

.Ocean
nautical innovations



A Y B

Automate Your Boat

Manual

25 augustus 2023



Publisher dotOcean NV
Gistelse Steenweg 294/205
8200 Brugge
Belgium
BE 0807.246.767

Date 25 augustus 2023

Contact support@dotocean.eu

Revisions	Rev No.	Date	Description
	1	21/03/2018	1st AYB-draft
	2	18/05/2018	update
	3	24/05/2018	minor adjustments
	4	09/07/2018	Set APN configurations
	5	01/08/2018	Import csv adjusted
	6	14/04/2020	Several additions due to release AYB 2.0
	7	22/12/2020	Added import filetypes
	8	09/02/2021	Updated for version 2.1.2
	9	15/03/2022	Updated for version 2.3.0
	10	28/03/2022	Updated for new remote controller and minor adjustments
	11	20/06/2023	Updated for version 2.5.x
	12	25/08/2023	Updated for version 2.6.x



Title
AYB manual

Document
AYB manual

Date
29 maart 2022

Revision
10

This document is copyright protected. All rights are reserved by dotOcean NV. Nothing of this document or related information collected can be sold, reused, or otherwise disclosed without written consent of the authors.



1. Contents

1.	Contents	4
2.	Introduction	6
3.	Safety precautions	6
4.	AYB Unit content	8
5.	Prior to first use	9
5.1	Charging the battery	9
5.2	Inserting the SIM cards	10
5.2.1	Tablet	10
5.2.2	AYB unit	10
5.3	Configuring the tablet	12
5.3.1	Setting up a Google account	12
5.3.2	Installing the AYB app	12
5.3.3	Installing the Victron Connect app	12
5.4	AYB- and Atlantis account	13
6.	Installation instructions	14
6.1	Install battery	14
6.2	Mount box on vessel	14
6.3	Install compass	14
6.4	Install measurement sensor	14
6.5	Install an external GPS (optional)	15
6.6	Connect motor cables to case	15
6.7	Turn device on	15
7.	Operating the vessel	16
7.1	Autonomous mode	16
7.1.1	Managing your project	16
7.1.2	Creating a task	19
7.1.3	Managing multiple tasks in 1 project	23
7.1.4	Managing multiple projects	24
7.1.5	Starting the project	26
7.1.6	During the project	28
7.1.7	Stopping the project	28
7.2	RC mode	29
7.3	Managing your vessel/AYB unit	30
7.3.1	The vessel screen	30
7.4	Managing your data	34
7.4.1	Exporting your data	34



Copy project	35
8. Layers.....	35
9. Battery system	38
9.1 Battery Protector	38
9.2 Battery Monitor	38
9.3 LiFePo4 Battery	38
9.4 Blue Smart IP65 charger.....	38
9.5 Victron Connect app	38
10. Transport, storage and maintenance.....	39
11. Technical data.....	40
12. Troubleshooting (FAQ).....	41
12.1 Device.....	41
11.1.1 No internet connection	41
11.1.2 Vessel does not come online in app	41
11.1.3 Vessel does not turn the appropriate way	41
11.1.4 No GPS.....	41
11.1.5 Nothing happens	41
12.2 App	41
12.2.1 App is not responding to anything	41
12.2.2 Vessel will not start	41
12.2.3 Logging will not start	41
13. Support	42
14. Warranty.....	42
15. Addendum	43
15.1 Addendum A: Preparation of Calypso	43
15.1.1 Inflate vessel.....	43
15.1.2 Attach motor fins	43
15.1.3 Install measurement sensor	43
15.1.4 Place compass	44
15.1.5 Place vessel in water	44
15.2 Addendum B: Supported import files & projections	45
15.2.1 Projections	45
15.2.2 File types	45



2. Introduction

The Automate Your Boat (AYB) unit enables customers to build their own autonomous vessel.

The AYB unit allows to automate electrical propulsion, ranging from thrusters, outboards to pod or hybrid drives. The motor and battery pack can be selected from market providers.

Via 3G/4G the AYB unit connects to the Atlantis cloud platform without the need for line-of-sight.

Atlantis provides augmented maps on which the AYB module can take decisions. Based on the augmented maps the AYB box can plan its trajectory and can cover a selected area.

3. Safety precautions

NOTICE: Before using the AYB, read this instruction manual carefully, and obey all warnings and caution labels. Only use the AYB according to the instructions in this manual.

- Keep hands, hair and loose clothing away from the propellers when the power is switched on.
- Always keep a safe distance in all directions around your vessel to avoid collisions and/or injury. Stay away from obstacles.
- Never completely exhaust the battery. When the vessel starts to lose power, bring it back to the shore and change the batteries.
- Make sure the inside of the AYB box is not exposed to water. Always close the box properly when the box is turned on or on water. Do not exchange the battery of the box, when the box is on water. dotOcean shall have no liability for any claims resulting from exposing the inside of the AYB box to water.
- Before connecting or disconnecting any cables to the AYB box, make sure the emergency stop is pushed in. Do not connect or disconnect the cables, when the power is switched on.
- Make sure the batteries of the RC unit, tablet and the box are properly charged before use.
- Before a mission check with the RC unit if the motors of the vessels are working properly.

Battery safety instructions:

- While working on the Li-ion Battery wear protective eye-glasses and clothing.
- Any uncovered battery material such as electrolyte or powder on the skin or in the eyes must be flushed with plenty of clean water immediately. Then seek medical assistance. Spillages on clothing should be rinsed out with water.
- Explosion and fire hazard. Terminals of the Li-ion Battery are always alive; therefore, do not place items or tools on the Li-ion Battery. Avoid short circuits, discharging too much and high charge currents. Use insulated tools. Do not wear any metallic items such as watches, bracelets, rings, necklaces, et cetera. In case of fire, you must use a type D, foam or CO2 fire extinguisher.
- Never try to open or dismantle the Li-ion Battery. Electrolyte is very corrosive. In normal working conditions contact with the electrolyte is impossible. If the battery casing is damaged do not touch the exposed electrolyte or powder because it is corrosive.



- Discharging too much, damages the Li-ion battery seriously and can even be dangerous. Therefore, use of an external safety relay is mandatory.
- Li-ion Batteries are heavy. If involved in an accident they can become a projectile! Ensure adequate and secure mounting and always use suitable handling equipment for transportation. Handle with care, because Li-ion Batteries are sensitive to mechanical shock.
- If charged after the Li-ion battery was discharged below the Discharge cut-off voltage, or when the Li-ion battery is damaged or overcharged, the Li-ion battery can release a harmful mixture of gasses such as phosphate.

Transportation instructions

- When transporting the AYB box, make sure it is fastened properly. Handle with care because mechanical shock can cause damage to the box. Cover the connector panel with the lid to protect all connectors on top of the AYB box. Always disconnect all connectors when transporting the AYB box.
- The Li-ion battery must be transported in an upright position. Do not stand below a Li-ion battery when it is hoisted. Never lift the battery at the terminals, only lift the battery at the handles. Batteries are tested according to UN Handbook of Tests and Criteria, part III, sub section 38.3 (ST/SG/AC.10/11/Rev.5). For transport, the batteries belong to the category UN3480, Class 9, Packaging Group II and have to be transported according to this regulation. This means that for land and sea transport (ADR, RID & IMDG) they have to be packed according to packaging instruction P903 and for air transport (IATA) according to packaging instruction P965. The original packaging satisfies these instructions.



4. AYB Unit content



The AYB Unit contains the following items:

- AYB motor control
- 3G/4G communication (optionally with dual SIM)
- Compass
- Waterproof box
- Remote controller
- Tablet
- Manual
- IP67 emergency button
- Cloud Link
 - o Mission preparation
 - o Mission execution
 - o Real-time visualization on multiple Android devices
 - o Online data storage
 - o Use of latest machine learning algorithms to improve vessel control
 - o Free app upgrades

Options:

- Battery types
- Connector types (wet-mate or dry-mate)



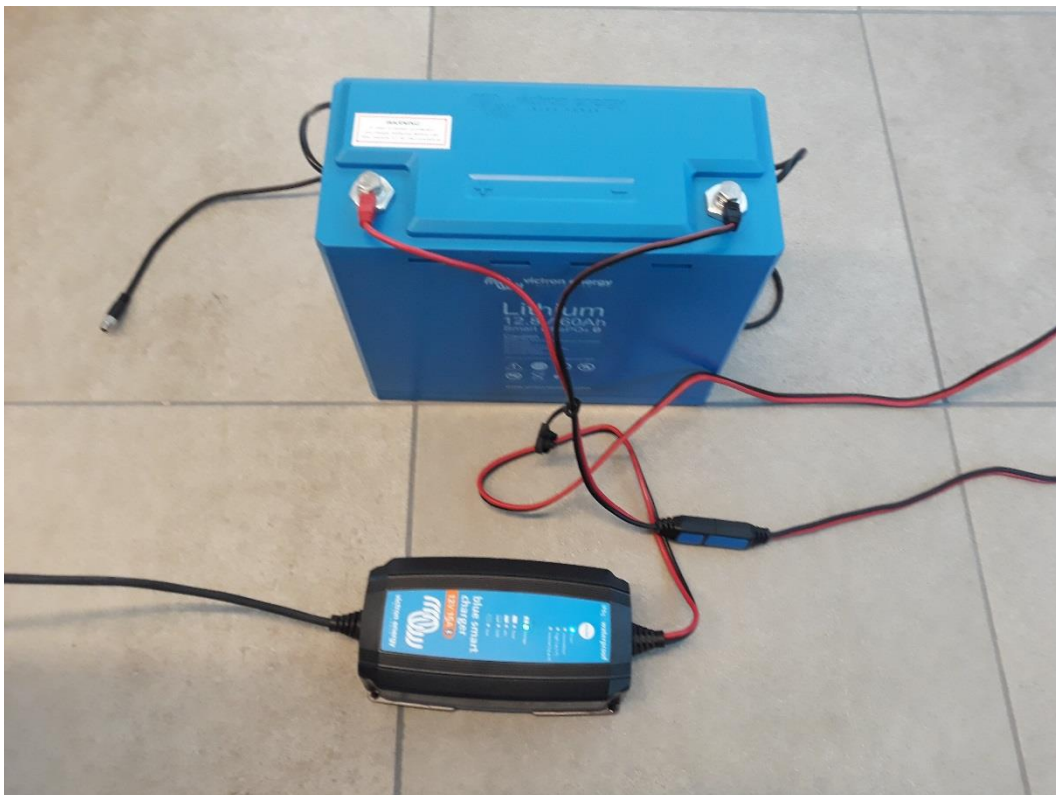
5. Prior to first use

5.1 Charging the battery

- Connect the charger to the battery
- Connect the charger to the wall socket
- If required, press the mode button until the blue Li-ion LED turns on.
- The battery is about 80 % charged when the ABSORPTION LED turns on.
- The battery is fully charged when the FLOAT or STORAGE LED is on. The battery is now ready for use.
- Stop charging at any time by disconnecting the charger from the wall socket.

For more information about the charger, please check the manual:

<https://www.victronenergy.nl/upload/documents/Manual-Blue-Smart-IP65-Charger-EN-NL-FR-DE-ES-SE-FI.pdf>

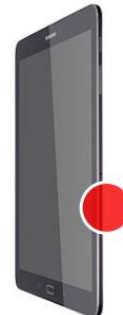




5.2 Inserting the SIM cards

5.2.1 Tablet

- **Insert** the opener for the SIM holder into the small hole in the SIM holder on the side of your tablet
- **Remove** the SIM holder from your tablet
- **Turn** your SIM so the angled corner of your SIM matches the angled corner of the SIM holder
- **Place** your SIM in the SIM holder
- **Slide** the SIM holder into your tablet



5.2.2 AYB unit

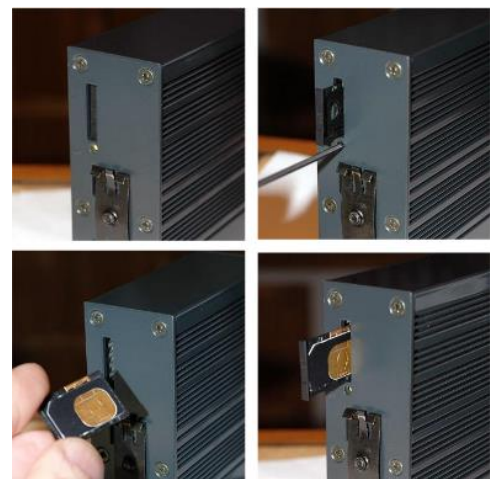
Wi-Fi Router with dual SIM

- Turn of the power of the AYB unit.
- Open the AYB box.
- Remove the anti-theft lid at the top of the router.
- Insert the SIM card according to the picture. If using only one SIM card, the card needs to be inserted in SIM card holder nr 1, as it is in the picture.
- Push the card until it locks.
- Put the anti-theft lid back.



Router without Wi-Fi

- Turn of the power of the AYB unit.
- Open the AYB box.
- Carefully lift out the metal frame. The router is at the bottom.
- Remove the router from the DIN rail.
- With a small tool, push on the button to release the SIM card holder on the back.
- Insert the SIM card into the card holder as shown in the picture.
- Put the card holder back in the router.
- Push the card until it locks.
- Put the router back on the DIN rail.
- Put the metal frame back in its initial place. Be careful to not damage any wires when you put the frame back.





