

Manual for the Underwater Acoustics context within the European Tracking Network data management platform



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1. Introduction

1.1 Objective

This document provides a standardised protocol to upload underwater acoustics data and metadata to the European Tracking Network (ETN). This protocol is aimed at C-POD and F-POD (Chelonia Ltd., UK) (henceforth referred to as “PODs”) users, and to a lesser extent, at hydrophone users (to log and manage metadata only, not upload detections). ETN-underwater acoustics is designed to accept POD data and metadata in a standardised way with the FAIR principles in mind. POD data can be processed with POD.exe software from Chelonia Ltd, UK or through the Valkyrie app developed by Aarhus University in the framework of DTO Bioflow, both are accepted by ETN-underwater acoustics.

This manual will provide the general information of ETN and specific aspects of the Underwater Acoustics context. ETN-Underwater Acoustics is designed to be used as an active metadata portal to store your active deployments, meaning that PODs that are deployed and not yet retrieved already have their metadata in the deployment tab of ETN, which eases management of field work.

1.2 What is ETN?

The [European Tracking Network](https://europeantrackingnetwork.org/en) (<https://europeantrackingnetwork.org/en>) is a collaborative network of researchers, infrastructure, data, and knowledge with a mission to track aquatic animals across Europe to better understand, protect and manage them in support of European policy priorities, breakthrough science and cutting-edge technological innovation.

The [ETN Data Platform](#) is the central data portal of ETN. It gives access to all types of acoustic telemetry and underwater sound data, and provides an interface to manage, explore and download the metadata and data. Access is password protected, and data embargo rules are in place.

The ETN Data Platform has been developed by the [Flanders Marine Institute \(VLIZ\)](#) and is open to all underwater telemetry and passive acoustics users. New developments and additional features are added on a continuous basis. The web application is built using PHP (using the Symfony framework) for the back-end side and Bootstrap/jQuery/Datatables/... (among others) to facilitate the development of the front-end side.

1.3 ETN structure and concepts

Data management portal

The ETN Data Platform can be navigated via the header at the top of the page (*Fig. 1.1*). Within, you can access the [landing page](#), the technology type, the metadata tables of the receivers (sensors) and deployments, the detections data table which can be obtained through queries, the tool to upload detections and import metadata, and the table containing all detection files.



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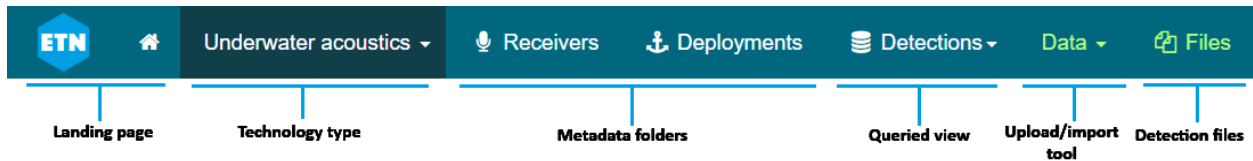


Figure 1.1. Overview of the different sections available in the data management portal.

ETN works within different contexts. Each context refers to a technology type. Currently there are four different contexts available: Acoustic Archival, Acoustic Telemetry, Underwater acoustics, and Archival Data (Fig. 1.2). By clicking the header, you can choose the technology type of interest and switch between the different contexts.

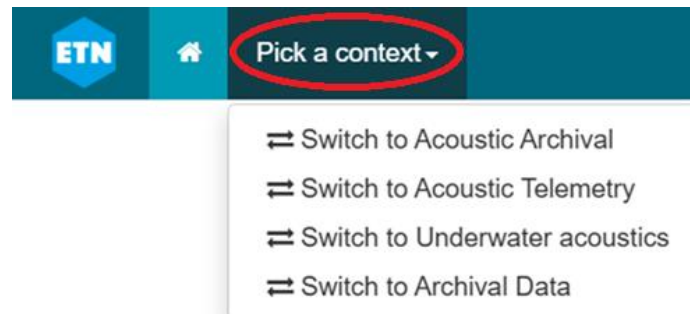


Figure 1.2. Available contexts in ETN.

The main sections in the “**Underwater acoustics**” context in ETN are receivers, deployments and detections.

- A **receiver** represents a specific acoustic sensor (POD or hydrophone) and can only be attached to one deployment at a time. A unique identifier (receiver model + serial number) is used to differentiate receivers and to link it to a deployment.
- A **deployment** represents the period during which a specific receiver (sensor) is in the water and in a specific location (for example, a station). Deployments allow users to define when a receiver has been activated and deployed in or retrieved from a station. Because deployments are linked to a receiver, if one receiver has multiple deployments, there will be multiple deployments for that receiver. Users can add additional information about the deployment, such as mooring type, battery end date, or hydrophone and amplifier sensitivity.
- A **detection** represents each cetacean click train per minute detected by a POD. The processed files describing 'train duration total' and 'detection and environment' are merged into the database.

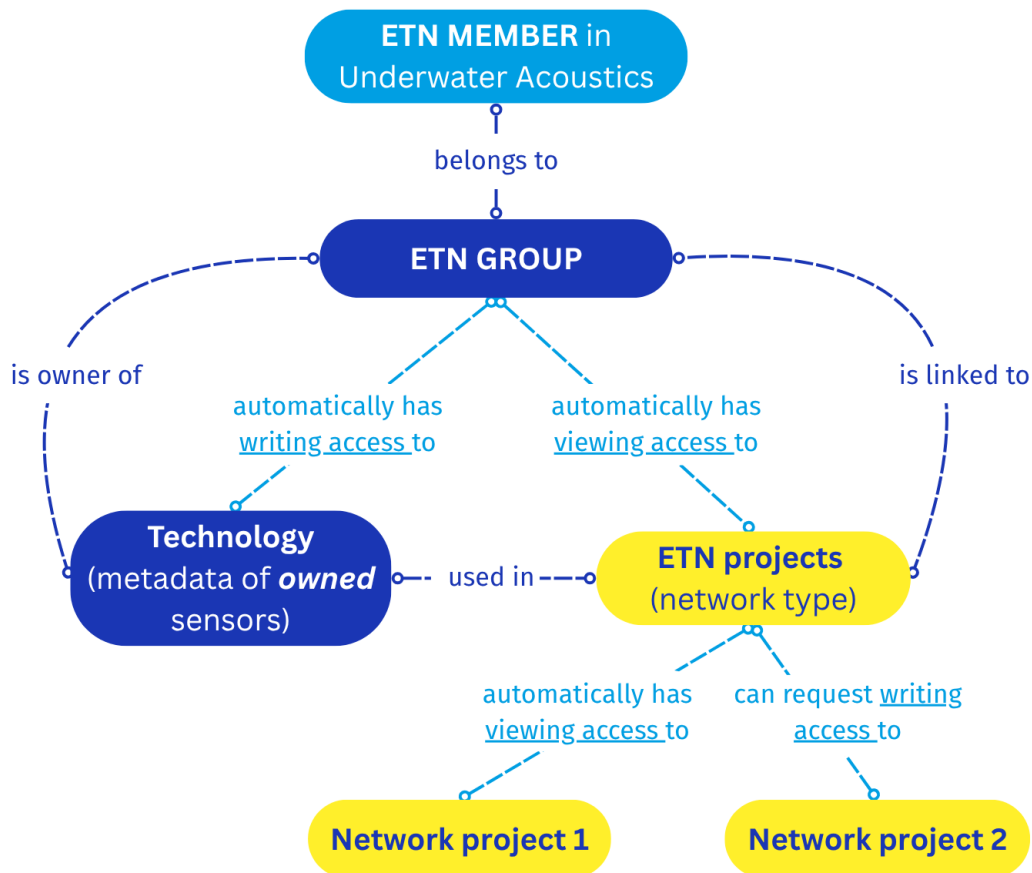
User groups and projects

Access to the [ETN Data Platform](#) is restricted to registered users only. By registering, you automatically agree to the [data policy](#). Once registered, each user is assigned to one or multiple groups, upon their request. User groups in ETN usually correspond to institutes (for example: VLIZ, INBO) but can also correspond to instances when the associated acoustic data and metadata pertain to a specific research

group, department or project (for example: APELAFICO, VLIZ_MOC). The decision to accept a new member into an existing group rests with the group lead, who needs to accept the user’s request. The process of requesting to join groups and gain writing rights is described in [section 3](#).

