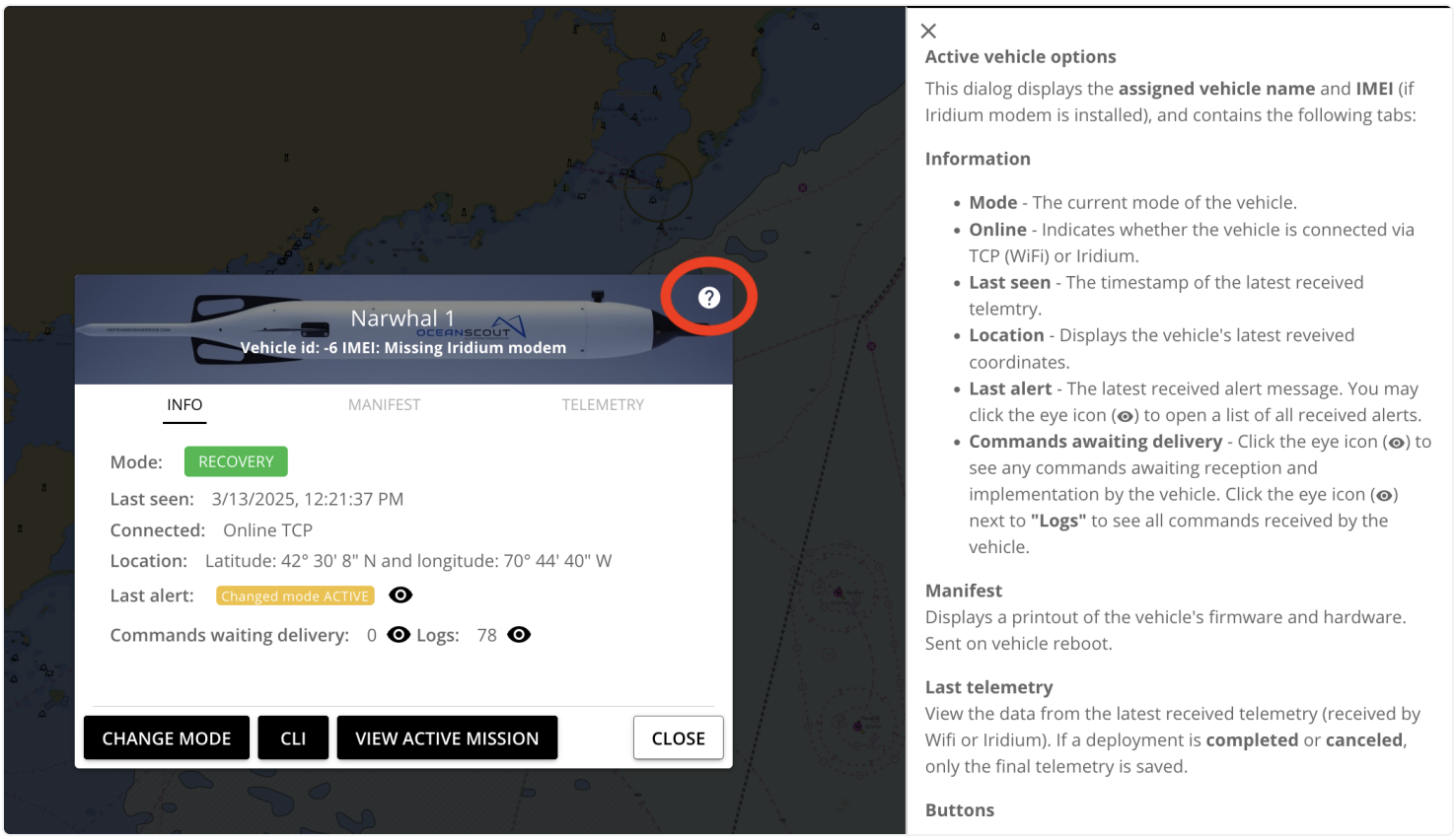
Cloud

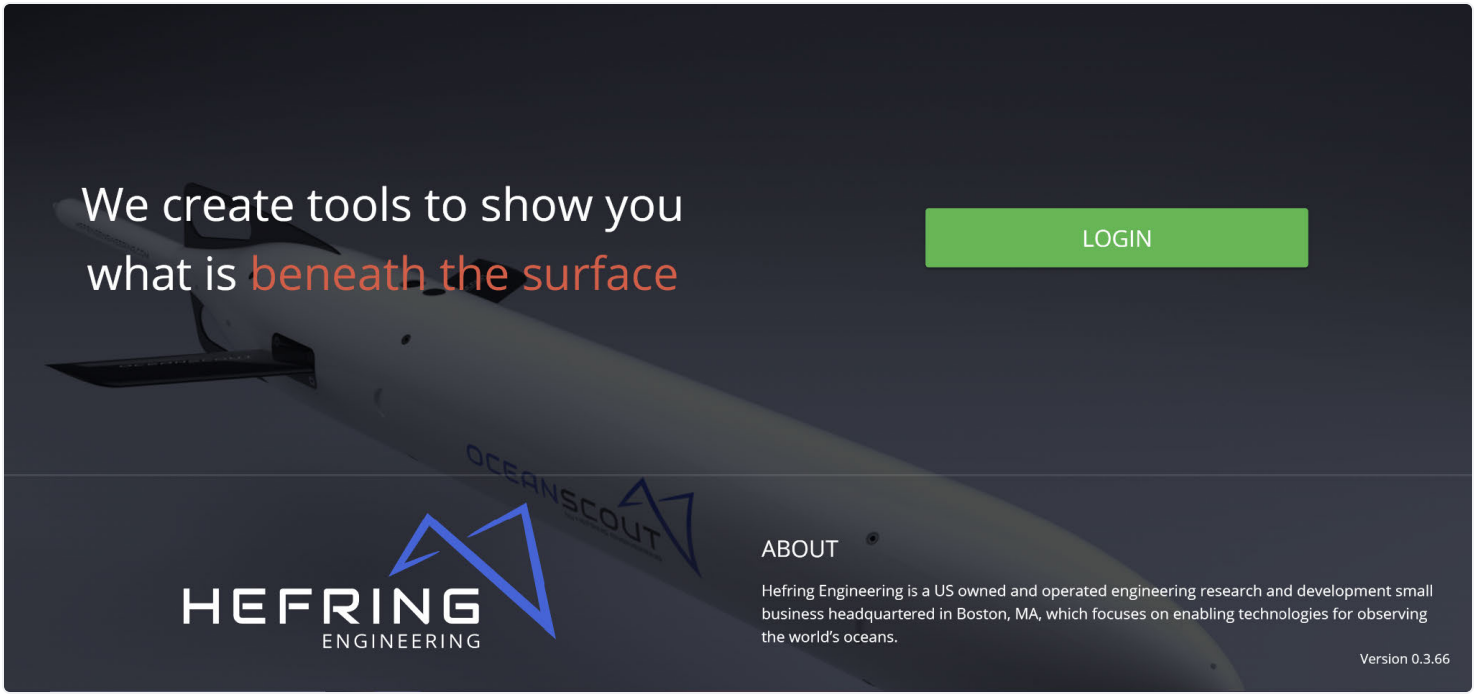
Cloud Inline Help Guide

Hefring Cloud has a built-in help guide accessible by clicking the question mark buttons in the upper right corner of pages and dialog boxes. This guide explains functions and use throughout the system.

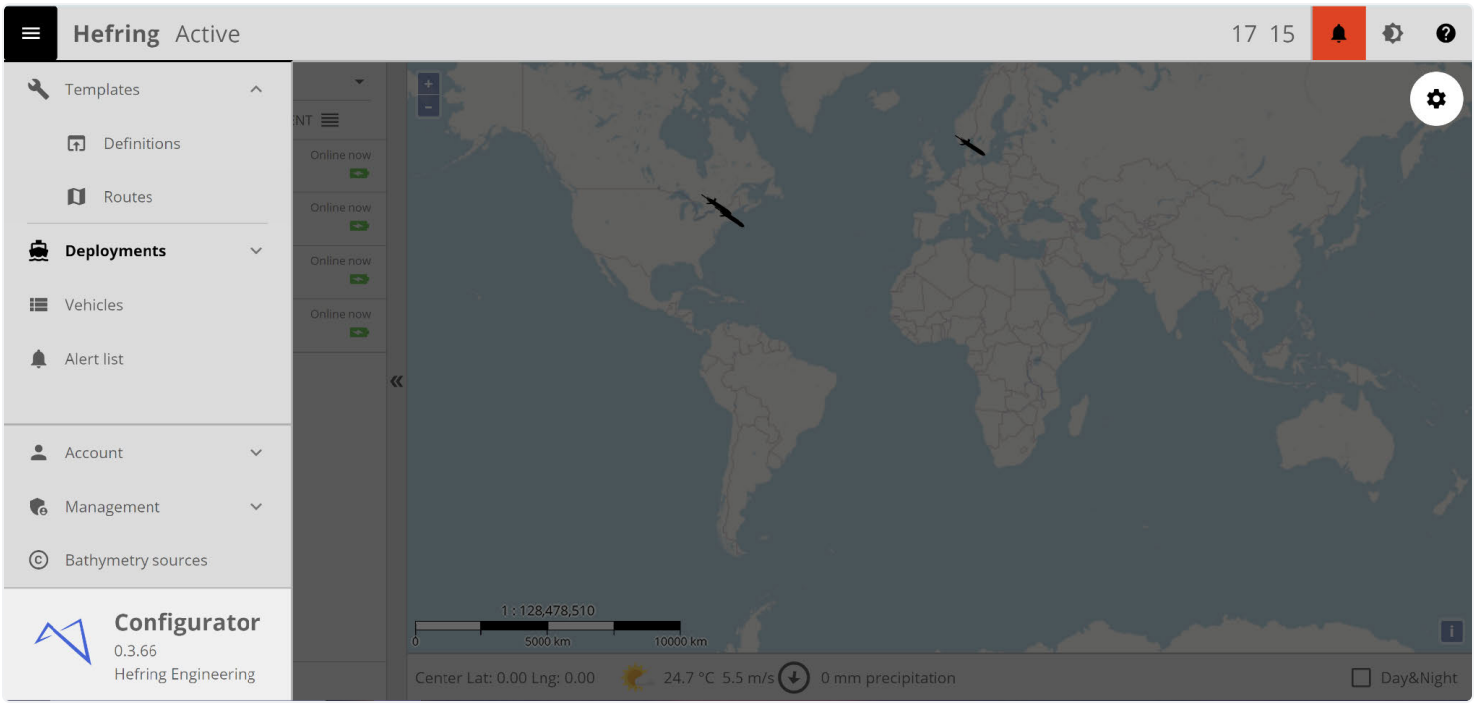