Configuring the router APN

- Plug in a PC to the router or connect via WiFi if this is enabled. The SSID of the WiFi network is the default name of the AYB box (company name with a number), the password is made up of the first 8 characters of the GUID. This can be found inside the box on the lid. You can browse to the router at the IP address 192.168.10.1.
- To configure the WAN interface, navigate in the menu of the web interface to Home > Setup > WAN interface
- Make sure the checkbox next to Enabled is marked.
- Enter the APN of your mobile service provider and the PIN code of your SIM card in the corresponding fields.
 - o Some examples:
 - Proximus
 - APN: internet.proximus.be
 - No login or password required
 - Mobile Vikings
 - APN: web.be
 - Login: web
 - Password: web
 - Orange
 - APN: mworld.be
 - No login or password required
- Check the box next to show advanced parameters
- Enter the login and password for the APN.
- Press save and reboot the router.

The screenshot shows the ETIC web interface for configuring the WAN interface. The breadcrumb is '> Home > Setup > WAN interface'. The 'WAN type' is set to 'Cellular'. Under 'Cellular WAN configuration', 'Enabled' is checked, 'Enable data connection' is 'Always', 'Cellular interface priority' is 'High', and 'SIM card' is 'SIM 1'. Under 'SIM1: modem configuration', 'Access Point Name (APN)' is 'web.be', 'SIM PIN code' is masked with '....', 'Show password' is unchecked, and 'Network type' is 'Auto'. Under 'Advanced parameters', 'Show advanced parameters' is checked. Under 'SIM1: Cellular WAN IP configuration', 'Login' is 'web', 'Password' is masked with '...', and 'Passwords match' is checked. 'Obtain an IP address automatically' and 'Obtain DNS servers addresses automatically' are both checked.


For more information about the router, you can check the manual:

http://www.etictelcom.com/telechargement/produits/doc_dev_ipl_user_guide_b.pdf




5.3 Configuring the tablet


5.3.1 Setting up a Google account

- **Open** the Google Play Store app 
- **Choose** whether or not you have an existing account
- **Sign in** with your credentials
- Next **Follow** the wizard

5.3.2 Installing the AYB app

- **Open** the Google Play store app 
- **Search** for AYB (By dotOcean)
- **Tap** install
- Review the requested access permissions and tap **Accept**
- **Tap** open to start the app

5.3.3 Installing the Victron Connect app

- **Open** the Google Play Store app 
- **Search** for Victron Connect (By Victron Energy BV)
- **Tap** install
- Review the requested access permissions and tap **Accept**
- **Tap** open to start the app



5.4 AYB- and Atlantis account

On purchasing an AYB unit, you will receive an account to login into the app. This same account (email address and password) can be used to login into Atlantis: <https://atlantis.dotocean.eu/>. This is dotOcean's online platform to manage all the recorded data into projects.

After you've logged in into Atlantis you can create projects, import datafiles and create datasets from it, interpolate single beam data, ...

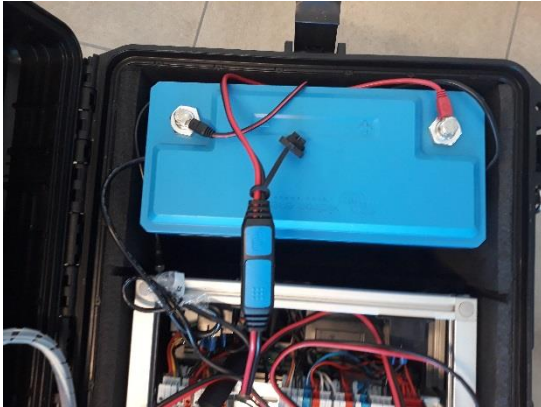
You can also use the project wizard to select your AYB project (from the app) and to automatically import all the recorded data and to immediately create the needed layers and interpolations to show on the map.

More info about the projects and the wizard are available in the Atlantis manual found online: <http://atlantis.dotocean.eu/Manual#/projects>.



6. Installation instructions

6.1 Install battery



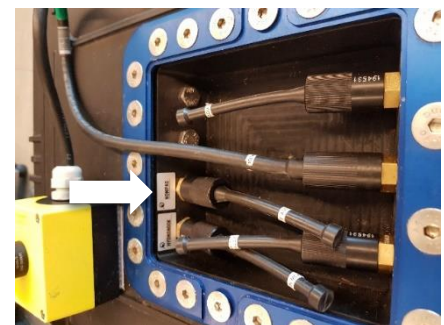
Before installing the battery, check if the emergency button is pushed in. Open the box by lifting every fastener. Place the battery in the provided compartment next to the drive unit. Next connect the cables of the AYB box to the battery. If everything is installed, close the box and secure every fastener of the case again. Make sure no cables are stuck between the box and the lid.

6.2 Mount box on vessel

Place the AYB box on the vessel. Make sure that the connectors on top of the box are closest to the front of the boat. Attach the rubber fasteners to make sure that the box is firmly attached.

6.3 Install compass

Install the external compass on top of your vessel, so that the front of the compass is aligned with the raft. The front of the compass is indicated by two arrows on top of the device. Connect the compass to the AYB unit, by placing the cable connector in the appropriate socket.



6.4 Install measurement sensor

Install the measurement device according to the installation instructions of the device. Pay special attention to make sure the device cannot detect any turbulence or bubbles from the hull or engines. The communication between device and driving unit is done with either the RS323 or the RS485 protocol, according to the device requested. The serial connection is configured by default at 4800 baud rate and NMEA DBT. The AYB supports NMEA 0183 DBT and DESO-25 depth sentences. should you want to change this or the baud rate, please contact dotOcean for support.

Should you wish to connect another device, please contact dotOcean for support.



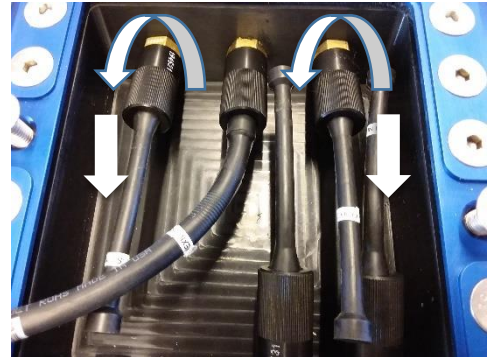
6.5 Install an external GPS (optional)

The AYB box has a basic internal GPS unit, so it is not necessary to install another GPS. If you want higher precision you can however connect a GPS to the AYB box. The box needs NMEA 0183 GGA and RMC sentences to operate. The baud rate of this connection is set at 9600. If your GPS has a different baud rate, please contact dotOcean for support.

6.6 Connect motor cables to case

At the top side of the connector compartment there are three connectors:

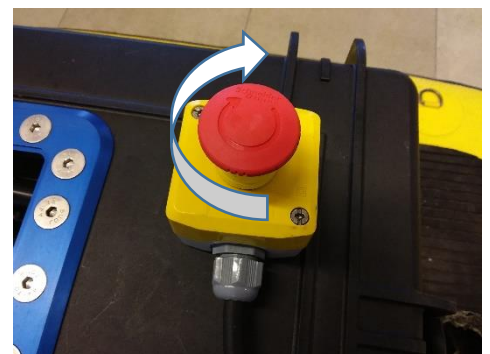
- Left connector: To connect the left motor (Port)
- Middle connector: Is connected to the red emergency stop button
- Right connector: To connect the right motor (Starboard)



Before connecting the motor cables, make sure the AYB unit is not switched on. Remove the dummy connectors from the left and right connector by turning them to the left and pulling it out. Now connect the motors to each side of the connector compartment by plugging it in and turning the fastener to the right. Make sure the pins from the connector line up to each other. If the vessel is not turning the right way in the water, it is possible that the connectors are swapped.

6.7 Turn device on

After the vessel is correctly assembled and put into the water, it can be switched on. Find the red emergency stop on top of the box. Slightly turn the button to the right and pull it up. Now the drive unit is booting up and will be ready within the minute to start your survey!





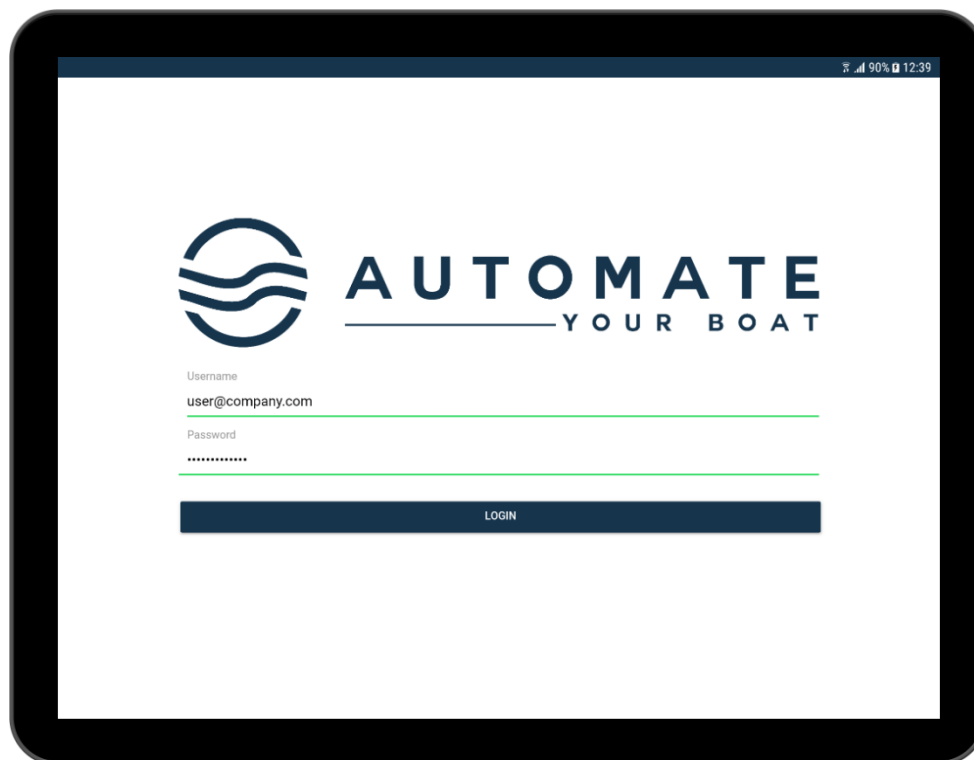
7. Operating the vessel

7.1 Autonomous mode

7.1.1 Managing your project

7.1.1.1 Logging in

Log in using your username and password. These are provided when purchasing the AYB unit, by the dotOcean support team. Contact the dotOcean support team if you don't have any credentials to login.



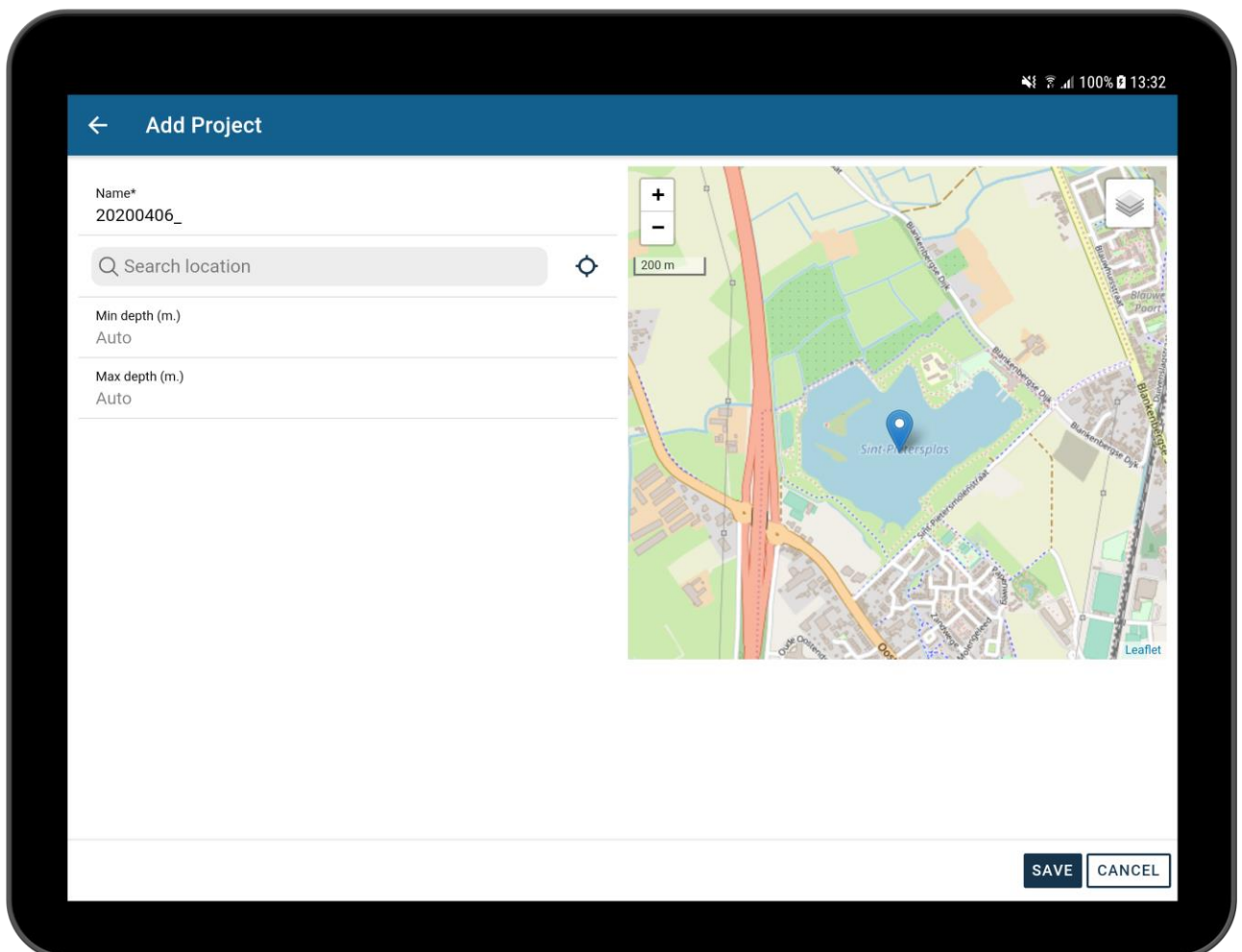


7.1.1.2 Creating a project

Create a project by tapping on the + in the lower right-hand corner.

