

User guide: Handheld hydrophone for recording cetaceans at sea

Hans Verdaat & Klaus Lucke



IMARES Wageningen UR

(IMARES - Institute for Marine Resources & Ecosystem Studies)

Version 1.0

Publication date:

July 2014

IMARES vision:

- 'To explore the potential of marine nature to improve the quality of life'.

IMARES mission:

- To conduct research with the aim of acquiring knowledge and offering advice on the sustainable management and use of marine and coastal areas.

IMARES is:

- An independent, leading scientific research institute.

P.O. Box 68

1970 AB IJmuiden

Phone: +31 (0)317 48 09 00

Fax: +31 (0)317 48 73 26

E-Mail: imares@wur.nl

www.imares.wur.nl

P.O. Box 77

4400 AB Yerseke

Phone: +31 (0)317 48 09 00

Fax: +31 (0)317 48 73 59

E-Mail: imares@wur.nl

www.imares.wur.nl

P.O. Box 57

1780 AB Den Helder

Phone: +31 (0)317 48 09 00

Fax: +31 (0)223 63 06 87

E-Mail: imares@wur.nl

www.imares.wur.nl

P.O. Box 167

1790 AD Den Burg Texel

Phone: +31 (0)317 48 09 00

Fax: +31 (0)317 48 73 62

E-Mail: imares@wur.nl

www.imares.wur.nl

© 2014 IMARES Wageningen UR

IMARES, institute of Stichting DLO is registered in the Dutch trade record nr. 09098104, BTW nr. NL 806511618

The Management of IMARES is not responsible for resulting damage, as well as for damage resulting from the application of results or research obtained by IMARES, its clients or any claims related to the application of information found within its research. This report has been made on the request of the client and is wholly the client's property. This report may not be reproduced and/or published partially or in its entirety without the express written consent of the client.

A_4_3_2-V14.1

Contents

Contents.....	3
Introduction	4
1. Setting up the Hydrophone.....	5
2. The recording device: Tascam HD-P2.....	7
3. Power supply.....	9
4. Getting started	10
5. Setting up the menu	12
6. Preparations before	16
7. Placing the hydrophone	16
8. Start recording	16
9. After a recording session.....	17
10. Sending the data	17
11. Self-analysis	17
12. Data publication	18
13. Questions	18
14. Online manuals.....	18
Attachment 1: Field form	18

Introduction

Marine mammals spend most of their time underwater which sometimes makes it difficult to detect them from the surface. At the same time, most cetaceans (toothed and baleen whales) produce a variety of sounds underwater and since sound travels easily in water, these sounds can normally be picked up even at distances beyond those of visual detection. Several studies have shown that the analysis of underwater sound recordings can complement the existing research efforts to assess the presence and distribution of cetacean species in the Caribbean waters and elsewhere.

As discussed during the International workshop in St. Maarten in 2012 and other meetings, an easy-to-use recording system would be the ideal tool to collect valuable information on the presence and distribution of cetaceans from platforms of opportunity (such as whale watching vessels or dive-tour operators) or in the context of dedicated marine mammal surveys (such the AGOA or IMARES surveys). Supported by the Dutch Ministry of Economic Affairs (EZ), IMARES has purchased and collated a number of recording systems which will be distributed among interested users in the Caribbean.

We hope the system will be easy to use even by untrained personnel and robust enough to withstand the strain of being used in the marine environment. This user's guide is intended to serve as a practical illustrated step by step users guide useful information in addition to the manual provided with every recording system. In the spirit of the discussions between all participants of the St. Maarten meeting, sharing the data between all interested parties is essential and IMARES'role will be to provide as much scientific support as possible and required.

1. Setting up the Hydrophone

The hydrophone is packed in a yellow waterproof Peli case.



Photo 1: Peli case

The hydrophone is protected by foam inside the case. All equipment should be packed away dry in the case.