Creating a Deployment

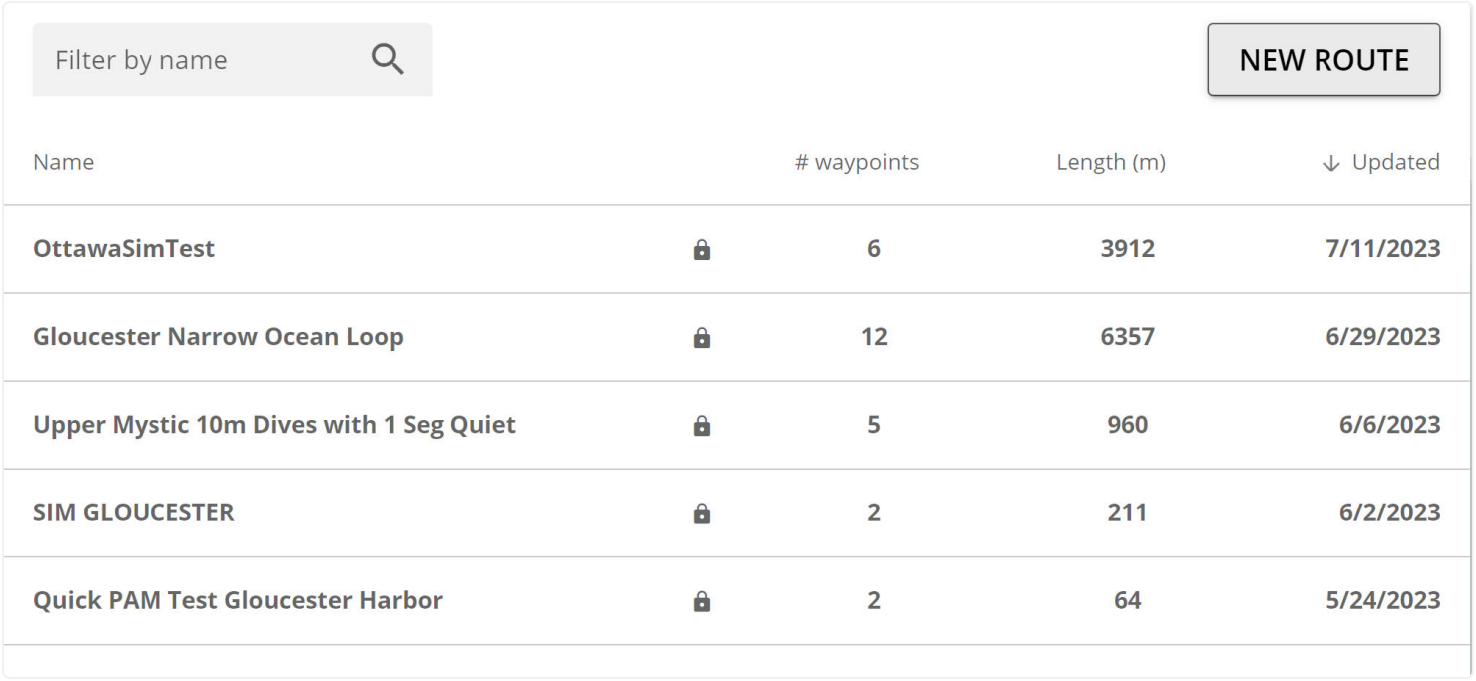
Login at [user].hefring.cloud (example https://cornell.hefring.cloud/). Presently you will need to contact Hefring Engineering to sign an email up with a user profile and temporary password which can then be changed. See "getting started" section for setup information.