A popup window will appear:

- Choose a project name
- Select the location of the project by:
 - o Search for location
 - o Navigating on the map to the desired location and tap to mark this location
 - o Dragging the existed pin on the map to the desired location
 - o Targeting your current location
- Optional: Choose the min and max depth of the survey (and for the legend)
- Tap **SAVE** to save and open the project. Tap **CANCEL** to discard changes.





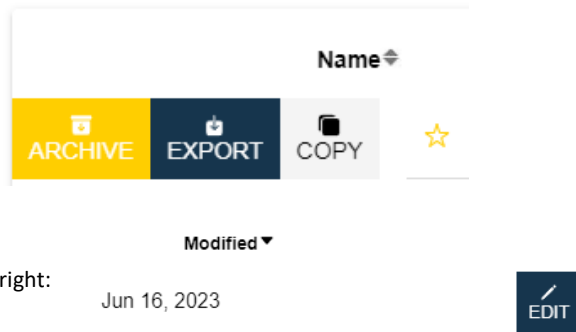
7.1.1.3 The project screen

This is an overview of all active projects. It is possible to switch between active and archived projects on the top right side of the page.

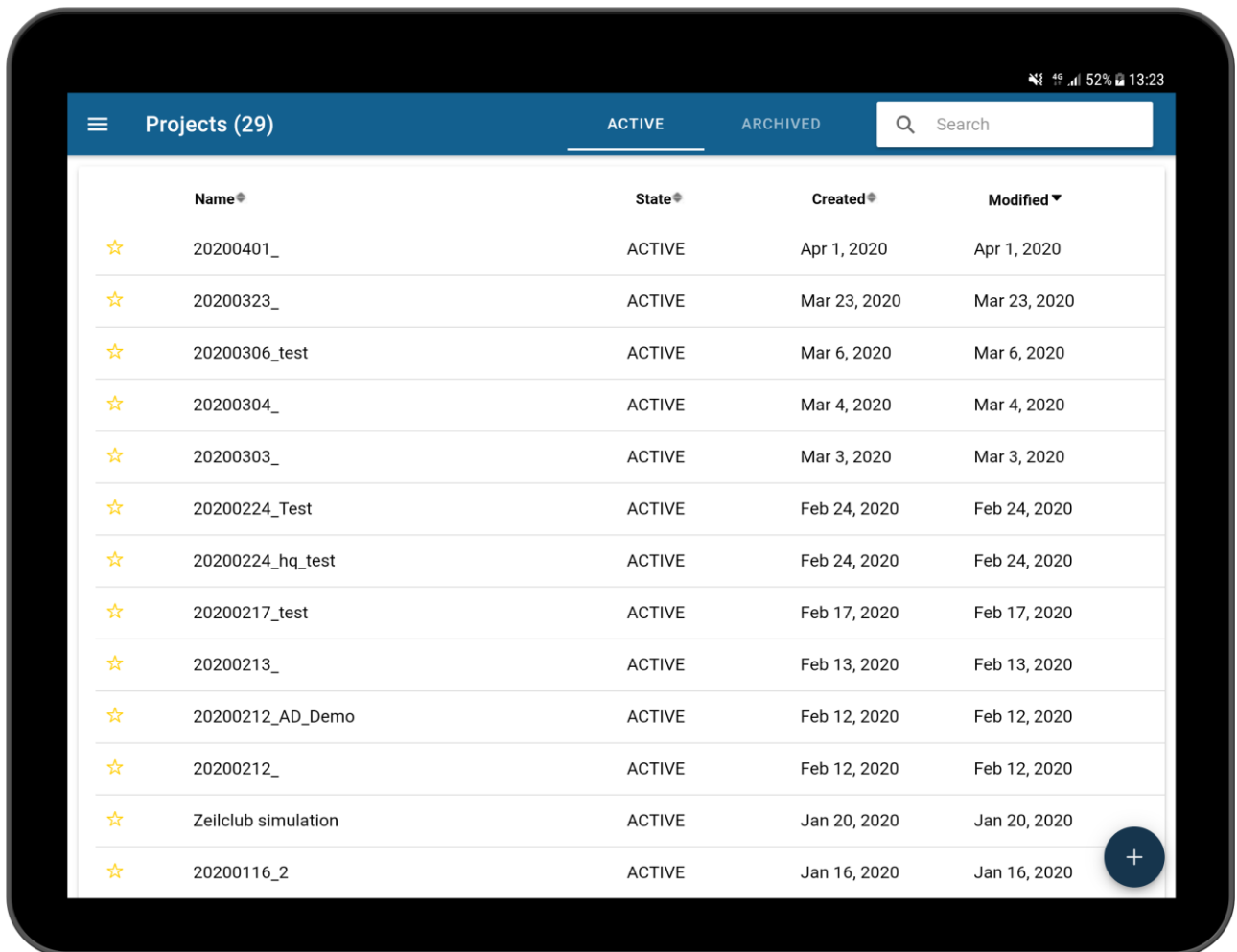
All columns (Name, State, Created, Modified) are sortable in ascending or descending direction. Last created projects first, is the default sorting method.

It is also possible to search for projects that contains a certain character or word using the search option in the header bar. This will search the names and the states of the projects.

To export, archive or copy the project, swipe it to the left.



To change the name or location of the project, swipe to the right:

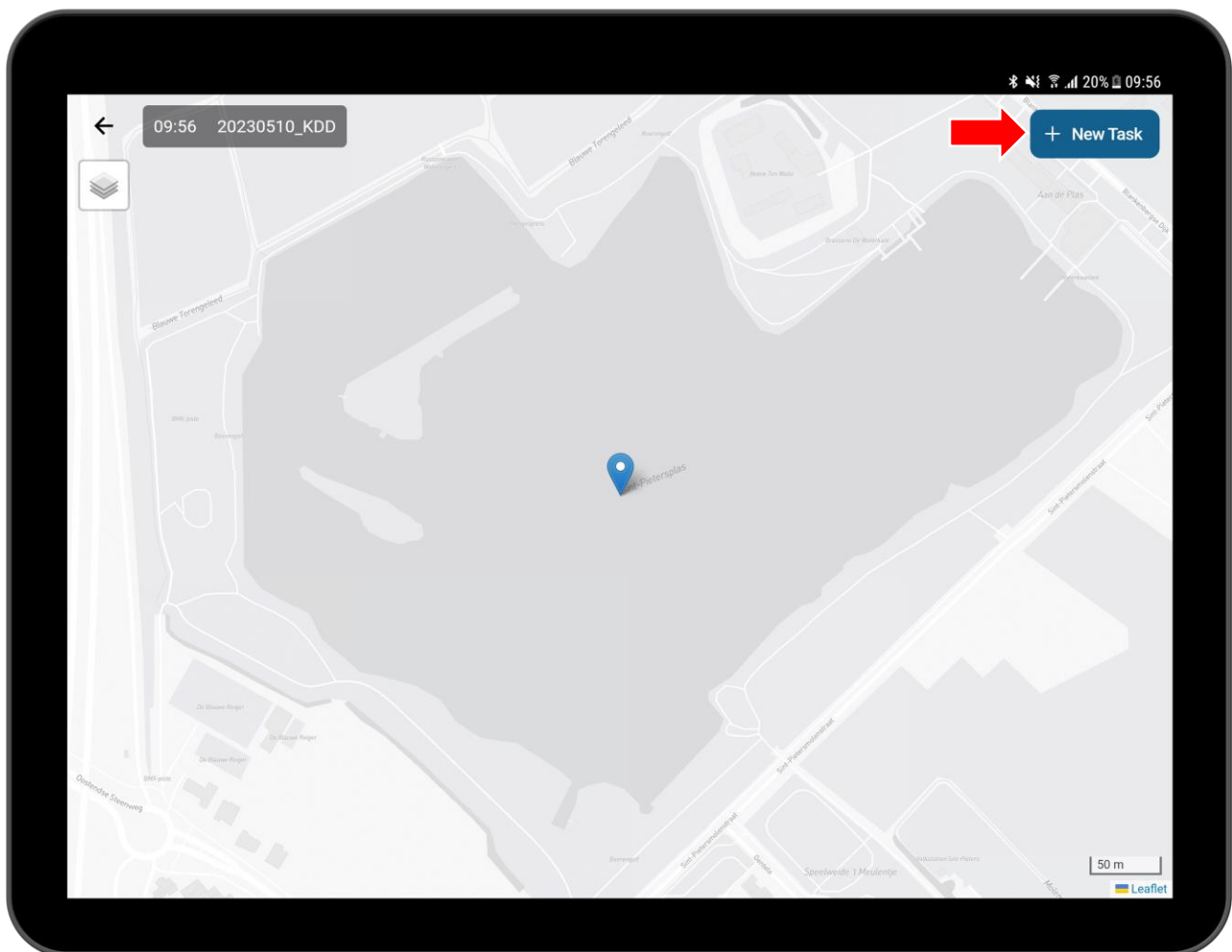




7.1.2 Creating a task

7.1.2.1 The task screen

To create a task, click the + New Task-button on the top right-hand side. New panels will appear. Switch between different task types on top of the task options panel.





7.1.2.2 Types of tasks

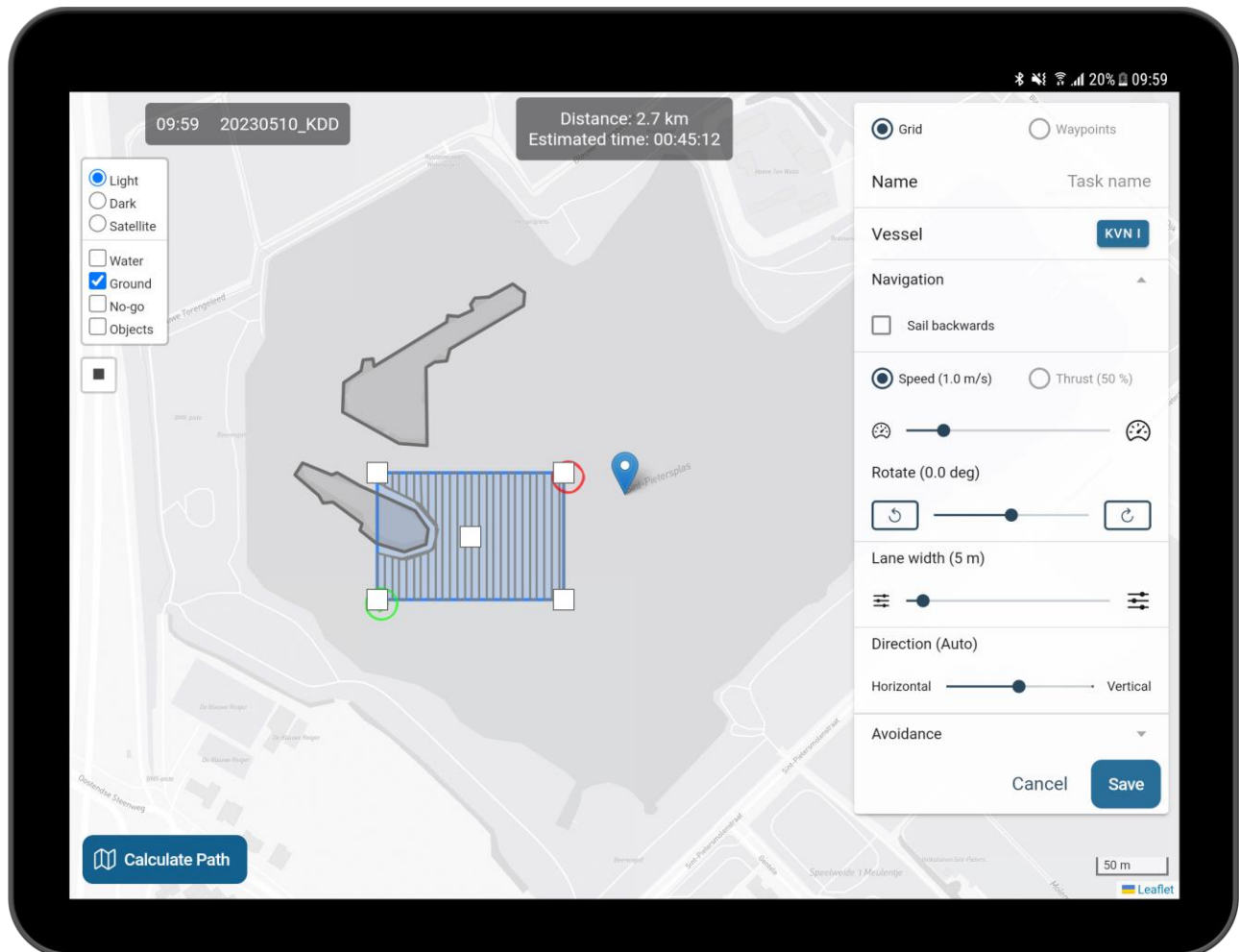
There are 2 types of tasks:

- Grid (The vessel will move covering the surface of the rectangle drawn):

A grid task is represented by a rectangle drawn on the map. To start drawing the rectangle, tap the screen on the top left side where the tooltip “Click here to start drawing!” is. To place the starting corner, swipe to the point where the diagonally opposite corner has to be. Dragging one of the corners will change the size of the rectangle. By holding and dragging the middle point of the grid it is still possible to move the shape elsewhere. After drawing the grid, the app will automatically draw lines on how it is going to sail. If the grid intersects with non-sailable areas, please click the “Calculate Path” button to generate a correct path on the water layer.