All data within the ETN Data Platform is stored and managed within [projects](#) which need to be registered via the [project template](#). This template is necessary to keep track and verify who is contributing (meta)data to a project. The information in the template will also be used to create a [MarineInfo](#) metadata record, allowing the projects to be visualised in the ETN map [on the website](#) and in the [data platform](#), and also to be discoverable via the [ETN Dataset Catalogue](#). All projects within the “Underwater Acoustics” context fall under the “network projects” classification (as they relate to receivers and deployments linked to a study area). A user group has access to one or more projects, and a project can be composed of one or more users from different user groups (see [Fig. 1.4](#)).

Additionally, receivers are assigned to a group or left blank. The owner group has editing rights to its receivers. Furthermore, all members of a group have viewing rights to the projects associated with the group, but only specific users assigned to a project have writing access to data and metadata for that project (deployments). Further editing access can be requested. See [Fig. 1.3](#) for a schematic overview:



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Figure 1.3. Relationship between a member (in light blue), a group (in dark blue), and a project (in yellow), along with a member's accesses.

As a recap, keep in mind the link between User – Group – Project (Fig. 1.4):

- A user is always linked to a group.
- Users can have access to multiple groups.
- A group can contain several projects.
- A user has read-access to all the projects of the same group.
- Write-access can be specified per user linked to the project.
- A project can belong to more than one group.

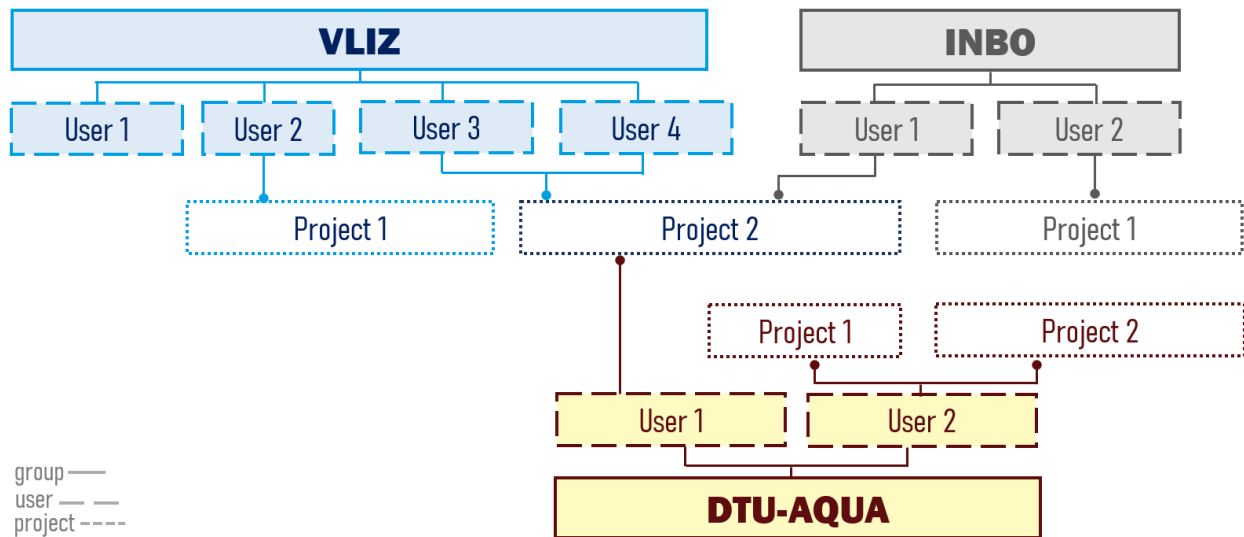


Figure 1.4. Links between group, user, and project in the ETN framework.

2. Overview

The following steps provide an overview of the data and workflow that goes into, through, and out of ETN:

- *Set up your Underwater Acoustics project*
 1. Register to ETN (see [section 3.1](#))
 2. Access granted to user group(s)
 3. Create an Underwater Acoustics project (see [section 3.2](#))
- *Metadata and data upload: fixed order*
 1. Upload receiver metadata per sensor or bulk (see [section 5.1, step 1](#))
 2. Upload deployment metadata per deployment or bulk (see [section 5.1, step 2](#))
 3. Upload detections from existing deployments (see [section 6.1](#))
- *Get your data*
 1. Query detections on the ETN data platform (see [section 6.2](#))



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2. Query data through the LifeWatch data platform or the Lifewatch R Studio Server with the LifewatchR package (see [section 6.2](#))
3. Download full datasets through [MarineInfo](#)

The following flowchart illustrates the process from registering to ETN to retrieving datasets from the ETN data platform using Valkyrie (*Fig. 2.1*). When processing the data with cpod.exe or fpod.exe, see *Figure 2.2*.

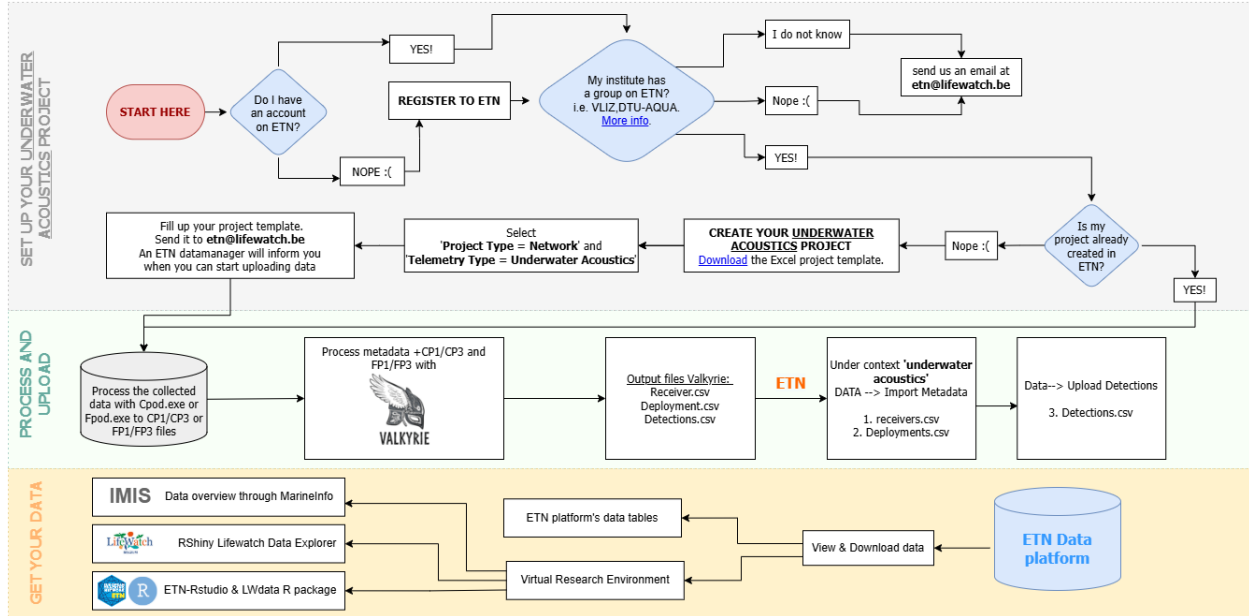


Figure 2.1. Flowchart of data with Valkyrie and workflow in ETN – underwater acoustics.