Once logged in, select the 3 bars in the upper left corner to open the menu. Here you can navigate between existing vehicles, active and past deployments, and the template for creating new mission routes for the glider to run. Clicking on templates and selecting “Routes” will bring you to a list of all existing routes that have already been created to deploy a glider on. These can be searched through or sorted by name, date, distance, and number of waypoints.

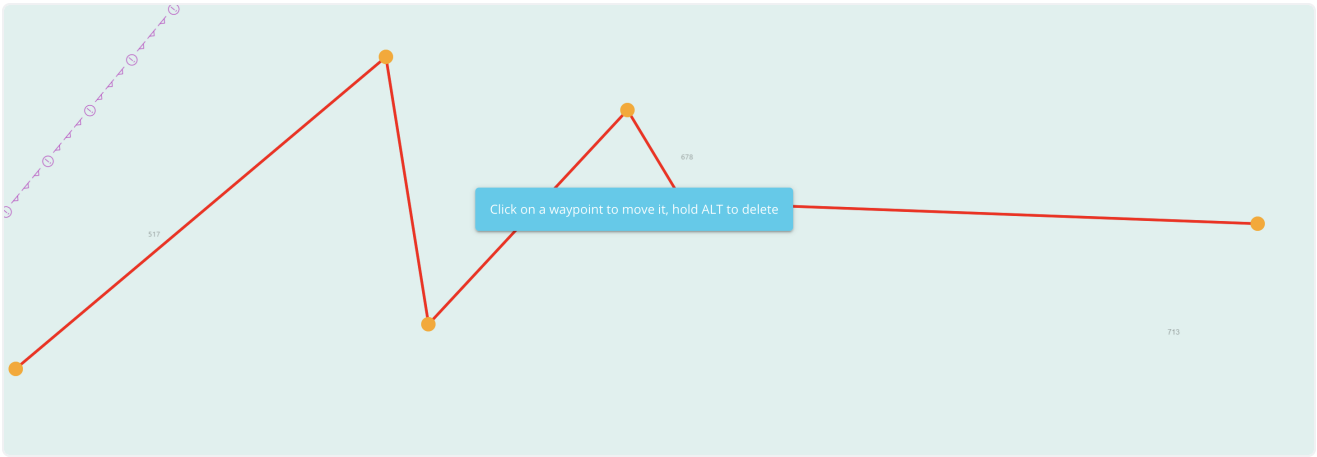


To create a new route simply click on "Routes" then on the “New Route” button in the upper right hand corner.