Photo 2: handheld hydrophone packed

The case holds:

- Sound recording device
- Headphone
- Hydrophone cable
- Electricity adapter for the recording device
- FireWire cable



Photo 3: stored headphone



Photo 4: connected handheld hydrophone in the Peli case

2. The recording device: Tascam HD-P2



Photo 5: top-side Tascam



Photo 6: right-side Tascam



Photo 7: front-side Tascam



Photo 8: left-side Tascam

3. Power supply

The device runs on 8 AA batteries or can be connected to the ships power supply using the adapter. Always check the batteries before going out to sea.



Photo 9: batteries Tascam



Photo 10: connecting power supply to the Tascam

4. Getting started

First connect the headset and hydrophone cable.



Photo 11: connecting the headset to the Tascam



Photo 12: connecting the handheld hydrophone to the Tascam

Make sure the CompactFlash (CF) card is formatted before use.



Photo 13: placing the CF card in the Tascam

5. Setting up the menu

Use the Power switch on the top of the device to switch on the recorder

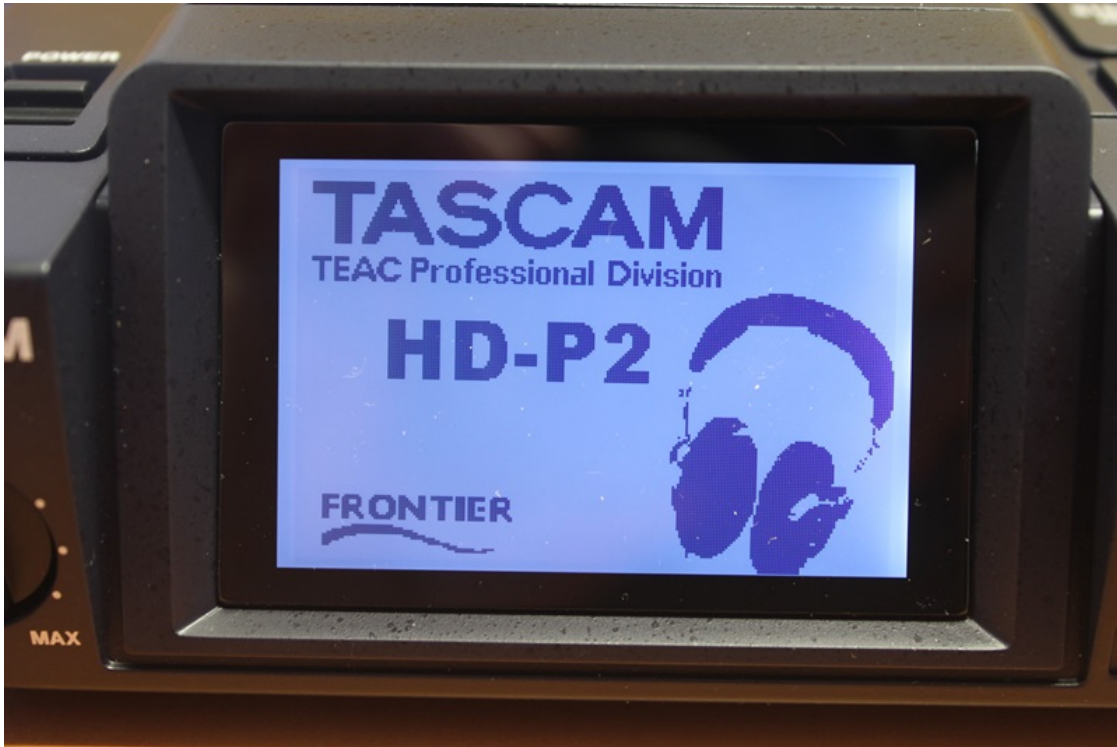


Photo 14: opening screen Tascam



Photo 15: recording screen Tascam

When entering a new CompactFlash (CF) card format it before use. Make sure there are no recordings on the CF card that have not been back-upped yet !!