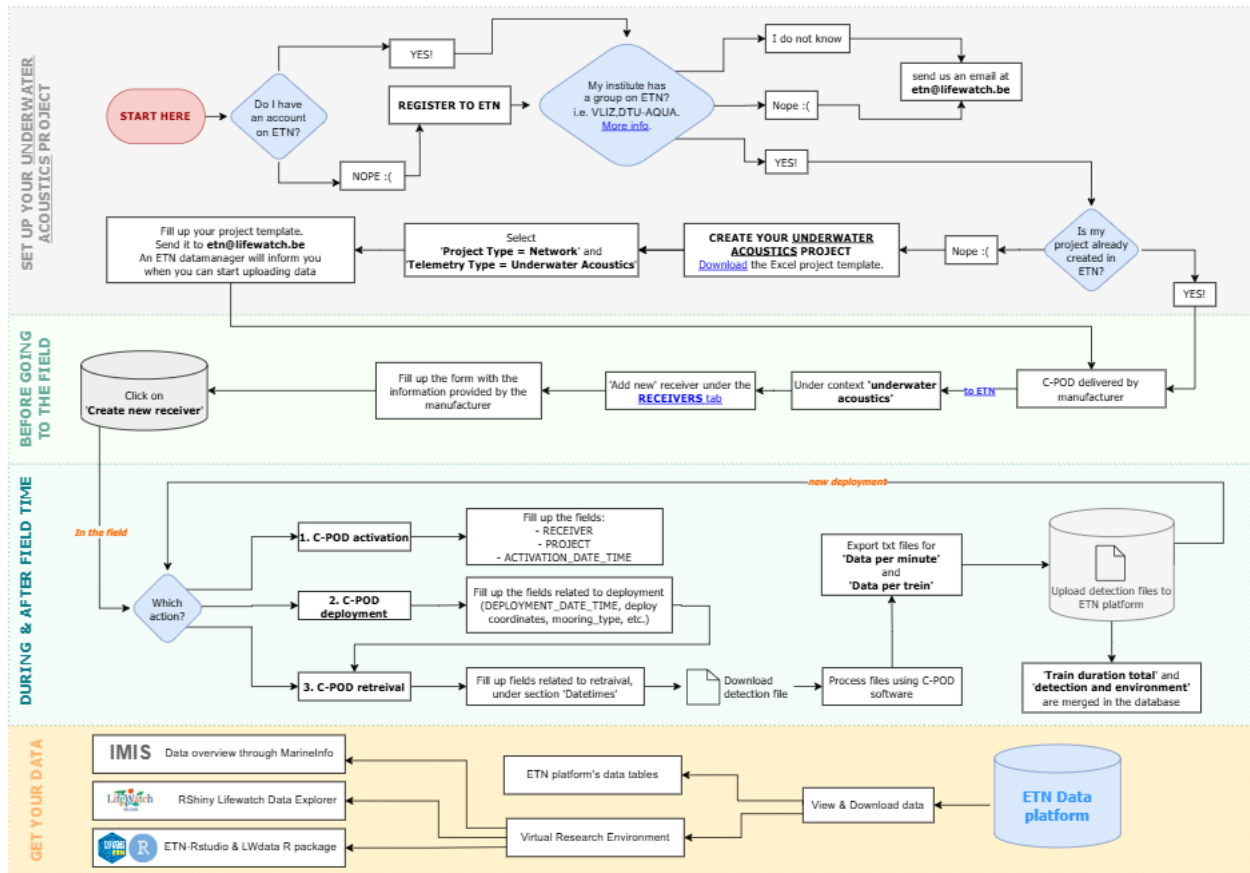


Figure 2.2. Flowchart of data with cpod.exe or fpod.exe and workflow in ETN – underwater acoustics.

3. Create an account and project

3.1 Register to ETN

To interact with the ETN data platform, an account must be created. This can be done by clicking on the “**Register**” button on the [login page](#) (Fig. 3.1).

To complete the registration process, the following form must be filled out (Fig. 3.2):

1. Select this option if you already have a personal record in [MarineInfo](#). A personal record allows people to easily find contact information and associated projects, publications and datasets. For example, this is the MarineInfo record for [Elisabeth Debusschere](#).
2. Select this option if you have fish telemetry data and would like to view/edit this data from ETN or retrieve it using the ETN R package through the ETN R Studio Server, this package does not include the underwater acoustics data.
3. To access and query the POD detections and metadata, select this option to access the data via the ETN R Studio Server.
4. Please make sure to provide a purpose (e.g. access and upload POD data).

Data platform

➔ Login

 Show Password

Login

If you have any problems logging in, please contact us at account@viz.be

[\[Register\]](#) [Lost password\]](#)

Figure 3.1. Login tab to ETN data platform.

RShiny/RStudio registration

Please register by filling out the form below. Once you have submitted your registration, you will receive a confirmation email.

my details are listed in IMIS 1

First name*

Last name*

Password*

Confirm password*

E-mail*

Request access to*

- Access to European ocean Tracking Network (ETN) data (ETN_data) 2
- Labeling Images (MOC) (labeling_app)
- Access Rstudio server (RStudio) 3

4

Purpose

* I agree that my personal data is processed in accordance with the General Data Protection Regulation (GDPR)

[\[Login\]](#) [\[Lost password\]](#)

Figure 3.2. ETN data platform registration form.

Once the online registration form has been filled out and the data policy has been agreed to (checked box), an ETN moderator will approve your registration. You should receive a confirmation email shortly after. You can request to join a user group and linked projects, as well as writing rights by answering the email. The project lead of these projects will then review your request.

Once you are granted access, you can get an overview of which user groups you are a part of, as well as which projects you have access to by visiting the user dashboard. This can be reached by clicking on **“Dashboard”** on the upper-right part of the screen when on the landing page (Fig. 3.3). Alternatively, you can reach the page by clicking on your name on the top right of the screen and then clicking on your name again in the drop-down menu.