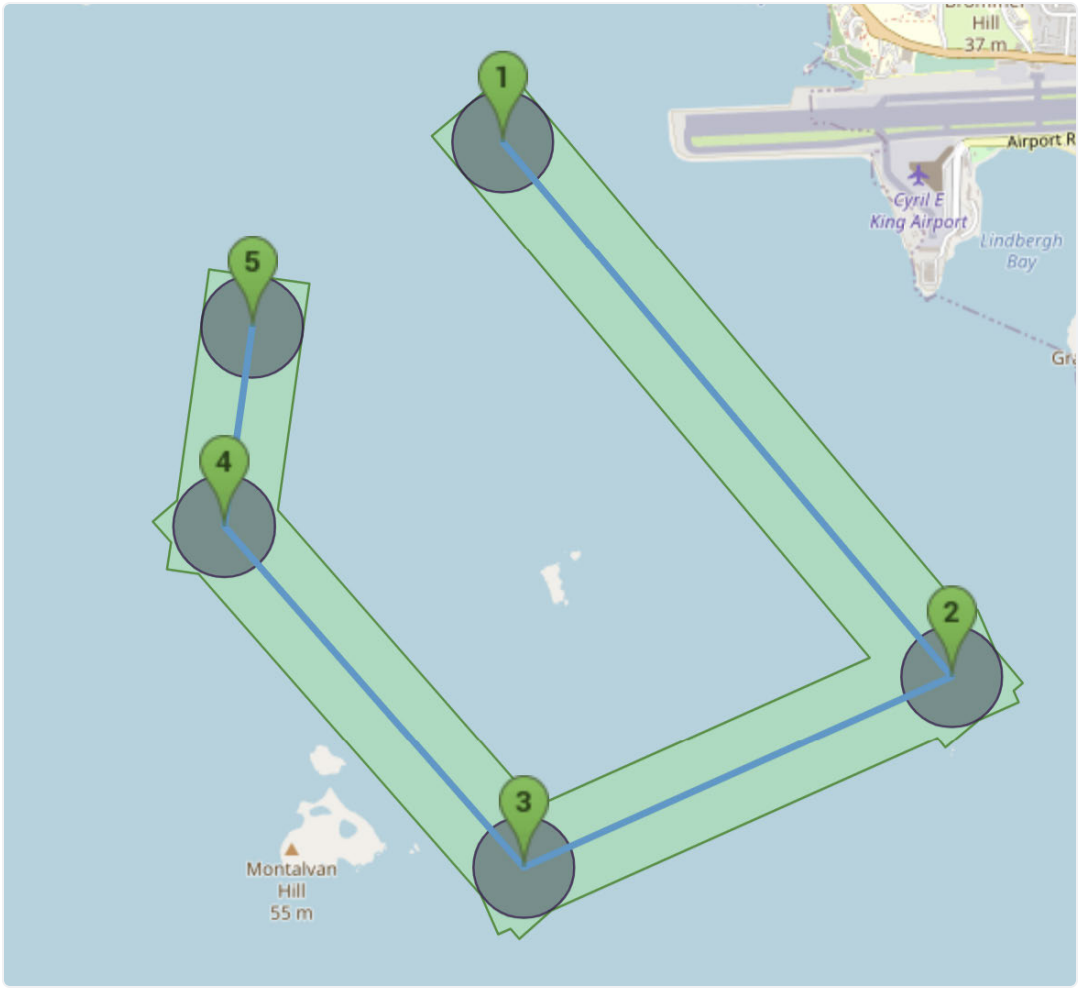


Then move the map to the body of water and region you wish to deploy the vehicle in. From here you may begin placing waypoints at desired locations by clicking the ‘Draw New Route’ button in the upper left.

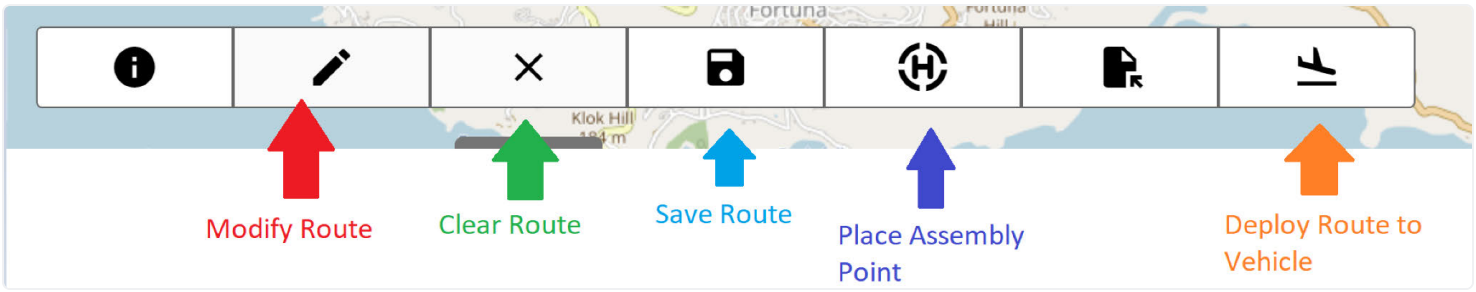
After clicking "Edit Waypoints", More waypoints can be added after initial placement by clicking anywhere on a segment. In this mode, waypoints can be moved by dragging them. To delete a waypoint, click on it while holding the ALT key. Note that you must have selected "edit waypoints" to create, move, or delete waypoints after initially drawing the route. To delete all waypoints and start over, select “Clear Route.”



Airport Road
Cyril E King Airport
Lindbergh Bay
Gram
918.9 m
Total length 8929.1 m
Montalvan Hill
55 m



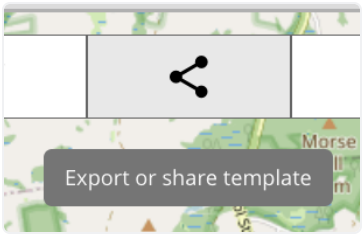
To edit an existing route, open it and select “Modify Route.” To save, click save.



Saving, exporting, and uploading routes

To save the route you have designed, select “Save Route as Template.” Make sure to save frequently as you are creating your route to avoid lost progress.

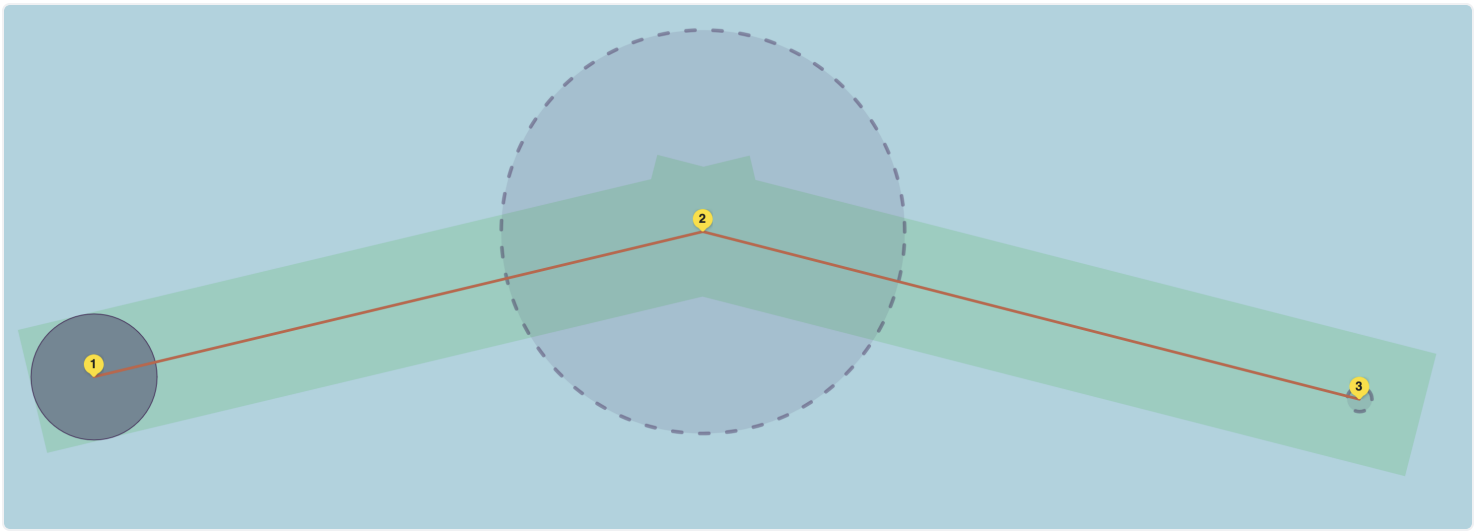
To export/download a mission, click the "Export or share template" button. This will download a .mission file containing your route.