Extra options:

- o Name: Choose a name for your task. This will also be visible on the project detail page (optional)
- o Vessel: Select the vessel to use for this task. If the vessel is online, it will have a green circle next to it, otherwise this will be grey. A search bar is also included to find a specific vessel. (required)
- o Sail backwards (If active): Allows the vessel so do the task backwards
- o Speed:
 - Desired speed (default 1, max 5): An indication for the vessel at which speed it tries to sail (in m/s)
 - Desired thrust (default 50%, max 100%)
- o Rotate: The grid can be rotated to fit everything on the map. Just drag the slider to the left or to the right
- o Lane width (default 5, max 50): The distance between the sail lines (in meters)
- o Direction (default Auto): The direction the vessel should survey the grid. Automatic, vertical or horizontal
- o Avoid vessel (If active): The vessel will avoid vessels via AIS and Radar if mounted. (Close – Normal – Far)
- o Distance from border (If active): How the vessel should react when it’s close to the border. Options are: Bump – Close – Normal – Far

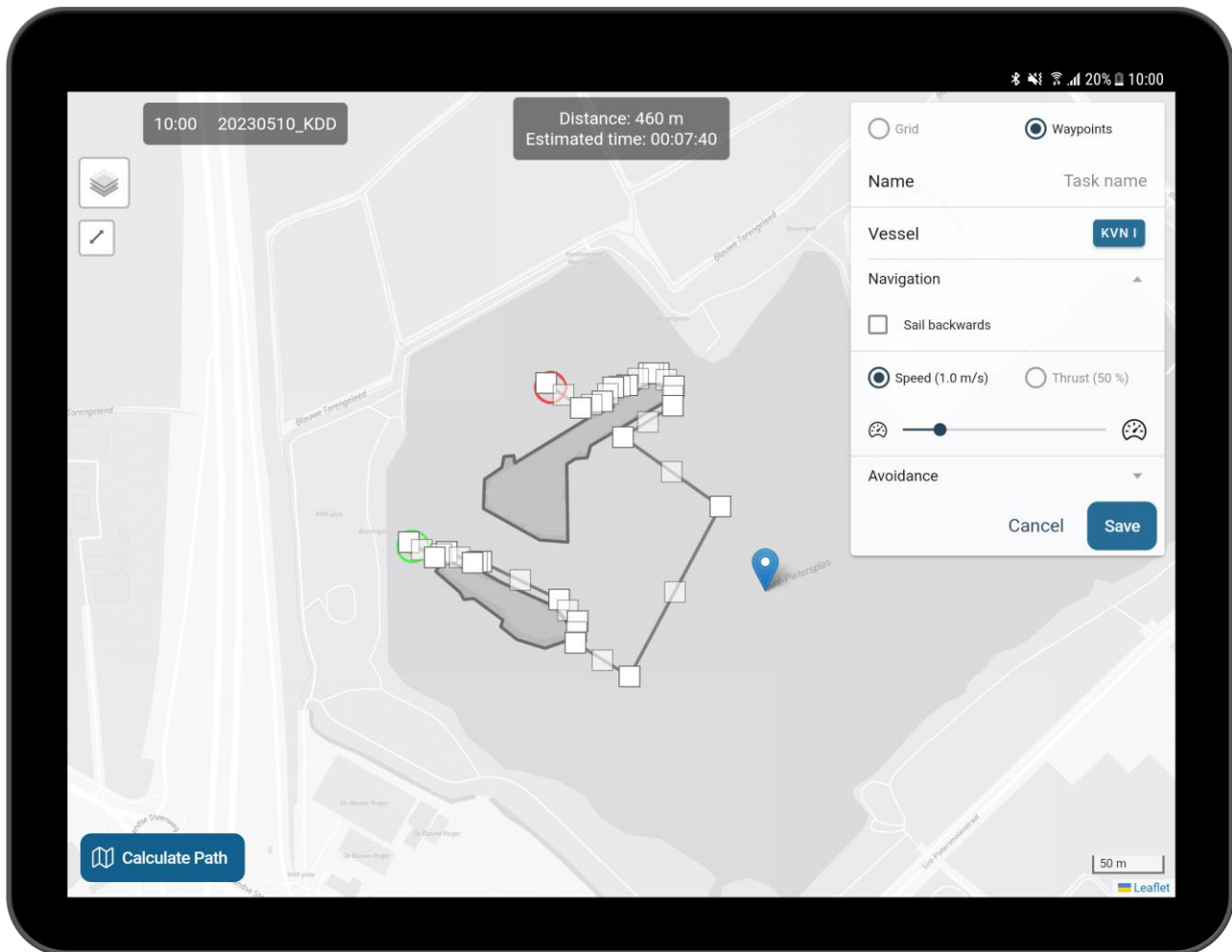


- Waypoints (The vessel will move from waypoint to waypoint):

A waypoint task is represented by points, which are connected in order of time placed. To draw waypoints, tap the top left side of the map where it says “Click here to start drawing!”. To finish drawing double-tap the last point. The waypoints can be edited by dragging the waypoints. If the waypoints intersect with non-sailable areas, please click the “Calculate Path” button to generate a correct path on the water layer.

Extra options:

- o Name: Choose a name for your task. This will also be visible on the project detail page (optional)
- o Vessel: Select the vessel to use for this task. If the vessel is online, it will have a green circle next to it, otherwise this will be grey. A search bar is also included to find a specific vessel. (required)
- o Sail backwards (If active): Allows the vessel so do the task backwards
- o Speed:
 - Desired speed (default 1, max 5): An indication for the vessel at which speed it tries to sail (in m/s)
 - Desired thrust (default 50%, max 100%)
- o Avoid vessel (If active): The vessel will avoid vessels via AIS and Radar if mounted. (Close – Normal – Far)
- o Distance from border (If active): How the vessel should react when it’s close to the border. Options are: Bump – Close – Normal – Far




On creation of the task the estimated distance and time is also shown at the top (only in the speed domain). This updates when the task options changes.








Tap **SAVE** to save the task or **CANCEL** to discard changes.

NOTE: When a task is removed that is started, the next queued task will begin.



7.1.3 Managing multiple tasks in 1 project

It is possible to add multiple tasks to multiple vessels. The project detail screen gives an overview of all the tasks that were created. The priority that the vessel will finish off the tasks is determined by the place in the list. To change its priority,  up or down in the list. To delete a task swipe the task from right to left and tap delete. Tasks can have the following statuses:

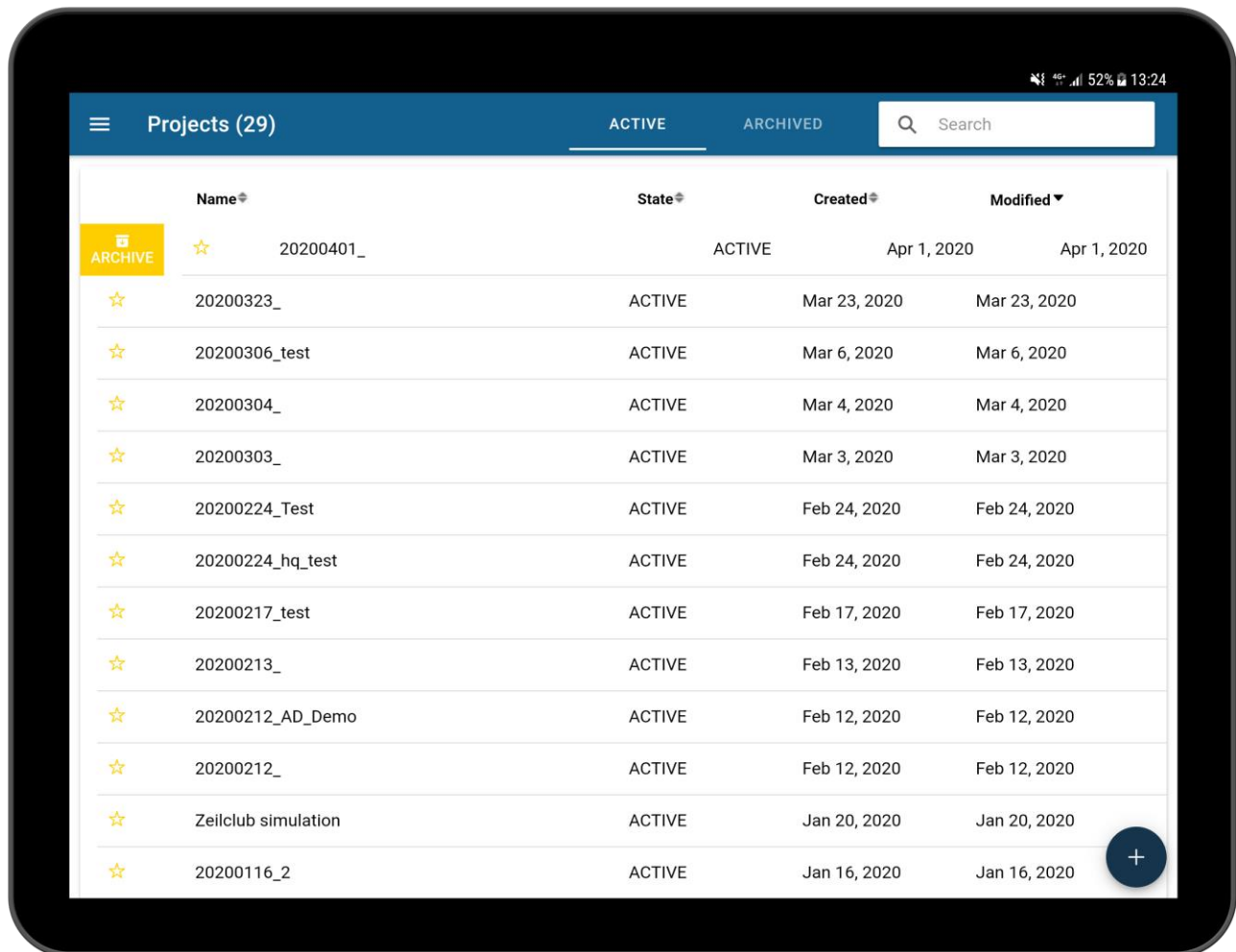
- Unknown: Task has been created but is never attached to a vessel 
- Queued: Task is in queue to be executed 
- Started: Vessel is busy with this task 
- Cancelled: User has stopped the survey 
- Removed: Task has switched from vessels 
- Completed: Task is successfully done 
- Tap to redo this task again 