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Data platform, featuring **948746802** detections

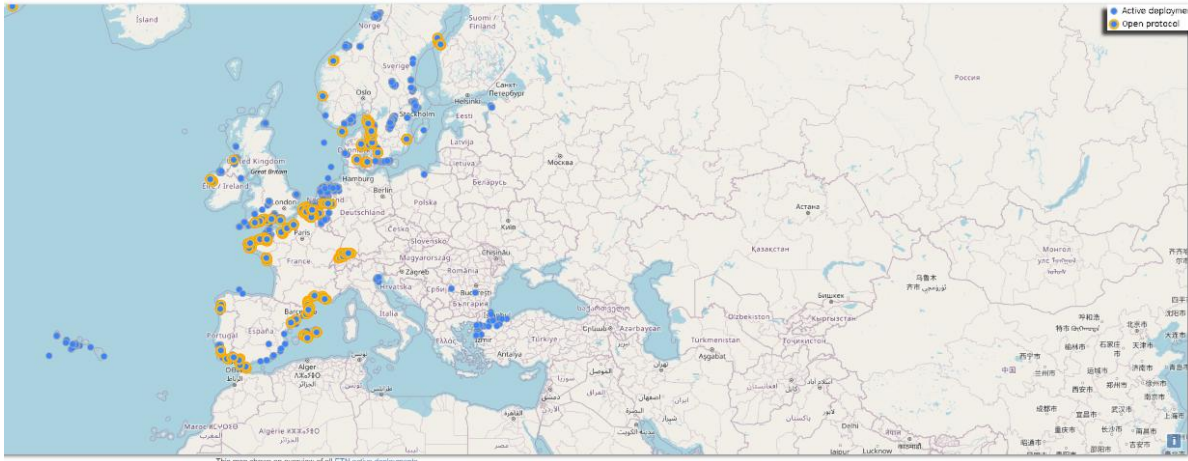


Figure 3.3. User dashboard to check project and group access.

3.2 Create a project on ETN

All deployments and data are linked to projects, which needs to be registered on ETN. This is important for proper data ownership, citation and license management.

In the case that a project doesn't already exist, you can create one by following these steps:

1. Click on **"ETN project template"** at the bottom of the landing page (Fig. 3.4). An .XLSX file will be downloaded. The template contains the necessary fields and guidelines.

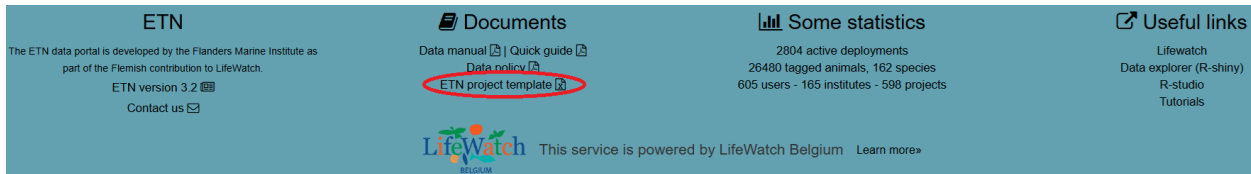


Figure 3.4. ETN project template at the bottom of the landing page.

2. Fill in the "Project metadata" sheet. If the project is part of a larger, overarching project, the sheet "Umbrella project metadata" can also be filled. It is important to register all metadata related to the project and to provide enough detail for external people to understand the study goals and identify data owners/collaborators. Here are some things to keep in mind:
 - a. The fields "Project Type" should be set to "network" and "Telemetry Type" to "Underwater acoustics (FPODs; soundtraps; hydrophones)".
 - b. The coordinates will be used to mark a point in the landing page's map.
 - c. The project's acronym does not accept spaces between words.



3. Send your project template to the ETN administrators (etn@lifewatch.be). If the template is incomplete, the ETN administrator will get back to you to request input on specific information.
4. When complete, the ETN administrator will include the project in the system and grant access to the project to every person mentioned in the project information (only if they have an account in ETN). This process takes a few days!
5. The ETN administrator will also log the project information on MarineInfo. This is the VLIZ search page where to access metadata information about projects, institutions, researchers, datasets and publications in a user-friendly manner.
6. Now you can begin to upload (meta)data! Project details can only be edited by ETN data administrators.

4. Process POD data

The data gathered by the PODs (.CHE format) should first be offloaded and then processed using the software provided by the manufacturer (for [C-POD](#) and for [F-POD](#)), where detections of cetacean click trains are obtained (.CP1/.FP1 format) and then automatically classified (.CP3/.FP3 format). Additional choices on classifiers and species preferences can be selected by the user. These choices should be stored in the metadata of the deployments.

Two options for processing the CP1/CP3 and FP1/FP3 files are possible to upload metadata and detection data per minute into ETN: (1) Valkyrie app specifically developed to standardise the processing of POD data and facilitate the storage on ETN for both metadata as data; (2) Chelonia software cpod.exe or fpod.exe exports only detection data.

4.1 Valkyrie application

The [Valkyrie app](#) is developed within the [DTO Bioflow project](#) by Aarhus University to harmonise metadata and porpoise detection data from C-PODs and F-PODs (Chelonia ctd, UK) in minute resolution and connects to the online repository European Tracking Network – underwater acoustics component. The Valkyrie app processes the metadata and CP1/CP3 and FP1/FP3 files from the PODs in a standardised open manner and produces three output files that can be ingested into ETN.

Short manual

To get started on ETN, please register first and follow the instructions in the ETN-Underwater Acoustics manual (see [section 3](#)). Registration of users and projects are required to verify contributions and projects. Once that is in place, prepare the two required inputs for Valkyrie: a single metadata .CSV file (e.g. Project name registered in ETN) and the POD files CP1/CP3 or FP1/FP3 . The metadata file must follow the Valkyrie format, with one row per deployment and timestamps split into separate year, month, day, and time columns, as well as contain all mandatory fields for ingestion into ETN. A [template](#) is available to help you create this file correctly. The POD data should consist of complete file pairs from each deployment, meaning CP1 and CP3 files for C-PODs or FP1 and FP3 files for F-PODs.

Begin by uploading the POD files to Valkyrie. These must belong to the same ETN project, but you may upload data from multiple deployments at once (a maximum of 5 deployments at a time to limit the size of the output files). You can select individual files directly or choose a folder, including one with subfolders,



and Valkyrie will locate and process all valid POD file pairs. As a first check, filenames are checked based on their deployment datetime and POD serial number to ensure that no duplicate files are being processed. Once the POD files have been checked, the metadata file can be uploaded. The system will automatically validate that all required fields are present and correctly formatted. When both POD files and metadata are uploaded and validated, Valkyrie will match the POD files to each row in the deployment metadata. Only POD files with corresponding metadata are processed. Finally, Valkyrie will check that only metadata for a single project is uploaded. If not, the user will be given a choice of the projects available in the metadata and Valkyrie will process all POD files from the project selected. Make sure to only select a project that has been registered in ETN.

Once all files are uploaded, Valkyrie takes over the processing. It extracts detections from the raw data and converts both detections and metadata into the standardized formats required by the ETN Underwater Acoustics database. When the processing is complete, you can download three output files: one containing receiver information, one containing harmonised deployment metadata, and one combined file containing all extracted detections with a unique identifier for detections in each unique deployment. These outputs are already formatted for straightforward ingestion into the ETN database, so no further editing is needed. The upload order is of importance ([see section 5.1](#)):

1. Receiver metadata
2. Deployment metadata
3. Detections in minute resolution.

4.2 Chelonia exports

The POD files can also be processed using the Chelonia software (cpod.exe or fpod.exe). Two output files (.txt): “train duration total” and “detections and environment” should be exported per quality (*Fig. 4.1*) and uploaded to the ETN database ([see section 5.1](#)). Files exported with cpod.exe should contain the deployment date and POD number in their filename. This differs from fpod.exe export filenames, which contain the activation date and the POD number. “Train duration total” needs to be exported per ‘Species’ whilst “Detection and environment” is exported for all the species together in one file and contains the species information per minute, which is not the case the “Train duration total”. To avoid upload of ‘Other cet’ and ‘sonar’ that is not validated within the Detection and environment.txt, you can select ‘NBHF’ (narrow-band high-frequency harbour porpoise clicks) in the CPOD.exe before the export. In FPOD.exe, this option is not possible and is offered during the upload in ETN, where you can select to limit the upload to the ‘NBHF’ detections of that file (*Fig 6.2*). Combining these two files in minute resolution generates all the possible parameters per minute resolution available via the POD software. To limit mistakes, please export first “Train duration total” per quality and then repeat for “Detection and environment”. Within ETN, these two file types are merged and linked to their deployment metadata via their filename, consisting of the deployment date and POD number for C-POD exports and the activation date and POD number for F-POD exports. Consequently, the receiver and deployment metadata needs to be added first to ETN before uploading the exported files with detections.