Photo 16: media management menu Tascam



Photo 17: menu Tascam

Create a New Project of every survey trip



Photo 18: menu Tascam



Photo 19: menu Tascam

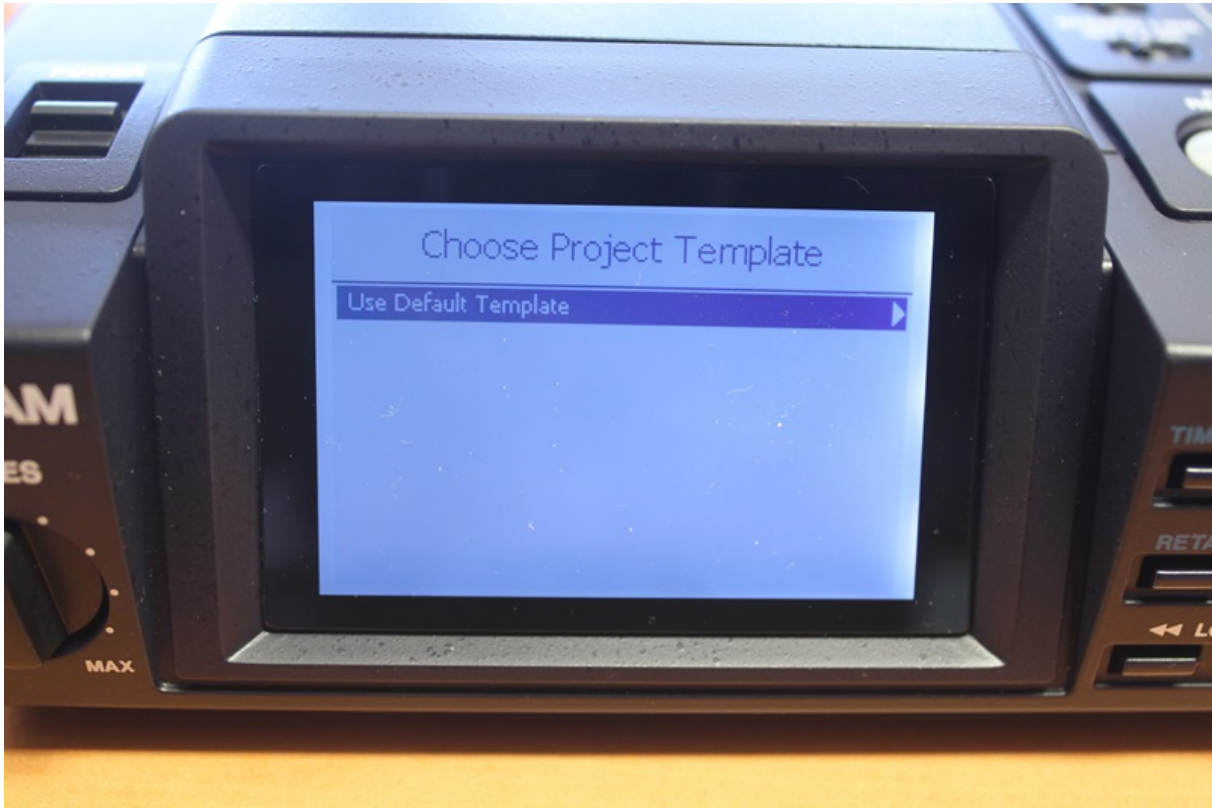


Photo 20: menu Tascam



Photo 21: menu Tascam

6. Preparations before field data collection

Before heading out to sea check if all components are packed in the box. Check if:

- a back-up has been made from the recordings of the last trip
- the CF-card is formatted after the last recording session
- the batteries are fully charged
- spare batteries are packed in the box

7. Placing the hydrophone

Before placing the hydrophone in the water, make sure the engine is switched **OFF**. The best recording quality can be obtained when the engine of the vessel the operator is working on isn't running. Only switch the engine back on once the hydrophone is out of the water after the recording session.

No single solution on how to deploy the hydrophone is best. Depending on the location and vessel different schemes are possible. If in doubt please contact IMARES (see 13.)