7.1.4 Managing multiple projects


7.1.4.1 Archiving a project

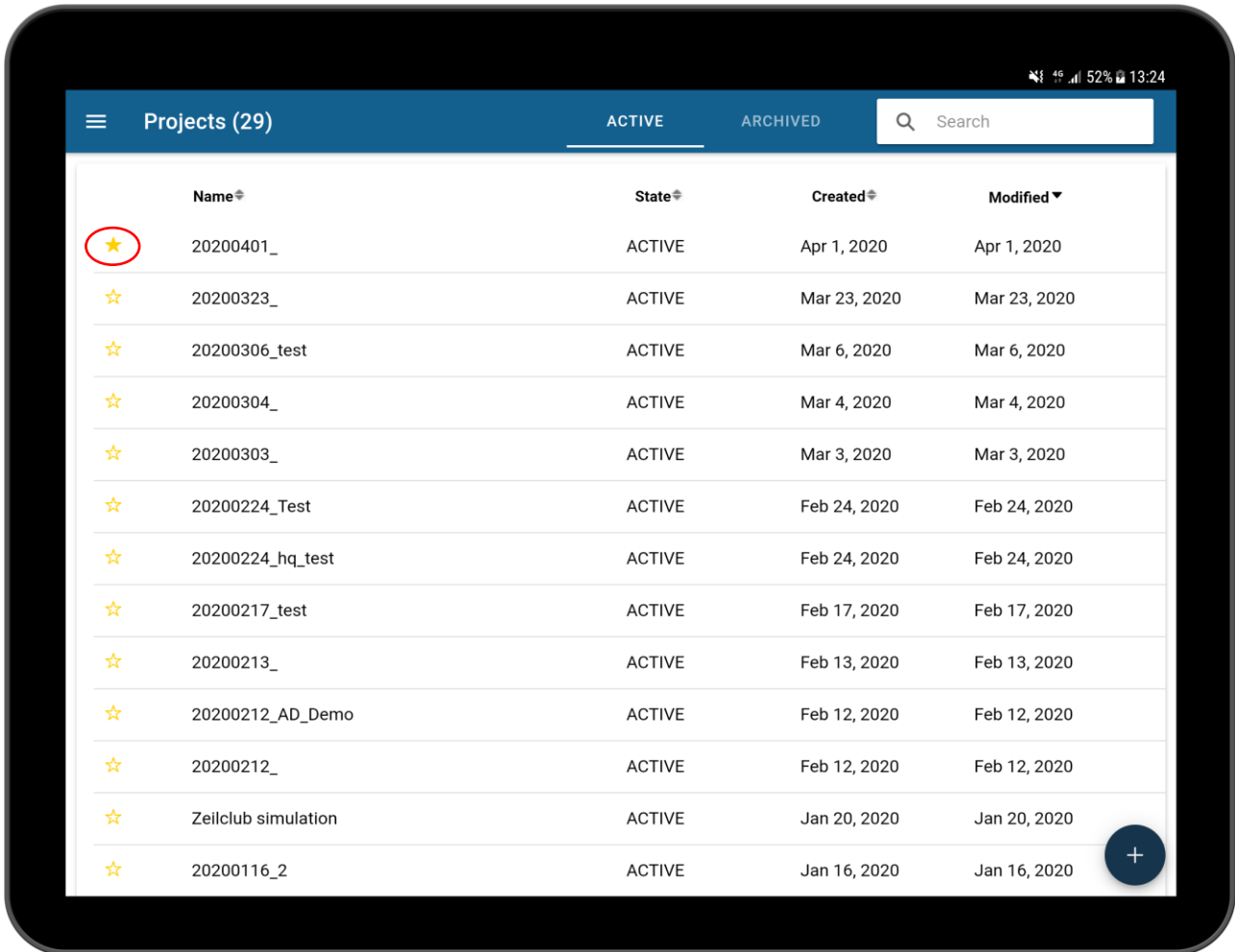
In the list of projects, swiping the project to the right gives the option to archive the project. This will remove the project from the active projects and it will be added to the archived projects.





7.1.4.2 Pinning a project

It is possible to pin projects to the top of the list. This will be remembered the next time the user logs in. To pin a project, tap the  icon.





7.1.5 Starting the project

When navigating to a project detail, the following items will be shown:

- Map:
 - o The vessels will be represented by an icon in its colour
 - o The tasks will be shown with their start- and endpoint
 - o A pin marker will be visible that shown the home location of the project
 - o At the right bottom there is a scale available of the map
 - o Data from the sensors are plotted on the map (single beam, multi beam, ...)
 - o A legend on the right-hand corner of the map, this shows a colour indication and scale of the measured depth once the vessel has started its first task. Note that the scale is relative to the project and this will vary from project to project
- Vessels
 - o In the footer of the screen there will be info about the vessel(s)
 - o By swiping the header, it is possible to expand or collapse the vessel bar
 - o This contains the current info about the vessel:
 - A list of tasks of the respective vessel (Click to edit, swipe to the left to delete, swipe to the right to copy)
 - Name, type, priority, distance (speed domain only) and status
 - Speed, Battery, Name of the vessel, RC/Autonomous Mode, Single/Multibeam information
 - Extensions state: AIS, Object monitor, Radar and Virtual Rangefinders (If active)
 - GPS-info



Tap on the button to start the vessel. If the vessel is paused, this button will resume the current task.

When first starting a task on a vessel, a token will be synchronised to establish a connection between the server and the vessel. The first task in the queue's state will become: **In progress**. When this task is done, it will become: **finished**, then the next task in the queue will be started. If the status of the task changes to in progress and the vessel does not start, check on the RC unit if autonomous mode is enabled.



This will pause the current task.



This will stop all the tasks. If the vessel is started again, it will begin from the first task.

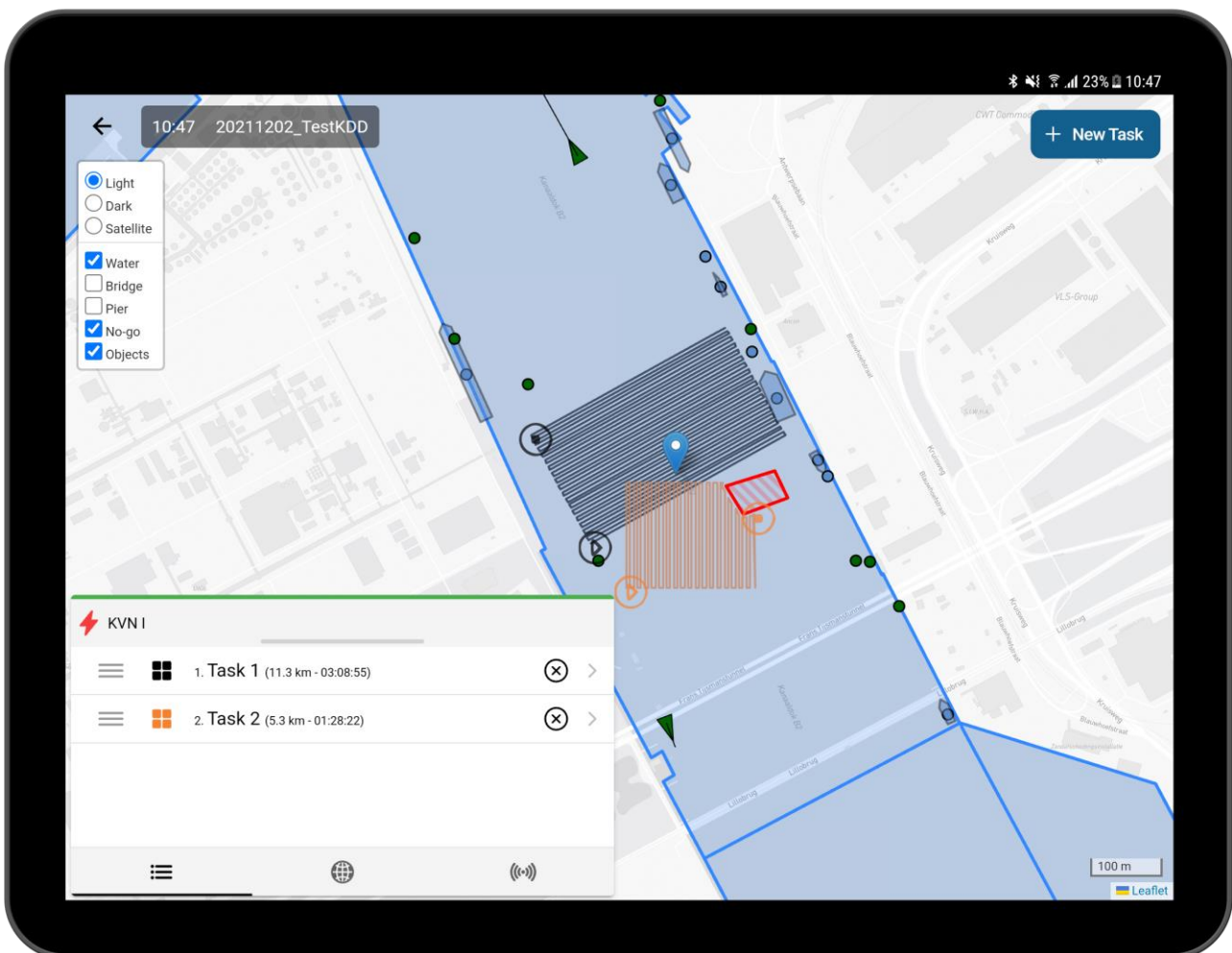


Tap on the button to start logging of the vessel or to stop it.



If the logging button is active, the AYB app will record all data about that vessel, this data will be available in the projects export:

- Vessel information
 - o Battery
 - o Location
 - o Heading
 - o Speed
 - o GPS Fix/No fix/RTK
- Sensor information
 - o Depth low
 - o Depth high
 - o ...





7.1.6 During the project

During the project all the acquired data will be plotted on the map. All the vessel information is at hand also to view during the survey. It is still possible to create new tasks and assign them to a vessel that already has started. The new task will appear in the queue and waits there until started automatically.

When a value lower than or higher than the current map legend is found, the legend automatically adjusts to the new depths, except if the range is fixed in the project settings.

7.1.7 Stopping the project

To stop the project, simply stop all the vessels and stop all the logging of those vessels. Now the project is done and is ready to be exported and/or archived.



7.2 RC mode

The vessel can also be controlled via the supplied Remote-Control unit. The RC unit can be turned on by pressing and holding the power button, marked with number four. Also press and hold the power button to turn off. If you wish to turn off the controller while the ayb is still powered, you will have to press down on the wheel marked with number 5 to confirm.

To toggle between autonomous and RC operation, use the toggle button marked with the number 1. When the button is pressed in the AYB is operating autonomous. When the button is not pressed in, the AYB is controlled by the RC unit.


The vessel can then be controlled with the joysticks marked with numbers 2 and 3. The left joystick controls the left motor, while the right joystick controls the right motor. For the motors to rotate forward, push the joysticks forward. To put the motors in reverse, pull the joysticks backwards. Pushing the joysticks to the right or left has no effect on the motors. The manual of the RC unit can be found at: <https://www.team-blacksheep.com/tbs-tango2-manual.pdf>





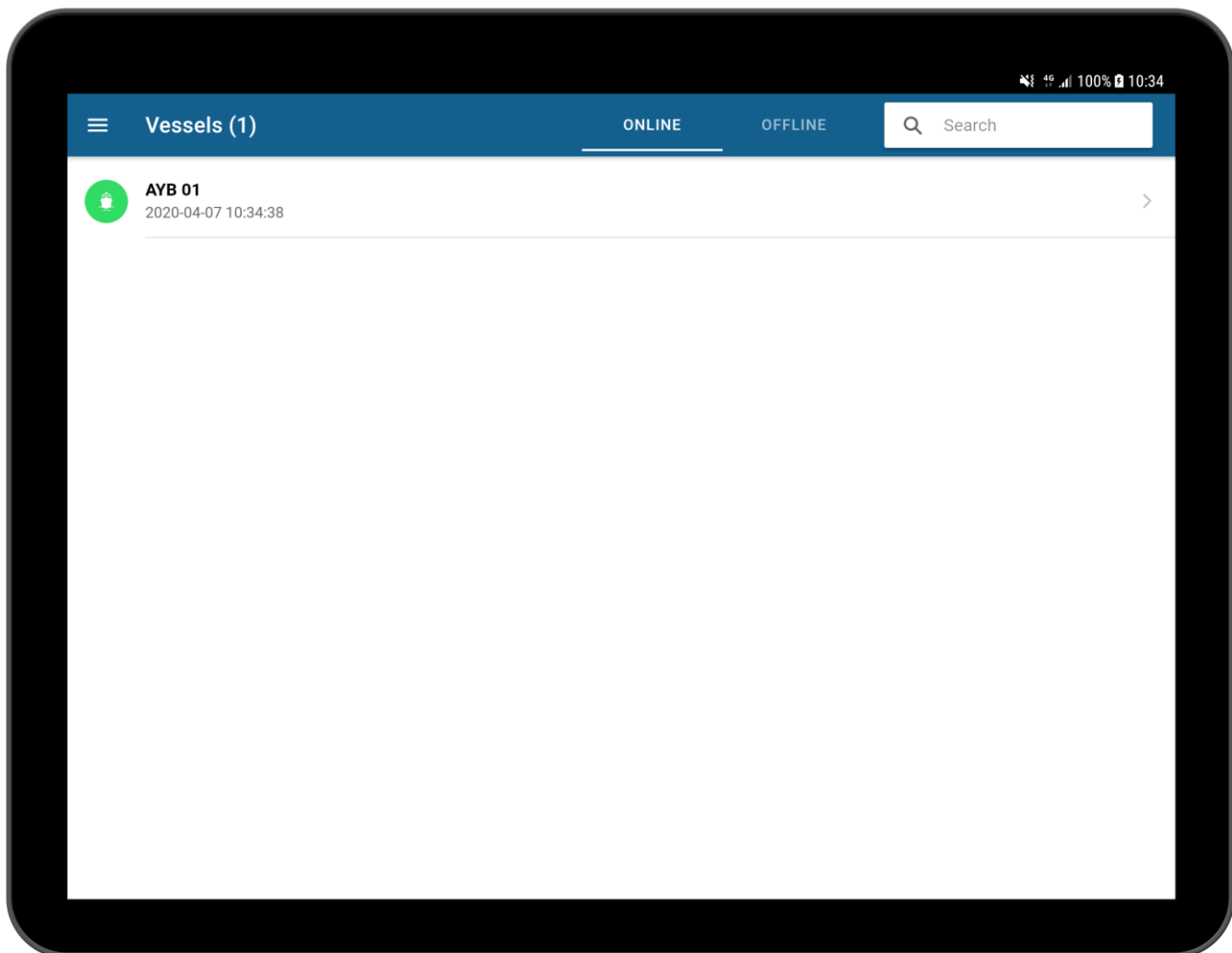
7.3 Managing your vessel/AYB unit

7.3.1 The vessel screen

Open the menu to the left where you have **Project, Vessels, Layers** and **Logout** by tapping the  button and then Vessels. This will open a new page with all the available vessels. It is divided in two pages, online vessel and offline vessels. It is also possible to search for a vessel name by tapping the search bar in the header.