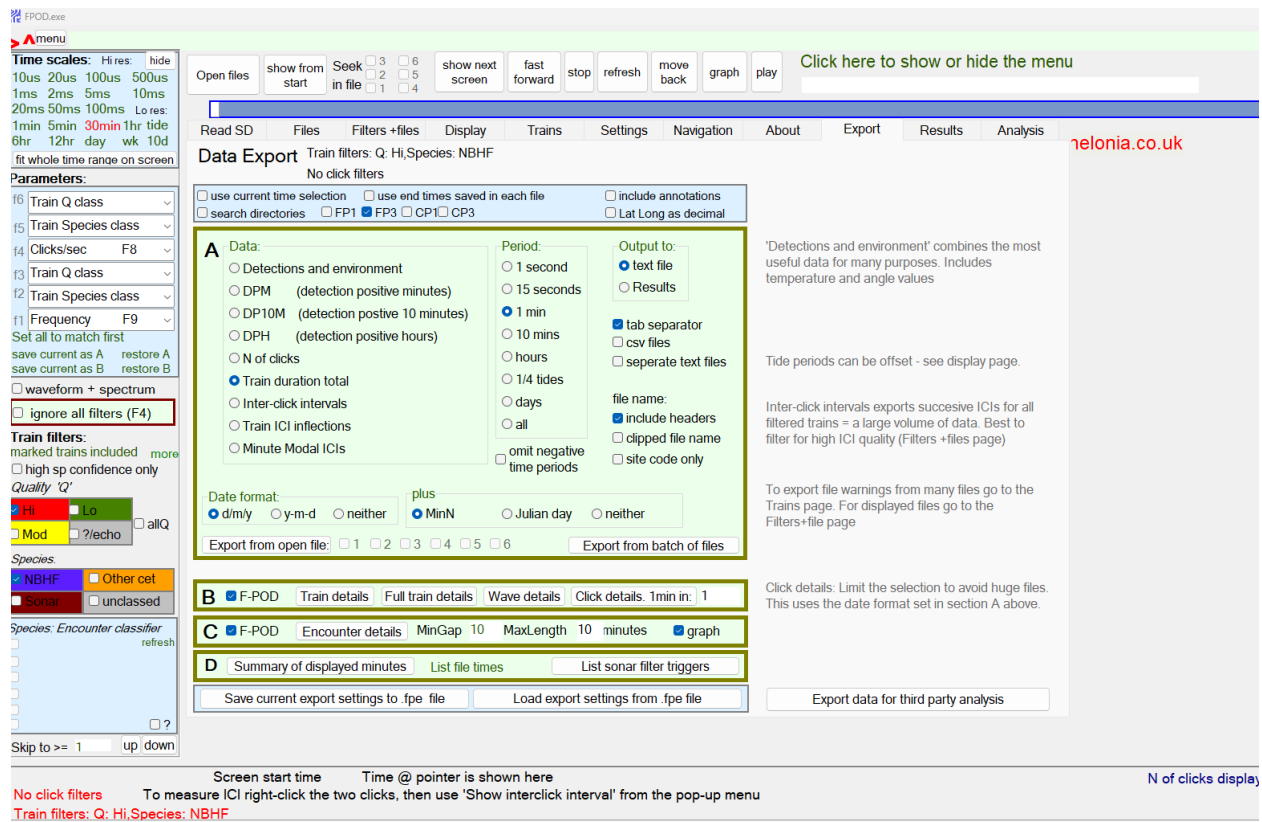


Figure 4.1. Screenshot of exporting settings for “Train duration total”. The same settings apply to “Detection and environment”. Import, manage, and download metadata

5.1 Upload metadata

Metadata of ‘Receivers’ (PODs) and ‘Deployments’ are essential for the storage and re-use of the POD data. The order for uploading the metadata is fixed: first receiver metadata followed by deployment metadata. Internal controls on metadata are performed to ensure properly linking receivers to deployments. The ETN-Underwater Acoustics accepts input of single as well as bulk metadata (see below for more information).

The Valkyrie app produces the necessary receiver and deployment metadata in the correct format for straightforward ingestion in ETN, followed by the detections upload (see section 6.1). These files can contain up to 5 deployments of various PODs per file type (receivers.csv; deployments.csv and detections.csv).

There are four options to manage the individual receiver and deployment metadata:

- **“New”**: a new record can be made.
- **“Edit”**: an existing record can be edited.
- **“Duplicate”**: an existing record is duplicated and the user is directed to edit the record. Note: if nothing is changed, a warning is set (this function will soon be removed).

- **“Delete”**: an existing record will be deleted (after confirmation).

A new record (receiver or deployment) can be added by clicking **“Add new”** near the top of the screen. To edit, duplicate or delete a record, click on the box of any field (not on the text) to select it. Then, click on the button of your interest (Fig. 5.1). When you click on the text of a field of an existing record, you are taken straight to the edit mode.

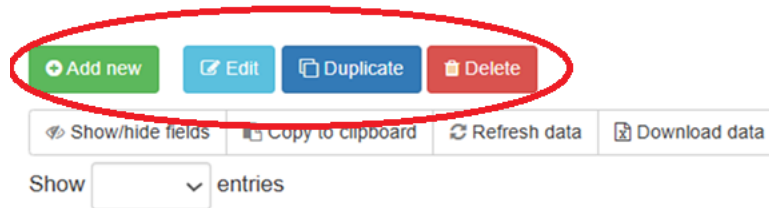


Figure 5.1. Metadata management options.

After selecting **“Add new”**, **“Edit”** or **“Duplicate”** you are directed to a metadata management form where information can be added/updated (Fig. 5.1). The form is subdivided in several topics (only in the case of the deployments). By clicking on the header of a topic, the metadata fields become available and can be filled out. Some metadata fields are mandatory (yellow colour) and should be filled out before information can be stored (a notification is given to inform the user if mandatory fields are missing). When the fields have been modified, click the **“Edit receiver/deployment”** or **“Create new receiver/deployment”** button (depending on the action) at the bottom of the page to save changes.

Step 1 Import receivers

Either receivers are uploaded one by one or in bulk. Individual upload is done via visiting the **“Receivers”** tab and clicking **“Add new”**. Mandatory fields are indicated (Fig. 5.2). For each field, there is a help function (the **“?”** icon next to the heading). The help functionality provides a short description of what type of data is expected for a specific field. In addition, the format of the field and an example are given.

Figure 5.2: Single entry of a receiver with the mandatory fields indicated in brown.

The same fields are part of the bulk upload that can be found under the “Data” tab, followed by “import metadata”. An example of a .CSV for bulk upload is provided as well as the necessary information on each field (Fig. 5.3).

ETN Underwater acoustics Receivers Deployments Detections Data Files

Upload detections
Import metadata

Metadata import

Import tags, receivers, animals or deployments

This page allows you to import metadata. To facilitate the import process, we require that **import files follow some conventions** (filetype, file header, content). These conventions are described further in detail below, for each of the supported metadata types.