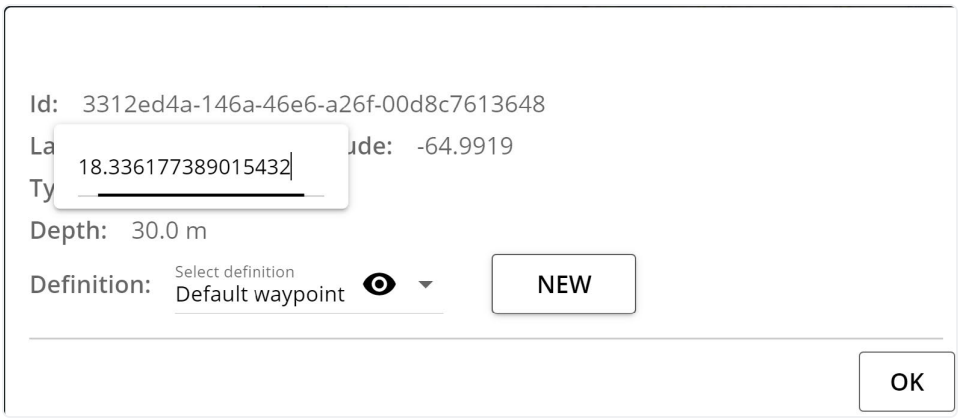
To upload a saved route file, click "Load route template" then "Import".

Currently, saving a route overwrites the previous save, even if the name has been changed. To duplicate a route or create a separate version, export the mission then re-upload the file with a new name.

Waypoint Settings



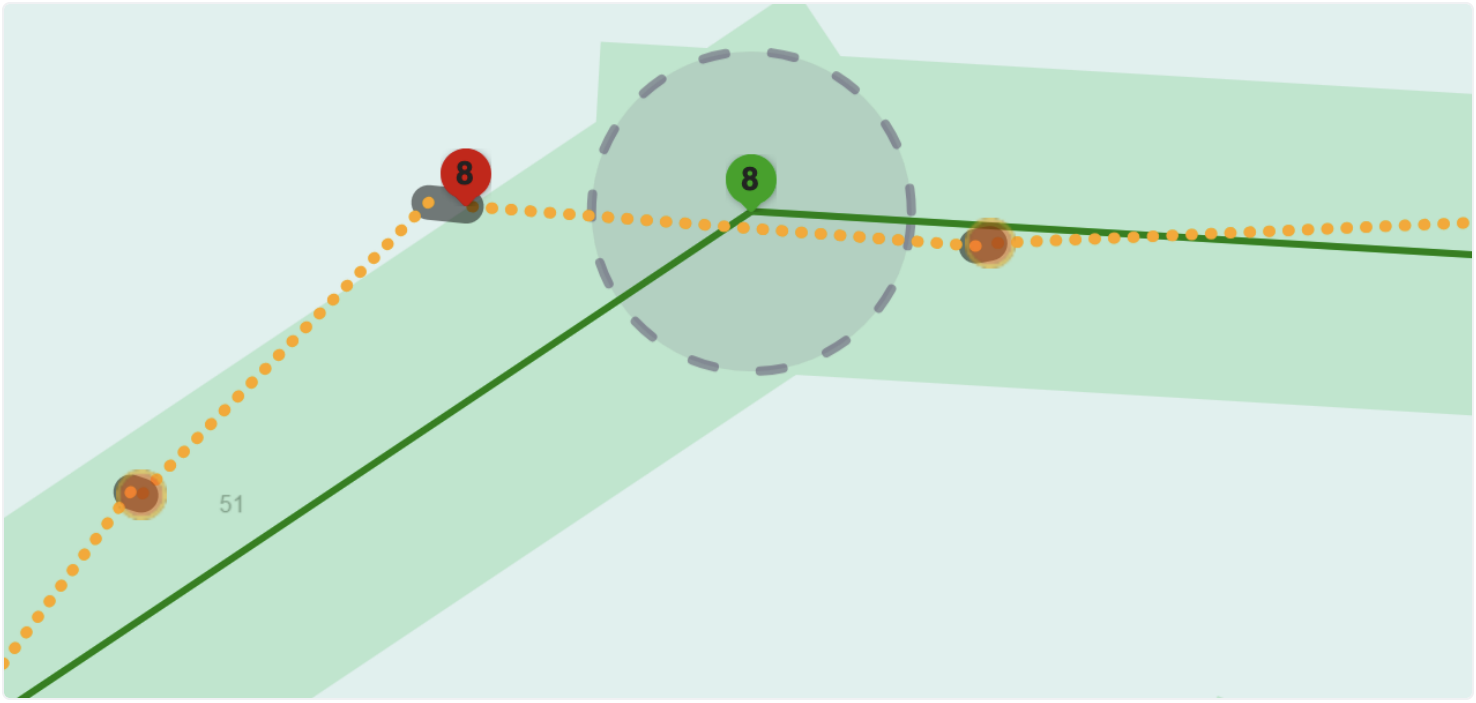
Precise waypoint positioning: Waypoint locations can be "drawn" freehand as described above. Alternately, if you have a specific GPS position in mind for a waypoint in the route this can be configured as well. Draw a rough version of the route, then iimply click on the waypoint you want to edit, click on the current GPS coordinates for the point, and it will allow you to edit, paste, or type your own.



Each waypoint has an **Attainment Radius** around it. When the glider reaches this circle, it considers the waypoint sucessfully reached and continues on to the next waypoint. Note that a definition of 500m produces a circle around the waypoint with an attainment RADIUS (not diameter) of 500m. The radius size setting should correspond to mission parameters. Use a smaller radius when running shallow, low-yo-count lake or coastal missions, and larger radii for deep, high-yo-count, open ocean missions. Generally the radius should be as large as practical to ensure the glider can easily reach it. 50m is the minimum, 250m is default, 5000m is the maximum.

Select a waypoint to edit its waypoint definition, which includes the attainment radius and other settings.

If the glider surfaces past a waypoint attainment radius (eg. due to deep, multi-yo dives and a starting point near the radius) it will bypass that waypoint and continue to the next point rather than try to return to the radius.