Main information about all the vessel is also shown here:

- Vessel name
- Last update of the vessel
- State (Online or offline)

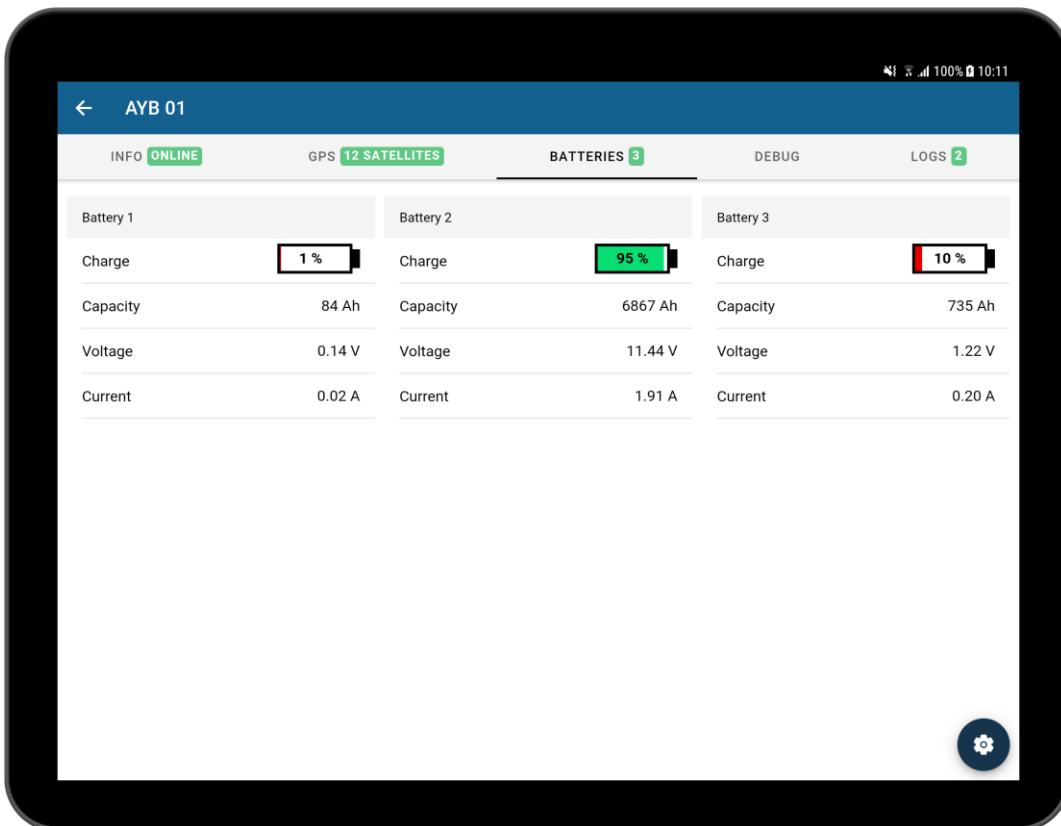
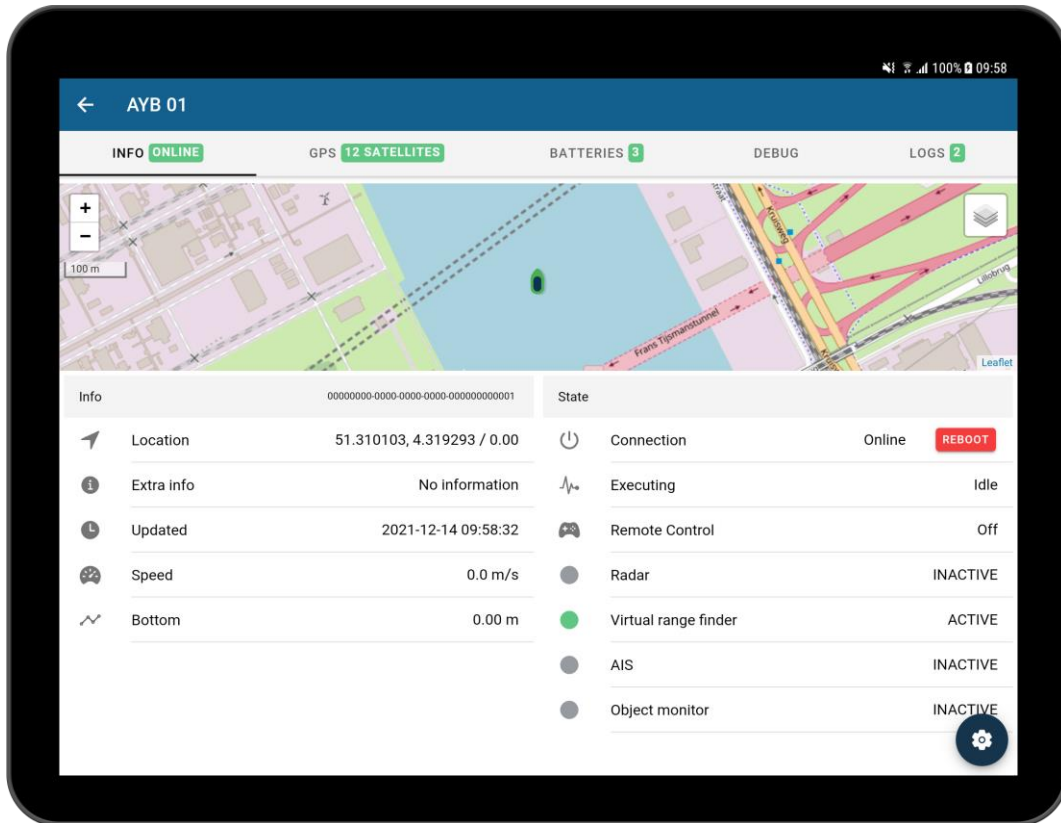


When tapping a vessel, the user is redirected to the detail page.



The detail page contains more information about the vessel:

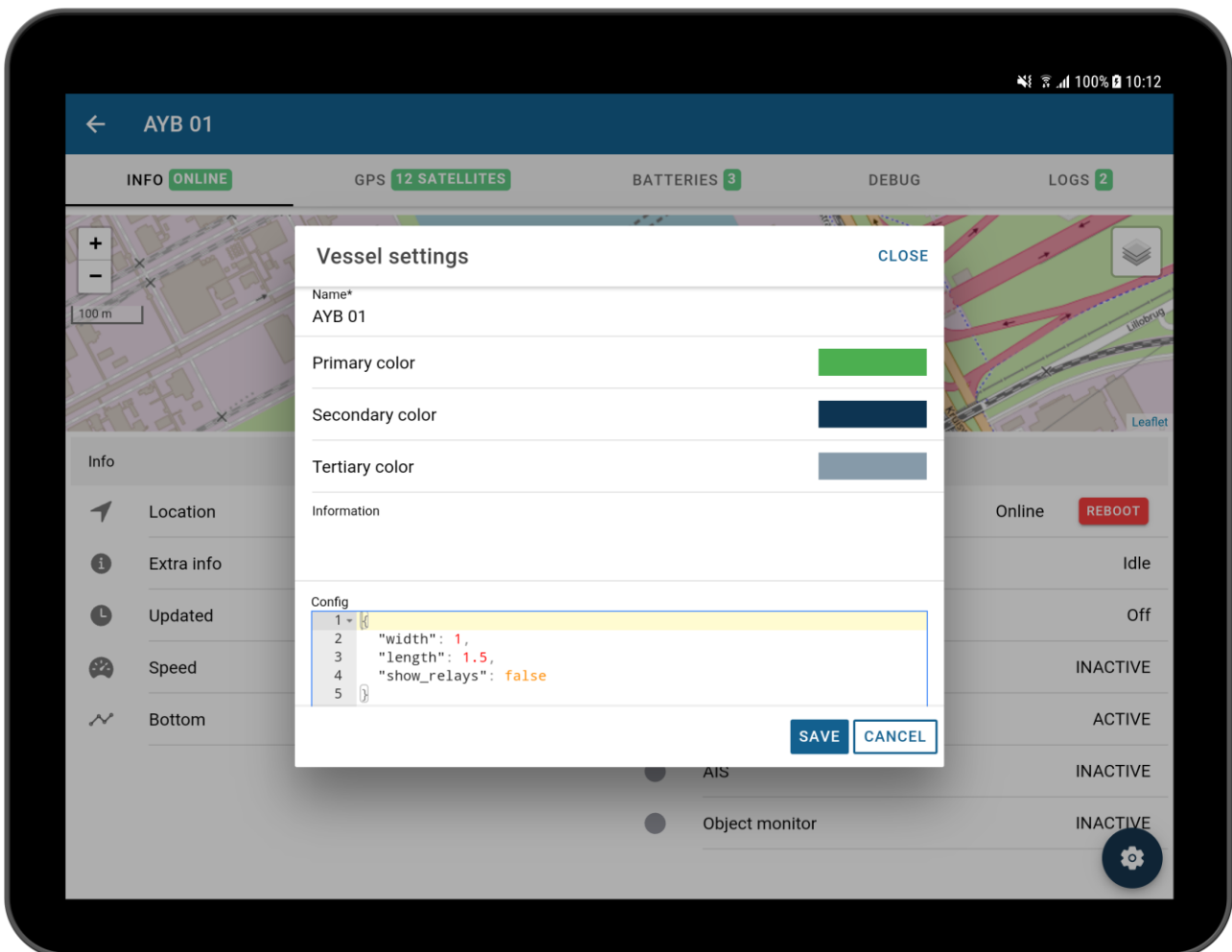
- Info
 - o Current location of the vessel
 - o Current survey where the vessel is active in
 - o Extra information (editable)
 - o Date/time when the boat is last updated
 - o Current speed
 - o Depth Low / Depth High (When available)
- State
 - o Connection (online or offline)
 - o Option to reboot the vessel
 - o Executing (Idle or busy)
 - o Remote control (On or Off)
 - o Radar, Virtual range finder, AIS and Object Monitor states
- GPS
 - o Info about the current GPS connection
 - Name of the GPS
 - How many satellites are connected?
 - Quality
 - Latitude, Longitude and Altitude errors
- Batter(y)(ies)
 - o Current percentage left of the battery
 - o Capacity
 - o Voltage
 - o Current
- Logs
 - o The daily log files of the vessel are available here.