General conventions

- fieldnames must match 100%; take the sample file as reference
- only accepting **comma-separated** files
- datetime** fields should follow the ISO-8601 format (e.g. `2017-01-01T12:07:23Z`)
- Please use this sample files for the data import.

Choose which metadata you want to import

Import deployments

Import receivers

File

Figure 5.3. Bulk upload of receivers and deployments possible. Sample .CSV files and file descriptions are given to facilitate the upload and formatting.

Metadata can also be uploaded in bulk via the Valkyrie app. This can be done by importing the Valkyrie output file “Receiver.csv” or by downloading the sample .CSV file on the ETN-Underwater acoustics Metadata import page.. The description per field and formats are found in “Open CPOD_Receiver file description” (Fig. 5.4). This can be uploaded into ETN.

Fieldname	Required	Type	Description
RECEIVER_ID_SERIAL_NUMBER	<input checked="" type="checkbox"/>	string	Serial number assigned by receiver manufacturer to uniquely identify receiver. as in: 2420
RECEIVER_MODEL	<input checked="" type="checkbox"/>	String	Predefined options. Needs to match receiver in 'KNOWN MODELS'. Send an email to info@europeantrackingnetwork.org if your model is missing from the list as in: C-POD
RCV_MANUFACTURER	<input type="checkbox"/>	string	Name of receiver manufacturer. Predefined options: "INNOVASEA", "CHELONIA", "LOTEK", "STAR-ODDI", "THELMA BIOTEL". as in: CHELONIA
RCV_STATUS	<input type="checkbox"/>	string	Current status of receiver. Predefined options: "Active", "Available", "Broken", "Lost" or "Returned to manufacturer". as in: Active
RECEIVER_ID_MODEL	<input type="checkbox"/>	string	Receiver model number as provided by the manufacturer. as in: POD

Figure 5.4. Bulk upload of receivers (e.g. PODs) file description.

Step 2 Import deployments

ETN is the ideal online platform to manage your ongoing field deployments efficiently as well as archiving past deployments. It allows you to register, track, and update all deployments - both active and completed - so you always have an up-to-date overview of what's in the water and what has been retrieved, processed and uploaded.

To add a single deployment, select the **"Deployments"**, followed by **"Add new"**. The mandatory fields are indicated in brown, whereas optional fields are in black. This allows the storage of metadata of a deployment that is still ongoing and can be further completed upon retrieval of the POD and processing of the data.

To import deployment metadata from PODs in bulk, first select **"Import metadata"** in the **"Data"** tab in the header (Fig 5.3). Import the output of the Valkyrie app **"Deployments.csv"** or download the **"Sample CSV file"** under the **"Import deployments"** section. This is the template containing all the available fields that can be filled with the corresponding deployment metadata. When the **"Sample CSV file"** (UTF-8 encoded) is completed, it can be uploaded by selecting **"Import deployments"** and uploading the file, **"Browse"** → **Select your file** → **"Start import"**. After importing the filled in **"Sample CSV file"**, either a success or an error message appears.

Some fields are mandatory to fill and some are optional. You can check them in the **"Open CPOD file description"** (Fig. 5.4). The mandatory fields have a check mark next to them. Each file description contains the type of character expected for each field and a description of the field with an example. Fill in as many

fields as possible in the .csv template following the explanations in the file description. ETN links the deployment to the receiver number, and the deployment date and receiver number are used to link detections to the correct deployment.

CPOD file content convention ✕

Fieldname	Required	Type	Description
RCV_PROJECT	<input checked="" type="checkbox"/>	String	Select a network project; predefined options; new project names can only be added by administrators as in: BPNS
RECEIVER	<input checked="" type="checkbox"/>	String	Receiver name, composed of 'Model number'-'Serial number'. as in: C-POD-2420 or F-POD-2420
ACTIVATION_DATE_TIME	<input checked="" type="checkbox"/>	datetime	Date and time the receiver was activated, in 24-hour UTC. format: yyyy-mm-ddThh:mm:ssZ; as in: 2017-08-08T12:00:00Z
STATION_NAME	<input checked="" type="checkbox"/>	string	Name of receiver station. The station name refers to a unique location, related to a specific latitude and longitude. as in: bpns-Birkenfels
DEPLOY_DATE_TIME	<input checked="" type="checkbox"/>	datetime	Date and time the receiver was deployed, in 24-hour UTC. format: yyyy-mm-ddThh:mm:ssZ; as in: 2017-08-08T12:00:00Z
DEPLOY_LAT	<input checked="" type="checkbox"/>	float	Latitude of the actual deployment location, in decimal degrees. Note: in the southern hemisphere all latitudes must be negative. format: dd.dddd; as in: 51.36324
DEPLOY_LONG	<input checked="" type="checkbox"/>	float	Longitude of the actual deployment location, in decimal degrees. Note: in the western hemisphere all longitudes must be negative. format: ddd.dddd; as in: 2.59020
VALID_DATA_UNTIL_DATE_TIME	<input checked="" type="checkbox"/>	datetime	Date and time until which valid data was recorded, in 24-hour UTC. format: yyyy-mm-ddThh:mm:ssZ; as in: 2017-08-08T12:00:00Z
RECOVER_DATE_TIME	<input type="checkbox"/>	datetime	Date and time that the equipment was recovered, in 24-hour UTC. format: yyyy-mm-ddThh:mm:ssZ; as in: 2017-08-08T12:00:00Z
ACOUSTIC_RELEASE_NUMBER	<input type="checkbox"/>	String	Related acoustic deployment as in: "2159" ID of the Acoustic Deployment

Close

Figure 5.4. Content conventions for the fields in the "Sample CSV file" for uploading deployment metadata. *Valid_data_until_date_time* is an important field since this marks the end of the POD data recorded in the marine environment, and can be determined in the pod.exe software. Empty batteries, software failure, and recovery of the PODs can be observed.

Note that the field 'VALID_DATA_UNTIL_DATE_TIME' is mandatory and marks the end of the trustworthy POD detections. It should be manually checked by the data owner in the pod.exe software. When ingesting the detections of this deployment, data from the deployment datetime until the 'VALID_DATA_UNTIL_DATE_TIME' will be accepted and not the detections before or after this period, eliminating manual cutting of the data.



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5.2 Search and download metadata

The successfully uploaded metadata can be checked in the relevant “Receivers” and “Deployments” tabs. Filters can be applied by looking for specific metadata entries in the boxes below the headers (Fig. 5.5). To see the metadata, you must have access to the relevant ETN user group.

RECEIVER	RCV_PROJECT	STATION_NAME	ACTIVATION_DATE_TIME	DEPLOY_DATE_TIME	VALID_DATA_UNTIL_DATE_TIME	RECOVER_DATE_TIME	DEPLOY_LAT	DEPLOY_LONG	QUICK ACTIONS
F-POD	Lifewatch	Grafton	2024	DEPLOY_DATE_TIME	VALID_DATA_UNTIL_DATE_TIME	RECOVER_DATE_TIME	DEPLOY_LAT	DEPLOY_LONG	QUICK AC
F-POD-7104	Lifewatch	bpns-Grafton	2024-07-15	2024-07-18	2024-10-02	2024-10-02	51.40666	2.0166	📄 📥 📂
F-POD-7598	Lifewatch	bpns-Grafton	2024-07-15	2024-07-18	2024-10-02	2024-10-02	51.40645	2.751833	📄 📥 📂

Figure 5.5. Filtered deployment metadata example.