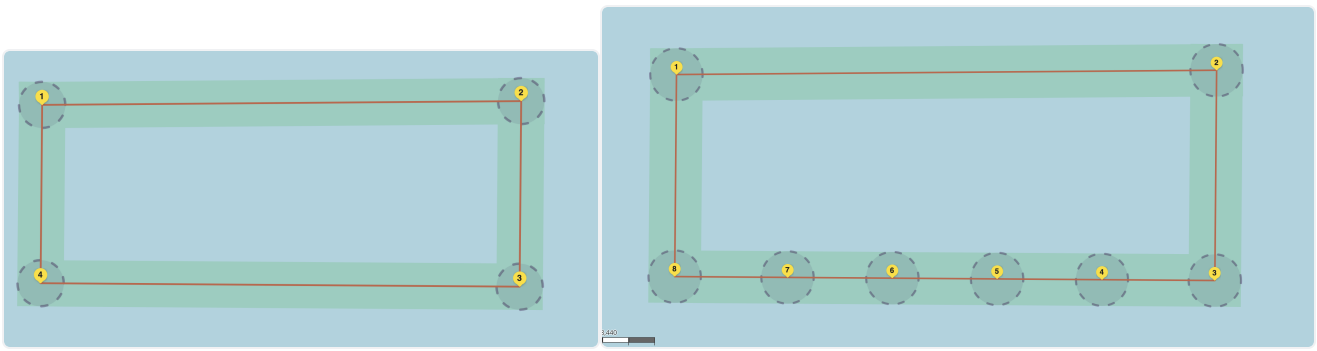


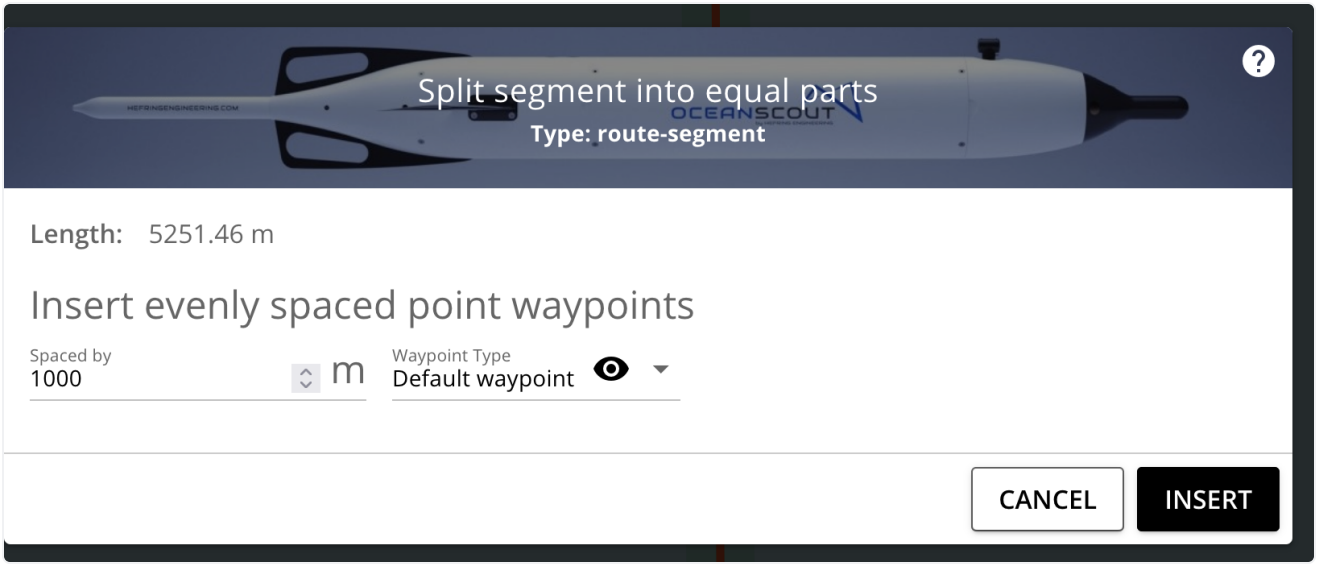
If you enable **Strict Attainment Mode** for a waypoint, the glider will modify its behavior to reach that waypoint exactly. It will reduce yo count on the last dive of the segment to prevent overshooting the attainment radius and ensure that it surfaces inside the circle. It also will refuse to bypass the waypoint even if it over/undershoots several times or is pushed away by current, insisting on reaching the attainment radius before moving on to the next waypoint. On the map, strict attainment radii are darker grey than regular radii.

Segments

Segments are lines between waypoints that the glider travels along. Each segment has settings defining navigation and sensor sampling settings. Click on a segment to define settings.

Tip: Control-clicking a segment line allows you to divide that segment with evenly spaced waypoints if desired.