Name and extra information of the boat is editable by clicking the cog button on the bottom right. This will open a popup where the user also can change the next settings:

- Option to change the primary, secondary and tertiary colors of the vessel
 - o - Primary color: Main color of the vessel
 - o - Secondary color: Inside color of the vessel
 - o - Tertiary color: Shadow color of the vessel
- Modify the config of the vessel

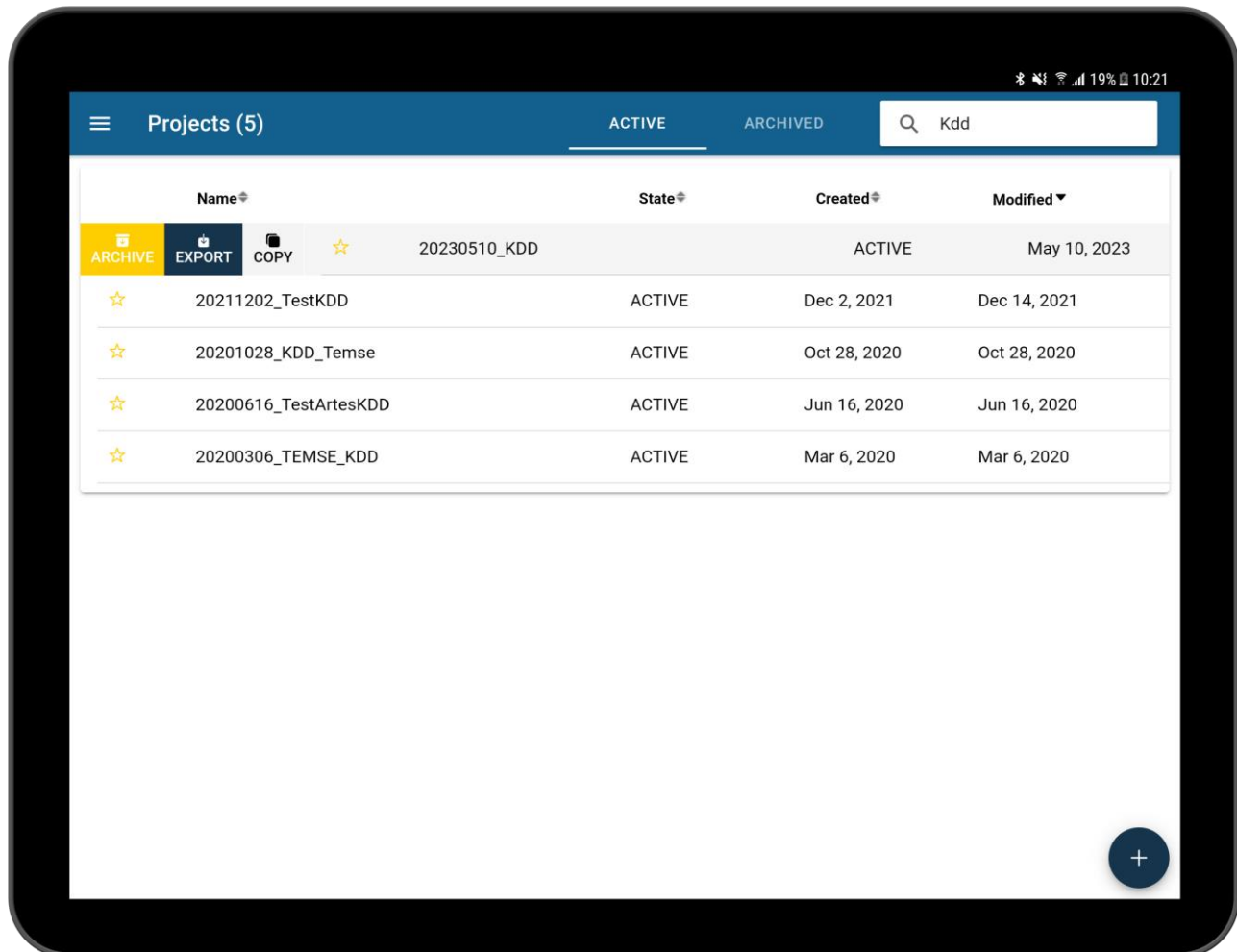




7.4 Managing your data

7.4.1 Exporting your data

All the data that has been logged can be exported by going to the overview of all the projects and swiping that project to the right and tapping **EXPORT**.



Exporting will result in generating a zip-file that contains the following items:

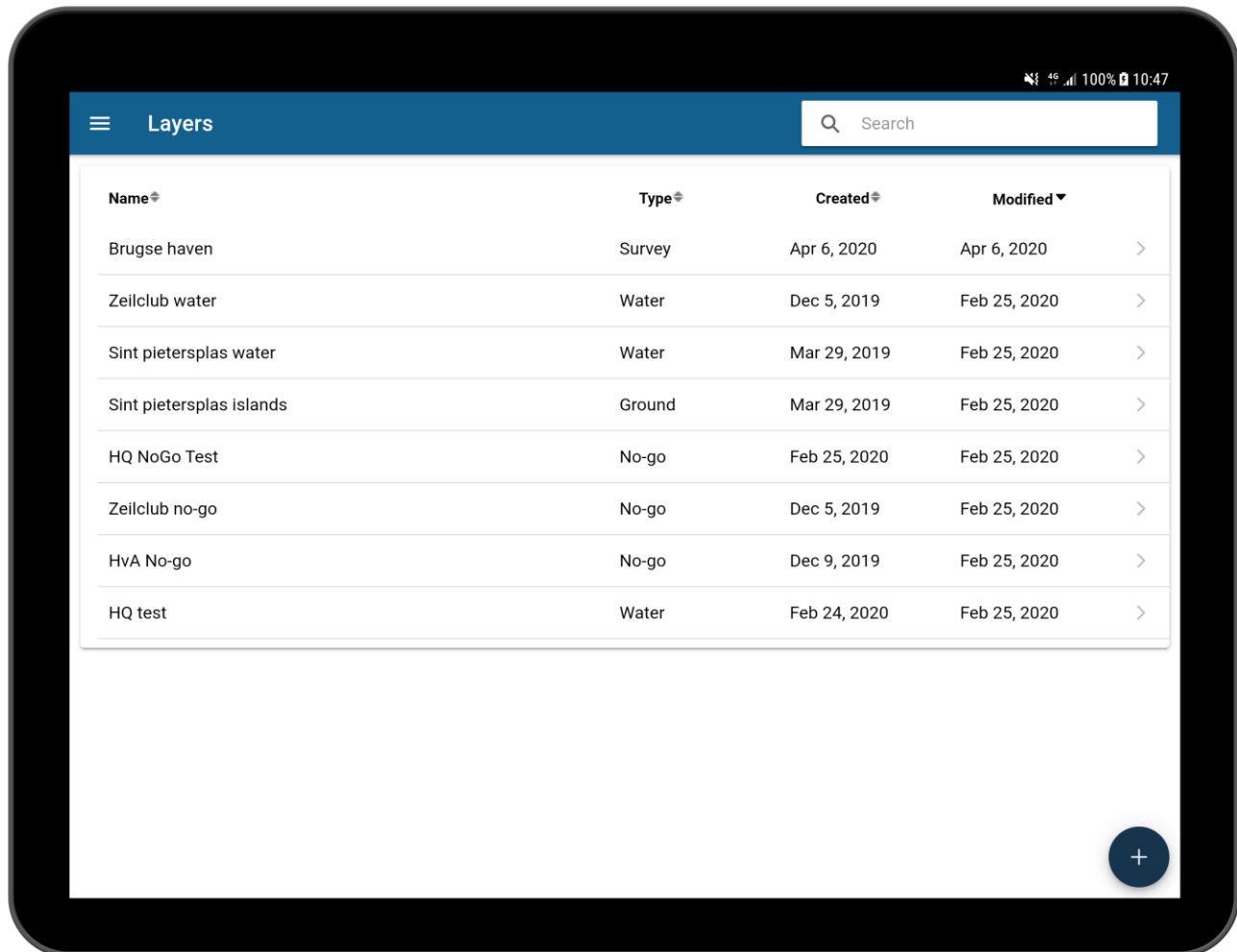
- <sensor> folder: This contains all the data of measurements of this sensor per vessel. Every time the user taps logging, a new file is created. The csv-file contains following items:
 - o Timestamp
 - o Latitude
 - o Longitude
 - o Depth Low
 - o Depth High
- Vessel folder: This contains information about all the vessels in this project:
 - o PNG-images of the measured depth data
 - o Metadata-files about these images
 - o Extra information about the vessel (Battery, info, location)
- Vessel.csv
 - o Containing a list of all the participating boats together with their name, first time in use and last time in use in this project.



Copy project

It is possible to copy your project and tasks to a new project. This project will get the same name of the to copy project with _copy behind it.

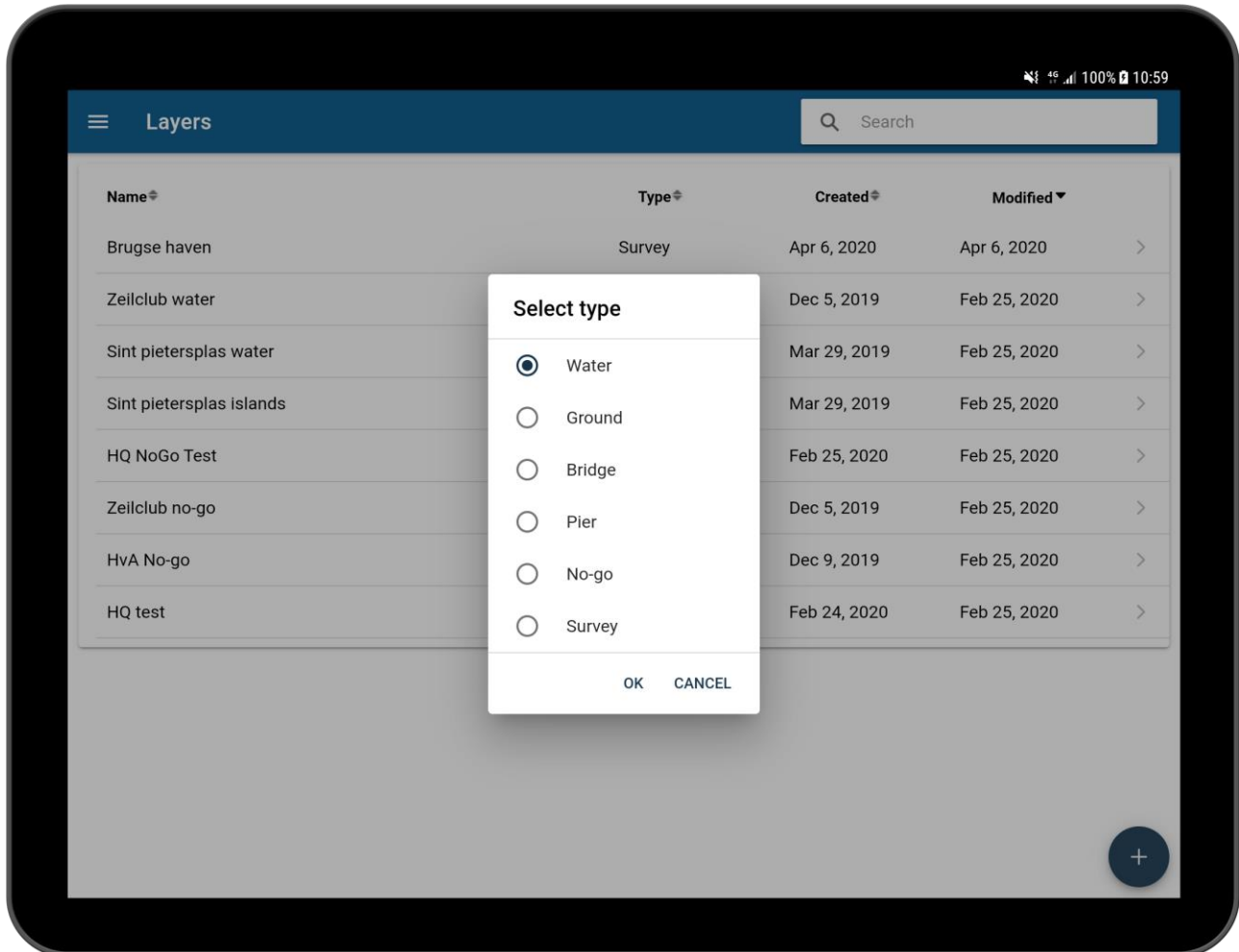
8. Layers



The list of layers can be accessed by going to the AYB menu – Layers. These layers will be used to calculate waypoints for the tasks. To successfully do that create a water layer where it is safe to sail and other layers (Ground, Pier, Bridge, No-Go) where it is not safe to sail. The path planner will take all the layers into account and try to calculate a valid route. Survey layers are passive layers and are only to mark the survey area (dashed border line).