As deployments and receivers are linked, you can check all the deployments of a receiver in the “Receivers” tab by filtering by the receiver serial number (Fig. 5.6) and directly clicking on the deployment name of your interest in the “deployments” column.

RECEIVER	RCV_MANUFACTURER	RECEIVER_MODEL	RECEIVER_ID_SERIAL_NUMBER	RCV_STATUS	DEPLOYMENTS	QUICK ACTIONS
2420	RCV_MANUFACTURER	RECEIVER_MODEL	RECEIVER_ID_SERIAL_NUMBER	RCV_STATUS	DEPLOYMENTS	QUICK ACTIONS
C-POD-2420	CHELONIA	C-POD	2420	Lost	bpns-VG2 (2015-10-01) bpns-Oostendebank Oost (2016-05-02) bpns-Goolebank (2016-10-24)	📄 📥 📂

Figure 5.6. View all deployment metadata linked to a receiver.

Metadata columns that are not visible can be selected to be displayed under “Show/hide fields”. Fields that appear in the metadata tables are those that appear in blue on the drop-down menu (Fig. 5.7).

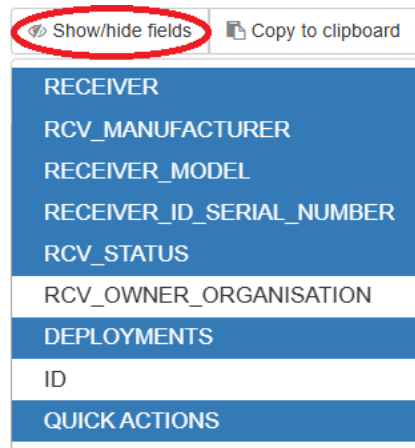


Figure 5.7. Available columns to show/hide in the metadata tables.

Metadata can be downloaded through the receivers and deployments tables. By clicking on “Copy to Clipboard” or “Download data” (Fig. 5.8), a .CSV file will be downloaded with all the metadata entries that comply with the selected filters. All columns will be downloaded.



Figure 5.8. Download a .CSV file with the metadata (example from receivers).

6. Upload and query detections

6.1 Upload detection data

The ETN portal can only accept detection data from C-POD or F-POD sensors, processed with Valkyrie, cpod.exe or fpod.exe. Detections and accompanying metadata obtained through hydrophones can be uploaded to the [Marine SoundLib](#).

To upload processed POD detections, you can follow these steps:

1. Select the context **“Underwater acoustics”** context on the top-left corner.
2. On the landing page, click on **“Data”** and **“Upload detections”** which redirects you to the space to upload detection data for each of the POD models (Fig. 6.1).

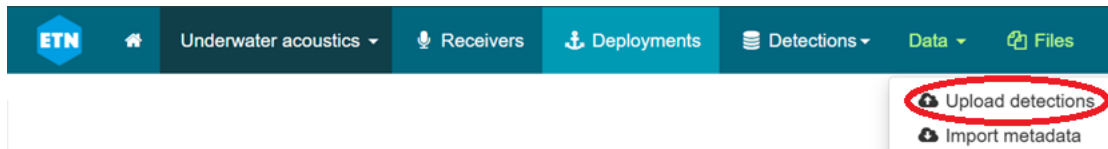


Figure 6.1. Header indicating where to upload detection data to ETN.

3. Select the model for which you would like to upload detection data: **“CPOD.exe”**, **“FPOD.exe”** or **“Valkyrie”** (Fig. 6.2).
4. Click **“Browse for files”** and select the file(s) you would like to upload (Fig. 6.2). Only .TXT files can be uploaded. Multiple files can be uploaded together, we recommend keeping it to 10 files at a time.

Note that in the case of the F-POD, ‘Detection and environment’ contains multiple species (‘classified categories’). Therefore, you need to tick the boxes of interest for the specific species groups that you want to upload in the **“Choose type of data”** section. Leaving all boxes unchecked will lead to all species groups to be uploaded.

Underwater acoustics Detection data upload

The portal accepts 'Trainduration.txt' per minute, quality and species and merges it with 'DetectionandEnvironment.txt' per minute, quality and species. *FPOD export of Detection and Environment contains all species, therefore you can choose which species you want to upload.*

Figure 6.2. Upload detections based on their corresponding POD model.

Once the files are selected, they can be in 3 statuses: “Pending” (other files higher in the queue are being processed), “Running” (current file is being processed), and “Success”/ “Error”. You can view the status of the files at the bottom of the screen (Fig. 6.3).

My processing queue (automatically refreshes every 30 seconds, or click [here](#))

This overview lists all file upload jobs created for you. Processing happens automatically, shortly after uploading the file.

File	Manufacturer	Deployment created	(UTC)	Status	Feedback
bpnsOHVS2belwind 2025 03 21 FPOD_7106 file0 file2 NB TrainDuration.txt		✓	2025-07-31 16:25	Running	
bpnsOHVS2belwind 2025 03 21 FPOD_7106 file0 file3 NB TrainDuration.txt		✓	2025-07-31 16:25	Success	Show logs
bpnsOHVS2belwind 2025 03 21 FPOD_7106 file0 file2 mixed DetEnv.txt		✓	2025-07-31 16:25	Pending	

Figure 6.3. Status of the to-be uploaded files.

In case of upload error with the CPOD.exe or FPOD.exe:

- No commas are allowed in .TXT files; make sure they're tab separated (sometimes an error occurs when exporting from the POD software). "VALID_DATA_UNTIL_DATE_TIME" should be filled in.
- For C-POD files, the filenames should correspond to the deployment date and POD number in ETN.
- For F-POD files, the filenames should correspond to the activation date and POD number in ETN.

If the error persists, contact ETN via the link **“Contact us”** at the bottom of the landing page (Fig. 6.4) or by sending an email to etn@lifewatch.be. When contacting ETN, provide sufficient information on the issue, and send along the file you wanted to upload together with a screenshot of the error message.



Figure 6.4. Contact link at the bottom of the landing page.

All uploaded detection files can be viewed in a filterable table in the **“Files”** section in the header (Fig. 6.5).

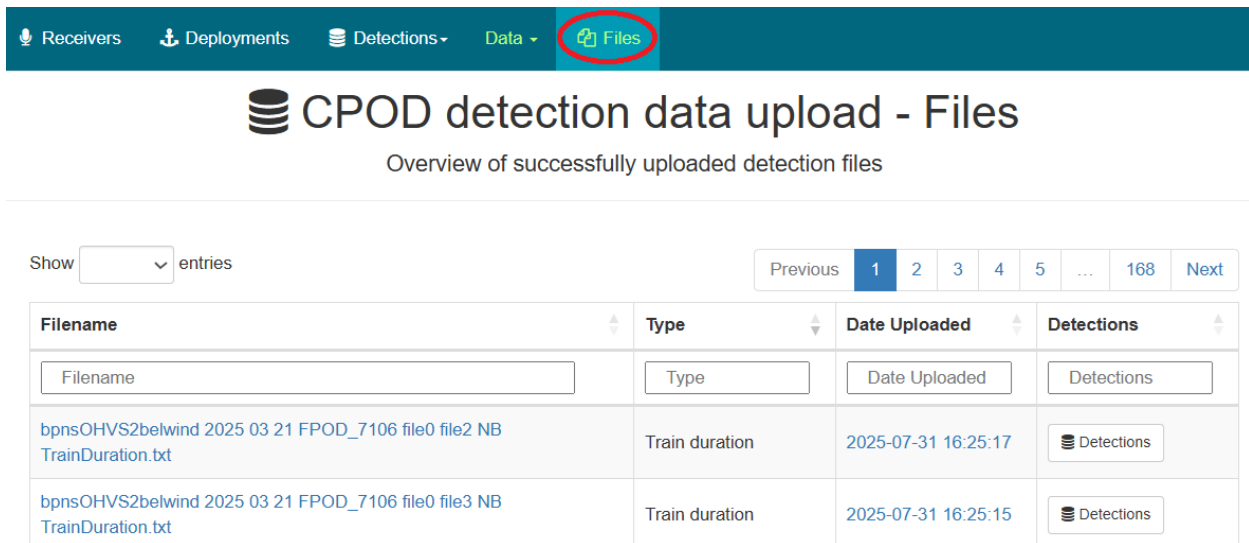


Figure 6.5. Uploaded POD detection files.

