

Recover Underwater Position by Acoustic RUPA

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Table des matières

Introduduction	2
User part	3
About the devices	3
Installation	4
Usage	6
Quick guide	6
Detailed guide	8
Campaign	8
New Campaign	8
Manage Campaign	9
Set up Structure	9
Manage Structure	9
Manage Transponder	10
Semi Automatic Burst	10
Burst Editing	11

Introduction

RUPA is an OpenCPN plugin, designed during my internship in DCNS Energies. The aim of that plugin is to have a friendly user HMI to locate underwater structures. To make that tool more efficient, I extended it to the management of the life of campaigns of measurement. In that manual, I will describe you how to use it (quite simple, don't worry) and if someone want to use it to improve it, in the "Developer part" I will explicit what my logic was.

User part

I hope this tool is quite easy to use, but here are some instructions, just in case.

Please, refer to the glossary if you're not sure what I'm talking about.

About the devices

About software, RUPA was developped with :

- Linux Mint 18.1 Serena
- OpenCPN 4.4.0

About the hardware :

- A deck unit from Sonardyne
- A Transponder from Sonardyne
- A FTDI (to connect computer and deck unit via USB)
- A GPS from trimble (just for information)

Installation

You have to install :

- opencpn (not needed for compilation, but as it's a plugin for it...)
- gcc-multilib
- g++
- autotools-dev
- cmake
- wx3.0-headers
- liwxgtk3.0-dev
- libghc-zlib-dev
- gettext
- libbz2-dev
- libmysqlcppconn-dev
- mysql-client
- mysql-server

You have to install ftd2xx too. To do that :

- go to <http://www.ftdichip.com/Drivers/D2XX.htm>
- download the good version (actually in the linux row, and for me the third or fourth column)
- go where you downloaded it
- extract it
- open a terminal where the folder is extracted
- `sudo cp ./releases/build/lib* /usr/local/lib`
- `cd /usr/local/lib`
- `sudo ln -s libftd2xx.so.1.1.12 libftd2xx.so`

— `sudo chmod 0755 libftd2xx.so.1.1.12`

If you want more explanation, please, look at the "FTDI Drivers Installation Guide for Linux".

Before launching it, you have to use the database :

- `mysql -u root -p`
- type the password you entered during installation
- `GRANT ALL PRIVILEGES ON rupa.* TO 'youruser'@'localhost' IDENTIFIED BY 'password'`
- `SET PASSWORD FOR 'youruser'@'localhost' = PASSWORD('')`(this step is deleting the password but if you want to keep one, skip that step and set it in RUPA/src/RUPA_Utility.h, 1.62)
- `quit`
- `mysql`
- create database rupa
- `quit`

Then build RUPA :

- `cd /path/where/you/want/to/download/rupa`
- `git clone https://github.com/DCNS-Energies/RUPA.git` (if not already done)
- `cd RUPA/build`
- `rm -rf *` (to correct something that have to be fix no need for sudo)
- `cmake ..`
- `make`
- `sudo cp librupas_pi.so /usr/lib/opencpn`
- `cd ../database`
- `mysql rupa<schema.sql`

Usage

Quick guide

Supposing you've already installed rupa, you will basically do that :

1. Enable RUPA in OpenCPN
2. click on the RUPA logo (even if actually it's the dog from watchdog)
3. click on "New Campaign"
4. fill the fields
5. click on "Install Now"
6. click on "New Structure"
7. fill the fields
8. click on "Add Transponder"
9. fill the fields
10. redo the 8th step as many time as needed to list each transponder on the structure you want to locate
11. click on "Launch Semi-Auto Burst" in the "Manage Structure" window
12. click on the "Range" button as many time as wanted
13. redo the previous step as many time as wanted

If you want to recover a Structure :

1. click on the RUPA logo (even if actually it's the dog from watchdog)
2. select the Campaign where the structure is and click on "manage" button
3. select the Structure you want to recover, click on manage

4. select the "Recovery" tab
5. launch the Semi Auto Burst

- if you want to mark a Campaign or a Structure as recovered, select it and click on the (Un)Recover button
- if you try to delete something, there will be no confirmation message, and no way to recover it

Detailed guide

Campaign

It is supposed you have clicked on the "RUPA" button, while you're in OpenCPN. Here, you have 2 tabs and 5 buttons. The "Current Campaign" tab list what campaigns are not finished and "Finished Campaign" list what campaigns are finished.

The "New Campaign" button allow you to enter the minimal information you use find usefull to describe a campaign (the geographical area, the name of th campaign). Be careful, at this time, it's not possible to edit that simply.

The "Delete Campaign" button remove all the datas you had got : what you entered thank's to the "New Campaign" button, but every measurement you should have done. Be really carefull, there is no way to recover what you erased (really, there is absolutely no tricks to do that).

The "Manage Campaign" button open a new window : "Manage Campaign" in wich you can see each structure.

The "(Un)Finish Campaign" button set a Campaign as finished or current, and move it to the corresponding table.

Make a backup of all datas, recursively not working yet

New Campaign

The "Campaign's Name" field let you name the campaign as you want.

The "Geographical Area" field let you indicate where the campaign takes place.

The "Install Later" button will save what you typed and show you the "Campaign" window.

The "Install Now" button will save what you types too, but here, it redirect you to the "Manage Campaign" window.

Manage Campaign

The "New Structure" button Open the "Manage Structure" and "Set Up Structure" windows. It creates a nex Structure by the way.

The "Delete Structure" button Delete the Structure selected and all of its Measurement, Transponder, etc. Be carefull, there is no confirmation window.

The "Manage Structure" button Open th "Manage Structure" window for the Structure you selected

The "(Un)Recovered" button Set a Structure as current or recovered, and move it to the corresponding table.

Set up Structure

The "Location Name" field Allow you to give a specific name to the structure

The "Devices" field you can list the devices (sensors or other) you put on the structure

Manage Structure

The "Set Up General Settings Of Structure" button Open the "Set Up Structure" window for the current Structure.

The "Add Transponder" button Open the "Manage Transponder" Window and add a transponder to the list.

The "Remove Transponder" button Remove the selected transponder, without confirmation window.

The "Launch Auto Burst" button Not working yet.

The "Launch Semi Auto Burst" button Open the "Semi Automatic Burst" window wich allow to make distance measurement. You need to add at least a transponder before clickingon that, else, OpenCPN will crash.

The "Enter a burst manually" button Not working yet.

The "Edit Burst" button Open Burst Editing window.

The "Delete Burst" button Delete a burst without asking you to confirm (the confirmation window wich pop is actually useless).

Manage Transponder

The "Address" and "Frequency" fields Used by Sonardyne to send message as : address :frequency.

The "Serial Number" field Serial number of the transponder, fill it if you want.

The "Battery Voltage (V)" field You can fill it (or not) manually or by clicking on "Check Battery Automatically"

Semi Automatic Burst

The "Message Sent" field Count how many time you clicked on the "Range" button.

The "Message Received" field Count how many time you received a useful answer.

The "Last value of received message" field print the value received by the computer (or an error message).

The "Range" button the button to get the distance between the probe and the transponder.

The "Next Transponder" button switch to th next transponder, according the table where transponders are listed.

The "Previous Transponder" button switch to th next transponder, according the table where transponders are listed.

The "Finish Burst" button Close the window, all the Measurement are saved when they are acquired.

Burst Editing

The "Add Measurement" button not working yet

The "Delete Measurement" button Delete the selected Measurement

The "Add Date" button Not working yet.