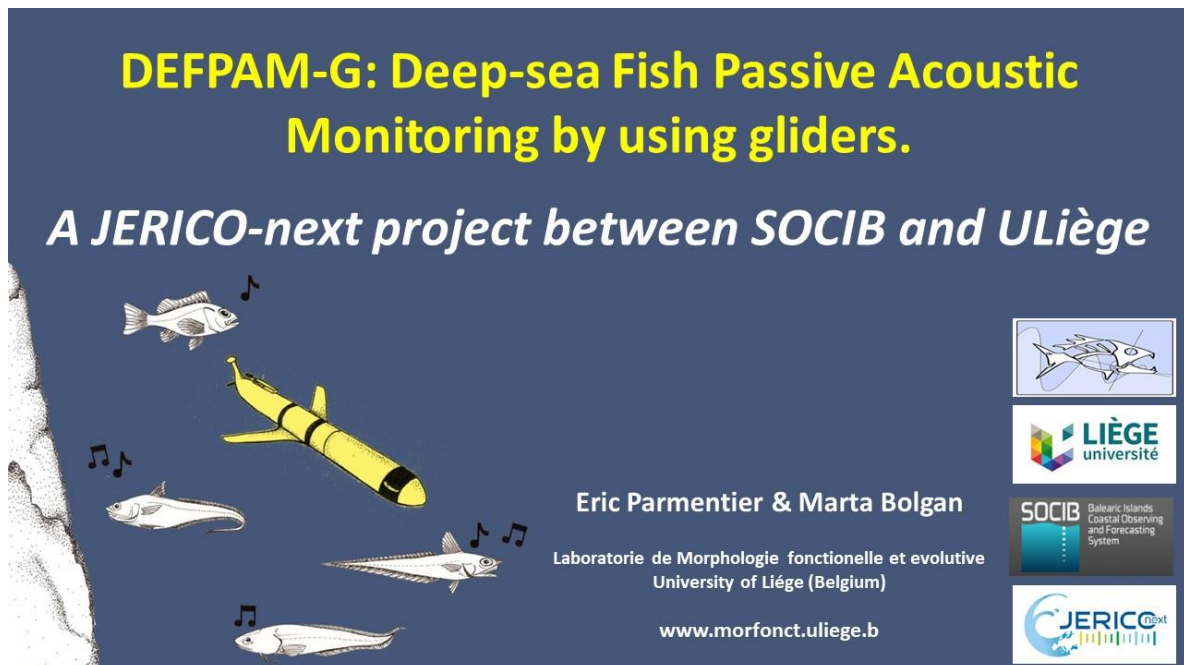


Figure 5- The seminar organised by Marc Torner (SOCIB) and provided by the user-team to IMEDEA and SOCIB scientists

Veronica Ortiz (SOCIB) has prepared the following list of divulgative media posted in the SOCIB account

1. 30/01/2019: Starting of the DEFPAM project:
https://twitter.com/socib_icts/status/1090643264905117696
2. 31/01/2019: Seminario at SOCIB:
https://twitter.com/socib_icts/status/1091006436157591552
3. 01/02/2018: Seminario feedback:
https://twitter.com/socib_icts/status/1091375984140578817
4. 05/02/2019: Glider launching:
https://twitter.com/socib_icts/status/1092721841469378561

Unfortunately, due to the problems encountered during WP3, we do not envisage any scientific publication arising from DEFPAM, as no valuable data were collected.



5. Technical and Scientific preliminary Outcomes

Unfortunately, no results have been collected due to an unexpected mechanical failure of the acoustic datalogger. This resulted in a) impossibility of publishing and divulging pioneer results on the possibility of mapping deep-sea fish populations thanks to Passive Acoustic technology; b) a serious financial lost encountered by the TNA-user group and c) the necessity to secure new funding for purchasing a new acoustic datalogger with mechanical improvements specifically designed by the manufacturer (Loggerhead Instruments) after analysing the technical problems encountered during DEFPAM. As TNA-user group we would like to stress that we are confident that this experiment can work, as we are in contact with other research teams which are using Passive Acoustic Monitoring coupled with glider technology for similar purposes.

Finally, we would like to acknowledge and thank the JERICO-NEXT TNA initiative for granting us the opportunity to perform this survey.

SUBMITTED, 11 MAY 2019; FINAL REVISION, 20 JUNE 2019