6.2 Query detection data

The detections tables allow you to view all the POD detections in the database. Access them by clicking on **“Detections”** followed by **“Train analysis per minute”** in the header (Fig. 6.6).

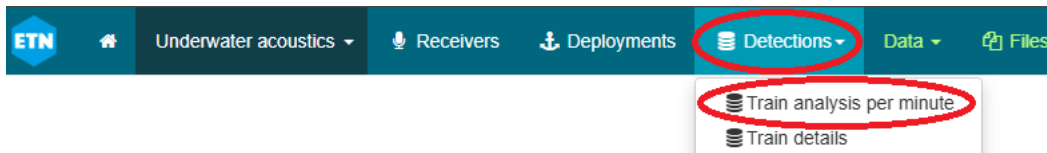


Figure 6.6. Access the detections per minute tables.

In ETN, entries can be copied by clicking **“Copy to clipboard”** for a quick look at the detection data. The number of entries and fields to be copied can be changed via the **“Show/hide fields”** and **“Show X entries”** buttons (Fig. 6.7).



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Due to the number of stored detections, please be aware that it may take some time before the data is loaded.

Show 25 entries

Trainduration file	Detenv file	DETECTION_DATE_TIME	QUALITY	SPECIES	NUMBER_CLICKS_FILTERED	NUMBER_CLICKS_TOTAL	RECORDED	DPM	MILLISECONDS	TIME_LOST_PERCENTAGE	ANGLE	TEMPERATURE
Trainduration file	Detenv file	DETECTION_DATE_TI	QUAL	SPEC	NUMBER_CLICKS_FILTER	NUMBER_CLICKS_TOT	RECORDE	D	MILLISECON	TIME_LOST_PERCENTA	ANC	TEMPERATU
bprns-Reefballs belwind 2023 10 19 FPOD_7598 file0 NB TrainDuration.txt	bprns-Reefballs belwind 2023 10 19 FPOD_7598 file0 mixed DetEnv.txt	2024-02-05 19:51	Hi	NBHF	0	0	true	0	0	0	0	8
bprns-Reefballs belwind 2023 10 19 FPOD_7598 file0 NB TrainDuration.txt	bprns-Reefballs belwind 2023 10 19 FPOD_7598 file0 mixed DetEnv.txt	2024-02-05 19:52	Hi	NBHF	0	147	true	0	0	0	0	8

Figure 6.7. Edit shown fields and number of entries.

POD detections can be quickly queried via the [ETN R Studio Server](#) (see section 3.1) and the [lwdataexplorer R package](#). With the *lwdataexplorer* package, using the *getCpodData* function, datasets of a certain period and quality can be viewed in an R data frame object:

```
CpodDataset= getCpodData(
  startdate = "2025-01-01",
  stopdate = "2025-12-31",
  processing = "Raw",
  quality = c("Hi"),
  by = "1 min",
  usr = NULL,
  pwd = NULL,
  params = FALSE,
  ...
)
```

getCpodData retrieves data for all species, which is currently either "NBHF" or "Dolphins". Filtering the dataset to a certain species can be easily done with another line of code, for instance, using the *tidyverse* package:

```
CpodDataset = CpodDataset %>% filter(species == "NBHF")
```

Retrieving large amounts of minute-resolution data from the *lwdataexplorer* package can lead to querying issues. To avoid this, it is recommended to loop a query with a date interval of 10 days separately for Hi and Mod data. A querying script for large minute-resolution C-POD datasets is available on https://github.com/lifewatch/acoustic-receiver-networkanalysis/blob/main/cpod_pipeline_hourly_v2.Rmd.

When cleaning the dataset, it is important to check for duplicates, data beyond `valid_until_datetime`, projects and species included, and lost minutes. Data entries where "recorded" = 0 mean that the POD was not actively recording during those minutes.

A detailed overview of the field recordings, methodology and processing are described, along with the data curation, integration and quality control in Calonge et al. (2024). Processed and cleaned yearly minute- and hourly- datasets of the permanent stations from the Belgian cetacean passive acoustic network since 2014 are published in MarineInfo (<https://www.vliz.be/en/imis?dasid=5531&doiid=1308>).

Access to the ETN server is password protected – to access your credentials (MarinePass) as well as the servers, click on your name in the top right corner of the screen, followed by "Rstudio info" (Fig. 6.8).

Once logged in the RStudio server, you will have to use these credentials to connect to the database via the [connect to etn function](#). MarinePass also gives you access to Marine Data Archive (MDA) and the Lifewatch Data Explorer. The latter is an Rshiny application where all data can be queried and downloaded as well.

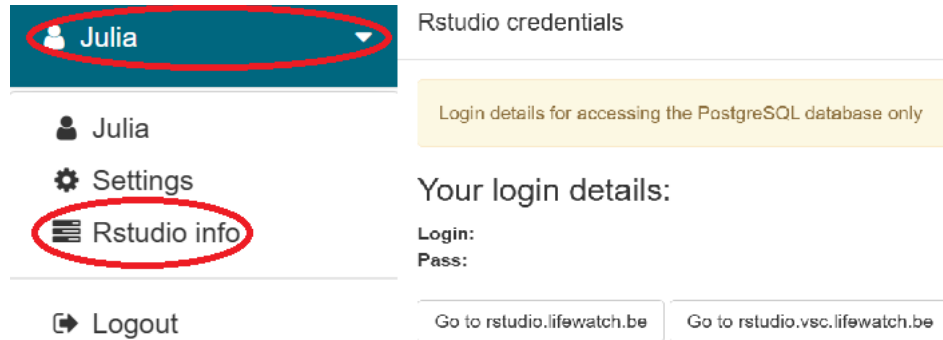


Figure 6.8. Access to your Rstudio server credentials.

For more information on the virtual research environments and data exploring in ETN, read [here](#).

Project information and metadata is stored in the [MarineInfo](#) catalogue. After project completion or once the embargo period ends, datasets will be archived in the Marine Data Archive (MDA) and assigned a DOI, subject to agreement with the project lead. The MarineInfo page will display the DOI and link to the corresponding dataset in MDA. If the data are also published through OBIS or GBIF, this will also be indicated on the MarineInfo page.

References

Calonge, A., Navarro González, P., Mortelmans, J., Deneudt, K., Hernandez, F., and Debusschere, E. (2024). Cetacean passive acoustic network in the Belgian part of the North sea. *Sci Data* 11, 971. doi: 10.1038/s41597-024-03806-y



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