Try to place the hydrophone at the side of the vessel away from its propeller if the engine can't be switched off. If the vessel does need to manoeuvre before the whole cable can be retrieved the risk of getting the cable in the propeller is smaller.

- An easy way to store the cable for deployment(s) is to place it in a bucket. This prevents the cable from getting tangled up on deck.

If possible place the hydrophone at 10m water depth. If the total water depth is less than 20 meters then place the hydrophone in the middle of the water column. The hydrophone should be placed at minimum 1 meter depth to prevent it from hitting the vessel during recording and it will improve the quality of the recordings.

To prevent the hydrophone from dropping further, fix the hydrophone cable with a short rope to the vessel. This line will also prevent the equipment from being pulled overboard if the hydrophone gets stuck underwater.

8. Start recording

The hydrophone should be placed in MIC/LINE R. On the front of the recorder there are two turning buttons. The outer button is for the Right plug where the hydrophone should be attached to. The inner button is for the Left plug, it's for recording above water. Make sure the outer button for the Right plug is on and the inner is off. It's best to make a recording on deck by speaking in the hydrophone, this can be found back later.

After switching the recorder on the recording screen (photo 15) will become visible. The recording settings for cetaceans are set to:

- **Recordings should be made at 44kHz.**
- **Sound should can range from dB -50 -40 -30 -20 -10 0**
- **Best between dB -30/-20**

The file size will be ~100kB/second = ~360mB/hour

If it constant measures near 0dB sound is to load, not good for analyses
When level is to load -> -20dB switch (records less sound)

It's possible to listen to the sounds via the headphone without recording; if you push PLAY, the LED light above the RECORD button will not light up.

To check if a recording was successful it's possible to listen to the recordings, rewind or fast-forward through recordings on the recorder.

Make sure the LED light above the RECORD button is on if you do want to make a recording.

If the recorder is switched OFF and later back ON there is the option to continue to record in the same sample (project). The records will be stored in different recording files.

For more options read the online manuals (see 14.)

9. After a recording session

After returning back from sea:

- Always rinse the hydrophone and the cable with fresh water and dry it using an towel after every recording trip. This prolongs the lifespan of the equipment.
- The recorder and connectors should stay dry at ALL times
- Backup the data on the CF card to a computer.
- If needed change the filenames so that the date of the recording and the project name matches the file names on the field form; **YYYY-MM-DD_projectname**
- Format the CF card in the recorder
- Charge the batteries
- Make sure all components are packed away in the box

10. Sending the data

All recorded files should be send to IMARES. Several recordings can be transferred at the time using <https://www.wetransfer.com/> with a maximum total file size should not exceed 2 GB. IMARES will then backup the data as well.

11. Self-analysis

After sending the recorded files to IMARES, the hydrophone operator has the option to self-analysis the data or just to play the recorded files. Suitable software would be

- Adobe audition <https://helpx.adobe.com/creative-cloud/learn/tutorials/audition.html>
- Audacity <http://audacity.sourceforge.net>
- Raven lite <http://www.birds.cornell.edu/brp/raven/ravenoverview.html>
- Window Media Player or any other MP3 player

12. Data publication

Recordings from several locations in the Caribbean will be stored at IMARES. Any findings made during the future analysis of the recordings will be shared. If the analysis results in a publication all who contributed to the dataset analysed will be asked to co-author or will be acknowledged. .

13. Questions

For further questions contact:

- Meike Scheidat meike.scheidat@wur.nl
- Hans Verdaat hans.verdaat@wur.nl +31-317-487113
- Klaus Lucke klaus.lucke@curtin.edu.au

Also suggestions for improvements to this protocol can be send to Hans Verdaat.

14. Online manuals

TASCAM HD-P2 Owner's Manual

<http://www.avisoft.com/HD-P2.pdf>

H2a-XLR Hydrophone User's Guide

http://www.aquarianaudio.com/AqAudDocs/H2a_XLR_manual.pdf

Attachment 1: Field form