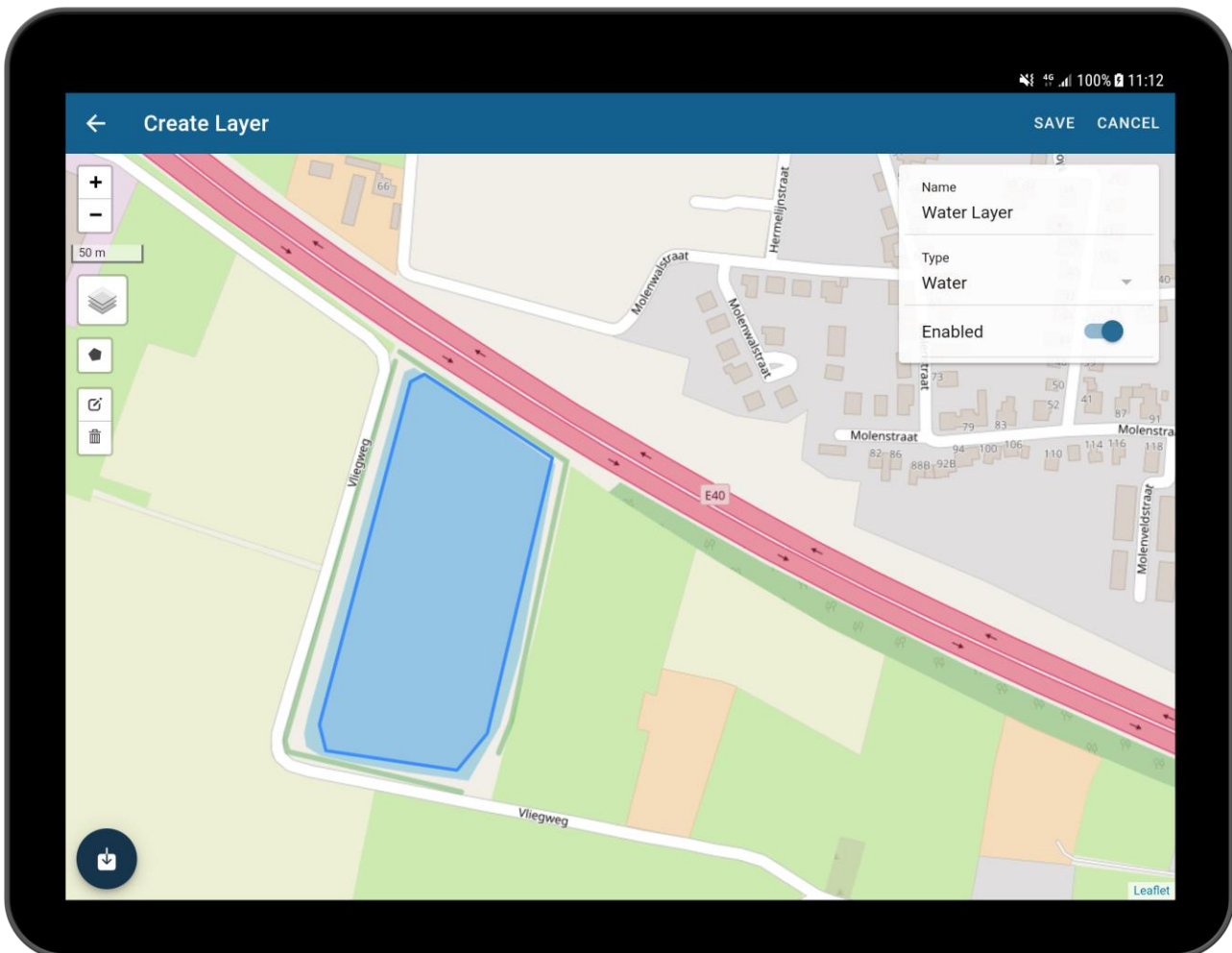


As in the other lists of the app it is also possible here to sort, search, delete layers. To create a layer, press the + button. And then select a type of task to add.





To start drawing a layer press the polygon button. A name can be given to a layer and it is still possible to switch between the types of a layer. A layer can also be set enabled/disabled.



It is also possible to import points into the app to create a specific layer. Press the button on the bottom left and select a file you want to import. After the file import the user must select in which projection the file is.

Supported file types: shapefile, csv

See more info on **15.2**



9. Battery system

The battery system is manufactured by Victron Energy (<https://www.victronenergy.com>).

It consists of a battery protector, a battery monitor, a LiFePO4 Battery and the Blue Smart IP65 charger.

9.1 Battery Protector

The Victron Battery Protect disconnects the battery from non-essential loads before it is completely discharged (which would damage the battery) or before it has insufficient power left to power the engine(s).

For more information, read the manual: <https://www.victronenergy.com/upload/documents/Datasheet-Battery-Protect-48-V-100-A-EN.pdf>

9.2 Battery Monitor

A Victron BMV-700 battery monitor is installed to calculate ampere hours consumed and the state of charge of a battery.

For more information, read the manual: <https://www.victronenergy.com/upload/documents/Manual-BMV-700-700H-702-712-EN-NL-FR-DE-ES-SE-PT-IT.pdf>

9.3 LiFePo4 Battery

See the Victron Energy Smart LiFePO4 manual:

https://www.victronenergy.com/upload/documents/Lithium_Battery_Smart/Manual_Lithium_Battery_Smart-en.pdf

9.4 Blue Smart IP65 charger

The AYB box is supplied with the Blue Smart IP65 charger from Victron Energy. The charger can charge a LiFePO4 battery as a lead-acid battery by selecting the correct mode.

For more information, read the manual: <https://www.victronenergy.nl/upload/documents/Manual-Blue-Smart-IP65-Charger-EN-NL-FR-DE-ES-SE-FI.pdf>

9.5 Victron Connect app

The battery and charger have a built in Bluetooth interface. The Victron Connect app can be downloaded via the Google Play Store to view the status of the LiFePO Battery and the status of charging.

See the Victron Connect manual:

https://www.victronenergy.com/media/pg/VictronConnect_Manual/en/index-en.html



10. Transport, storage and maintenance

Make sure that the AYB unit, vessel and battery are stored in a dry environment, and are protected from extreme temperatures. Please disconnect the battery from the electronics when storing the AYB unit for a long period of time.

When transporting follow the safety instructions provided in this manual (See 3. Safety precautions). Use the dummy wet mate connectors to protect all wet mate connectors and cables. Use the connector panel cover to protect the connectors on the AYB box during transport.

When finished using the AYB unit, disconnect and remove the battery, place the dummy connectors back, and let the vessel and components dry. If necessary clean the various components. If any cables, connectors or wiring are damaged, then those must be replaced before using the AYB unit again.

The AYB box utilize wet-mate connectors that greatly reduce problems associated with traditional underwater connectors. However, these connectors must be properly maintained to reap the full benefit of this design. Never stick any foreign object into a female connector. Use, on a regularly time base, grease to lubricate the mating surfaces of the connectors.



11. Technical data

Specifications

Internet:	3G+/4G (2 SIM readers)
Wi-Fi (optional):	Access Point and Client (2.4 & 5.5GHz)
LAN (optional):	Up to 4 Ethernet Ports
Serial:	RS-232 and RS-485
Bluetooth (optional):	Version 4

Power consumption:	< 20 W (excl motors)
Voltage:	12-24 V
Protection:	Galvanic shielded zones / Over voltage, reverse & battery protection

Compass:	NMEA Compass
Accuracy:	+/- 2 degrees
Gimbal:	+/- 30 degrees max
Output frequency:	1Hz
Output data:	NMEA 0183 sentence HDG

R/C controller:	2,4 GHz – 5 Channels
Receiver:	2,4 GHz – 6 Channels

Case IP rating:	IP67
Size:	550x350x280mm

Tablet included - Android App downloadable on Google Play





12. Troubleshooting (FAQ)

12.1 Device

11.1.1 No internet connection

Check if the data SIM-card is correctly plugged into the router. Be sure that there is data available on the card.

11.1.2 Vessel does not come online in app

First of all, check point 1 of the troubleshooting (Device - No internet connection). If this is ok, please press and lift the emergency button of the AYB box to reboot the device and refresh the app

11.1.3 Vessel does not turn the appropriate way

If the vessel is not responding correctly towards a task or the remote controller, it is possible that there is something wrong with the motors. Check if all motors are working by manually controlling the RC. If one motor is not working, check if the cables are correctly connected. If the left motor is turning right and the other way around, it is possible that the motor cables are switched.

11.1.4 No GPS

Check if all the cables of the GPS are correctly connected and the AYB box is not located indoors. Please try rebooting the device if the problem returns.

11.1.5 Nothing happens

When nothing happens, it is possible that the battery is dead. Please switch the batteries with a fully loaded one and restart the device. Check also if the battery is connected to the electronic frame.

12.2 App

12.2.1 App is not responding to anything

Please check if your tablet/phone has an internet connection by enabling Wi-Fi/3G/4G. Restart the app. In case of 3G/4G: check if there is data on the SIM card.

12.2.2 Vessel will not start

Check if the RC unit is in autonomous mode. If it is, there is a problem with the device, please reboot the AYB box.

12.2.3 Logging will not start

There is a problem with the server or the project is corrupt. Try again later or try to create a new project.



13. Support

If you have any remarks or questions, don't hesitate to contact us at support@dotocean.eu or <https://dotocean.zendesk.com/hc/en-US>

14. Warranty

dotOcean offers a one-year warranty against manufacturer's defects on the assembly and all parts of the AYB box.

Warranty is only valid for original purchase and is non-transferable.

Manufacturer defects do not include malfunction or damage resulting from improper use, lack of proper maintenance, misuse, abuse or vandalism, unauthorized modification or alteration.

Travel expenses, accommodation and freight cost involved to be covered by buyer.

This warranty does not cover failure of product or components due to any act of nature; lightning, floods, hurricanes, tornadoes or any other such catastrophic events.

All repairs must be authorized by dotOcean. Unauthorized repairs will not be reimbursed under any circumstances.



15. Addendum

15.1 Addendum A: Preparation of Calypso

In case of one wants to use the AYB box with the inflatable board (Calypso packet), one has to follow these instructions additionally to those in paragraph 6 Installation instructions.

15.1.1 Inflate vessel

To inflate the vessel, take the accompanied pump and attach it to the rear of the vessel. First open the grey protection cap by turning it to the left.

Attach the pump and then turn the end 90 degrees to the right. This way the tube will stay in place while pumping. (1)

Inflate the boat to around 0.25bar / 4 psi. When you detach the pump and the vessel is deflating, press the white button in the middle of the hole. This prevents deflating. When done put the grey protection back in the hole and turn it to the right.



15.1.2 Attach motor fins



Turn the vessel around. To place the motor fins correctly, make sure that the motors are on the outside. Slide the fins in their place and fasten the bolt to secure that the motor no longer comes loose. Put the two cables of the motors through the closest hole of the vessel and turn the boat around again.

NOTE: When the weather conditions aren't that good (Windy or high waves), it is recommended to place an extra fin at the bottom of the vessel. This will result in much smoother sailing and better data measurements. It is attached the same way the motor fins are (see 6.2). Place the extra fin at the front of the vessel.



15.1.3 Install measurement sensor

Install the measurement device in its appropriate position. Make sure that the device is fastened enough, so that it cannot get lost during sailing.



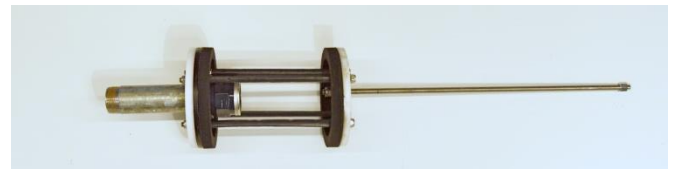
15.1.3.1 Default Single Beam

For the default calypso package, a single beam device is provided. Take the single beam device and put it in the appropriate hole of the vessel. Make sure it's deep enough for good measurements and stuck enough so it's stays in position.



15.1.3.2 Hydrobook

In case you bought the hydrobook upgrade package, take the mounting bracket and unbolt the top. Place the bottom through the appropriate hole of the vessel, then bolt the top back on the clamp. Make sure that the clamp is fastened enough so that the clamp no longer can move.



Put the cable through the bracket, then screw the hydrobook onto the bracket.

15.1.4 Place compass



On the bow of the calypso inflatable boat, a Velcro patch is provided to place the compass and keep it in place.

Place the compass so that the front of the compass, indicated by two arrows on top of the device, is aligned with the raft.



15.1.5 Place vessel in water

Carefully place the boat in the water.





15.2 Addendum B: Supported import files & projections

15.2.1 Projections

The following projections are currently supported:

- European Terrestria Reference System 1989
- ETRS89 / UTM zone 31N
- ETRS89 / UTM zone 32N
- Belge 1972 / Belgian Lambert 72
- NAD83(NSRS2007) / Alaska zone 4
- OSGB 1936 / British National Grid
- RGF93 / CC47
- RGF93 / CC49
- RGF93 / CC50
- Amersfoort / Rijksdriehoek
- World Geodetic System 1984 (WGS84)

15.2.2 File types

Shape file

A shape file is a binary file with .shp as extension.

The shapefile can contain polylines or/and polygons.

DXF file

A DXF file is data file format for exchanging drawings between AutoCAD and other programs with .dxf as extension.

To import a valid DXF file into the AYB App, the following geometries are supported:

- LwPolyline
- Line
- Polyline
- Text



Comma separated file

A comma separated file is a text file with .csv as extension and consist of 2 columns.

The first column is always the latitude or the Y value. The second column is always the longitude or the X value.

- All values in the file need to be separated by a comma (,) or by semicolon (;).
- Latitude and longitude are decimal degrees (WGS84).
- Decimals should contain a period as decimal sign.
- The headers are obligated, but not processed. The first line is ignored.

Examples

WGS84

```
lat, lng  
51.121532634205586, 4.222269058227539  
51.12105450535622, 4.226517677307129  
51.12067065185377, 4.226367473602295  
51.1211757215891, 4.222140312194824  
51.12070432334126, 4.2220330238342285  
51.120158842222494, 4.226346015930175  
51.11970763692382, 4.226346015930175  
51.12004435771319, 4.22174334526062
```

Lambert

```
Y,X  
77853.47,175924.73  
77865.92,175961.38  
77880.83,176036.49  
77904.37,176032.29  
77877.5,175915.81  
77856.2,175921.09  
77887.53,176038.61  
77908.57,176034.72  
77879.66,175911.35  
77857.24,175915.81  
77893.69,176042.4  
77904.49,176040.59  
77871.57,175908.14  
77862.13,175908.55  
77900.7,176047.57  
77887.11,176048.59  
77857.65,175905.29
```

Qinsy file

A Qinsy file is a text file exported from the qinsy software suite and has .txt as extension.

- The headers of the file should contain “**Latitude1**” and “**Longitude1**”.

The values of the file should be formatted in Degrees, Minutes and Seconds. Therefore, only GPS **WGS84** is supported.