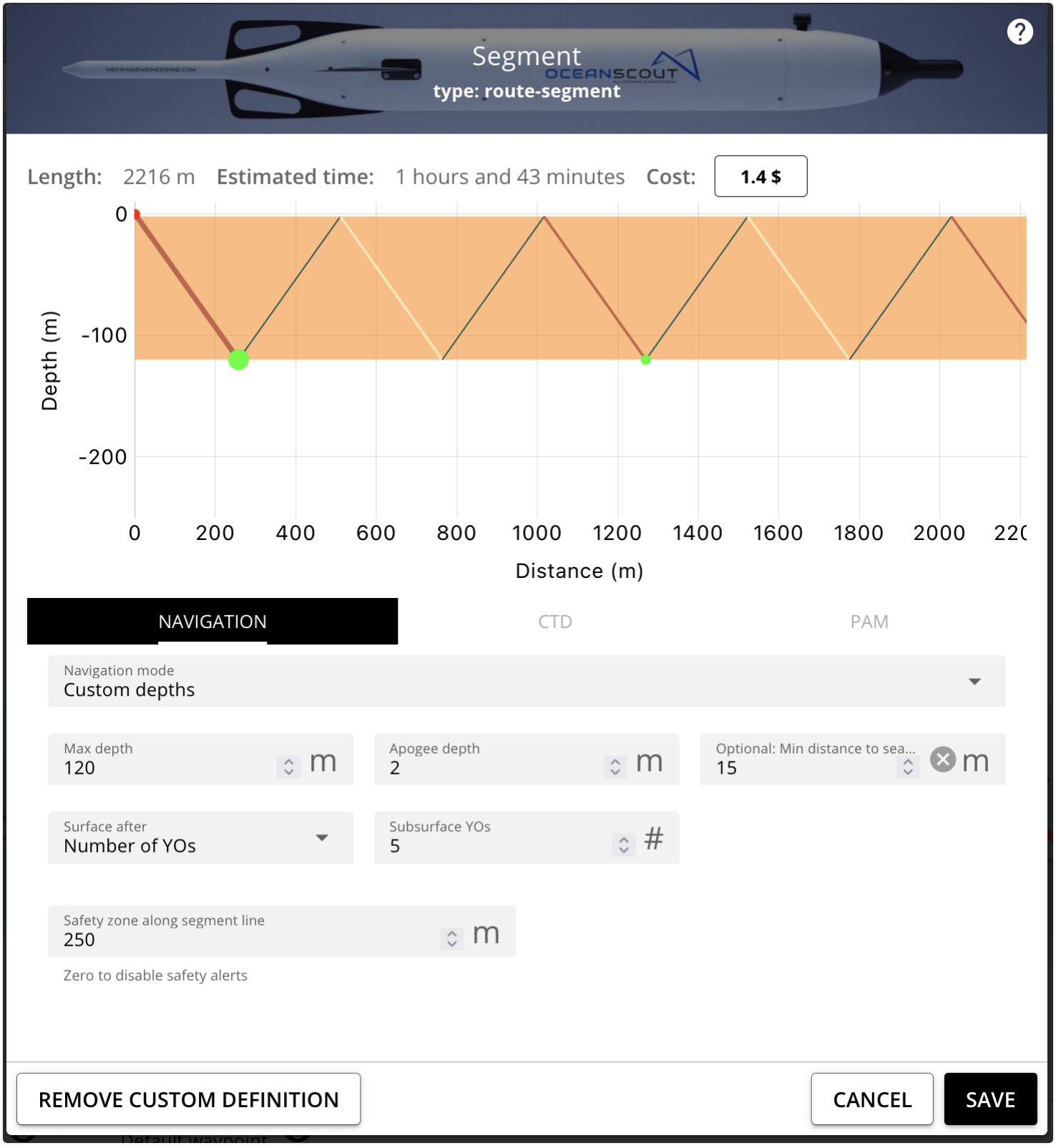




Segment Settings

Each segment has setting definitions for navigation (dive parameters eg. depth, yo count) and for the scientific sensors.

You will need to edit the “Segment Definition” to control the details of the dives and sensing on each segment. You can either choose a preset definition (which can be created, saved, and edited under templates ‘Definitions’ in the menu), or create a new one by selecting the “NEW” button to the right of the definitions. When creating a new definition select “Custom Depths” under the “Navigation Modes” drop down menu, and “Number of Yos” under the “Surface after” menu.



Navigation (dive) Settings:

Max Depth: Depth the glider will attempt to dive to on this segment for every ‘yo’

Apogee Depth: Depth the glider will ascend to before diving again for subsurface yos. Set 1m to come all the way up, or 5-10m if you need to avoid ship traffic or wave action.

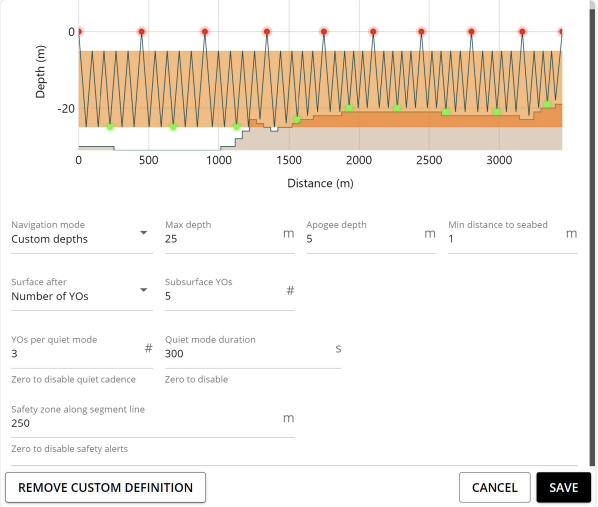
Min Distance to Seabed: Altimeter based turnaround distance, the minimum allowable distance from seafloor before the glider must turn around (i.e. 5 meters will cause the glider to begin ascending once it has reached 4.9 meters off the bottom even if it has not reached the maximum depth). Larger is safer.

Subsurface Yos: Yos performed between surfacings

Yos per Quiet Mode: number of yos performed per quiet mode (i.e. 3 yos means on the third yo a quiet mode will be performed before ascending). A zero disables quiet time.

Quiet Mode Duration: time in seconds the glider will turn off all motors and other sensors to record passive acoustic data (a zero disables this feature).

Safety Zone: A user-defined safe area around the glider's course, if the glider exits this perimeter it will generate an alert.



Conductivity and Temperature Sensor (CTD) settings

CTD Ranges

- From depth / to depth
  - The start and end depth for the range
- Sampling interval
  - Frequency of samples (samples per meter) to be sent within that range.

Default range settings transmit data for every 0.5m between the surface and 10m depth, then every 5m between 10m and 200m.

You can add ranges by clicking the ADD RANGE button, or remove them by clicking the trash can.

CTD Transmit yo settings:

Start at yo index

Interval yo index

Transmit yo

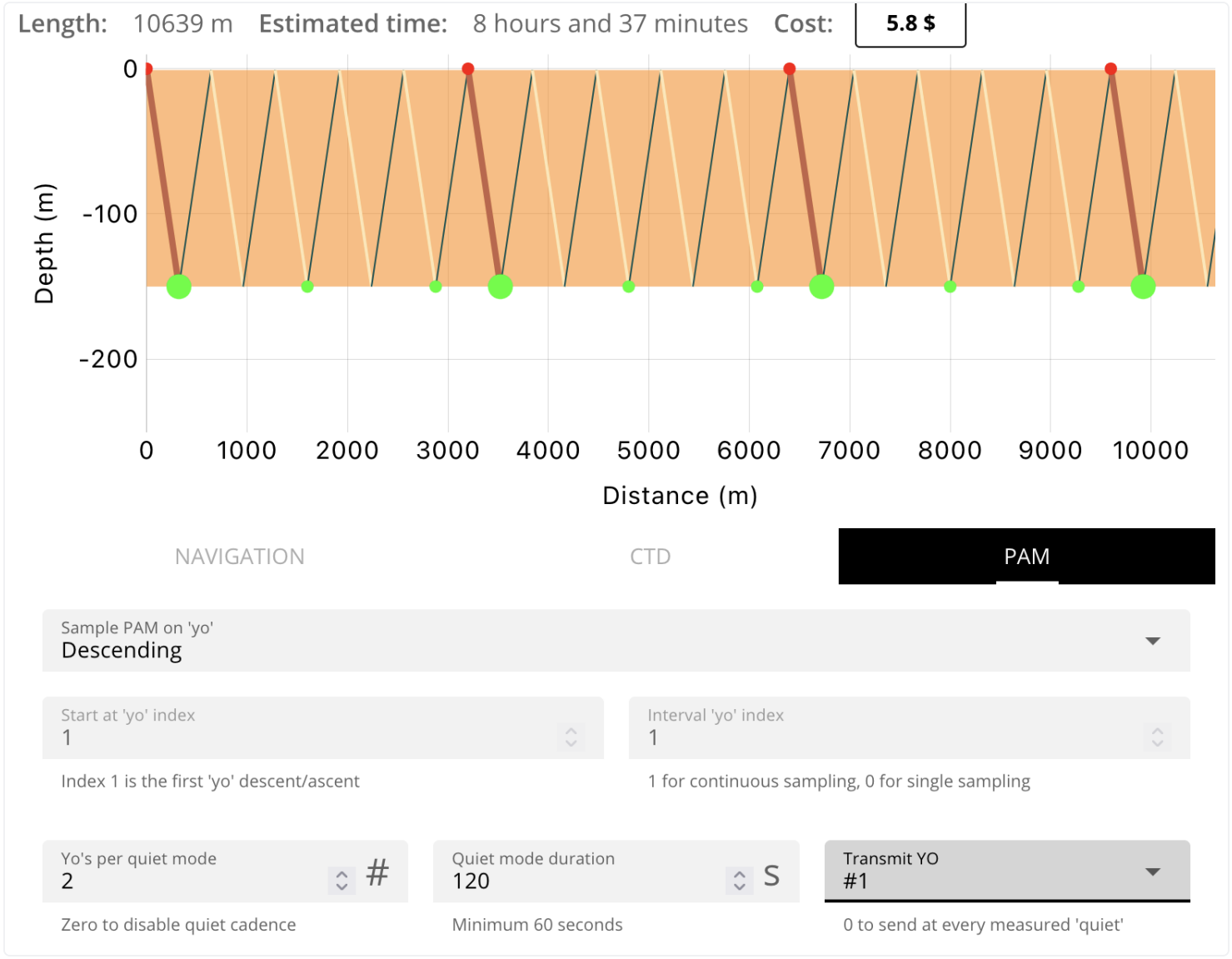
Sample CTD on yo

- Estimated CTD samples to transmit
  - This shows how many CTD samples are sent over Iridium. More samples = more data use.

Passive Acoustic Monitor (PAM) settings

- **Sample PAM on yo:** Defines the section of the yo to record PAM data. Select ascent, descent, or both.
- **Start at yo**:
- **Interval yo**:

- **Quiet Mode** (AKA "quiet times")
  - Quiet times are defined periods where the glider stops and hovers (neutrally buoyant) with motors off and the PAM on, to acquire clean acoustic data without motor or flow noise.
  - As currently implemented, quiet times occur at the bottom of yos. The maximum descent depth setting (or altimeter distance to seafloor) determines where the quiet times will occur.
  - Quiet times are displayed as green dots on the segment preview graphic. All green dots are recorded quiet times. Large green dots are quiet times that will generate and transmit power spectrum data (see transmit yo settings below)



- In quiet mode, the glider can drift. This has several implications:
  - While the glider does achieve neutral buoyancy before stopping the motors, it may still drift up or down several meters during a motors-off quiet period.
  - Do not run quiet times close to the bottom terrain. We recommend keeping the glider at least 15m above the bottom when running quiet times. This can be set using the descent depth and/or minimum distance from seafloor settings under the Navigation tab.
  - Do not run full depth (200m) dives with quiet times, if the glider drifts below 200m it will trigger a "maximum depth exceeded" abort.
  - If you are operating in a strong current, the glider will drift downcurrent while hovering. Long and/or frequent quiet times make it difficult to navigate against heavy currents.

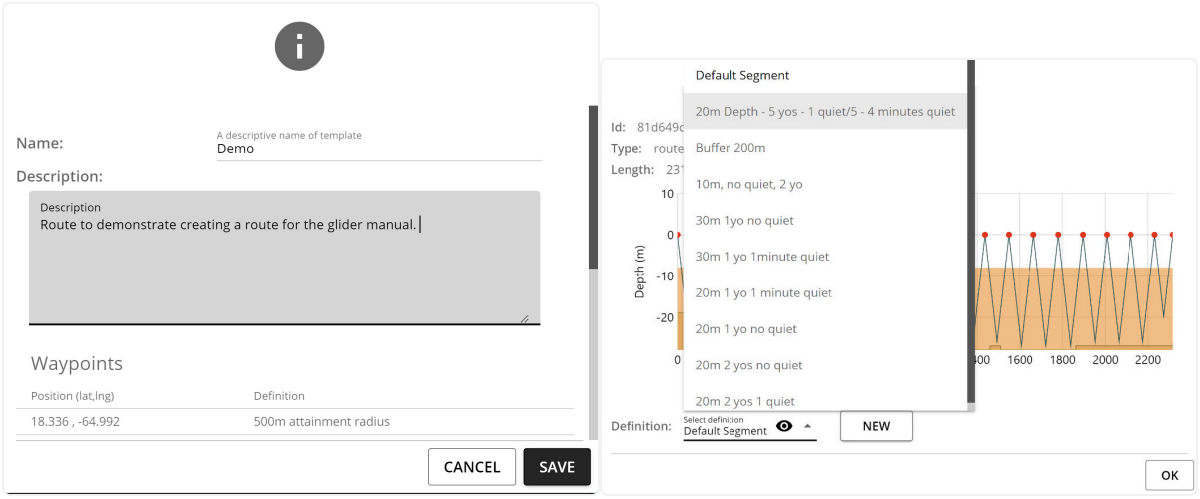
    - Heading may drift while the glider is hovering. This is usually not an issue as the glider turns to correct heading when it starts traveling again. However, on very shallow dives it may not have time to complete these correcting turns. Therefor, long quiet times on very shallow dives may cause erratic travel directions.

- Yos per quiet mode
    - Setting 0
- **Quiet mode duration:** Defines the length of quiet times in seconds. Longer quiet times have more potential for the glider to drift. Generally quiet times are on the order of several minutes. Minimum is 60 seconds.
- **Transmit yo:** Defines the yo for which to generate and transmit a power spectrum preview viewable on cloud.

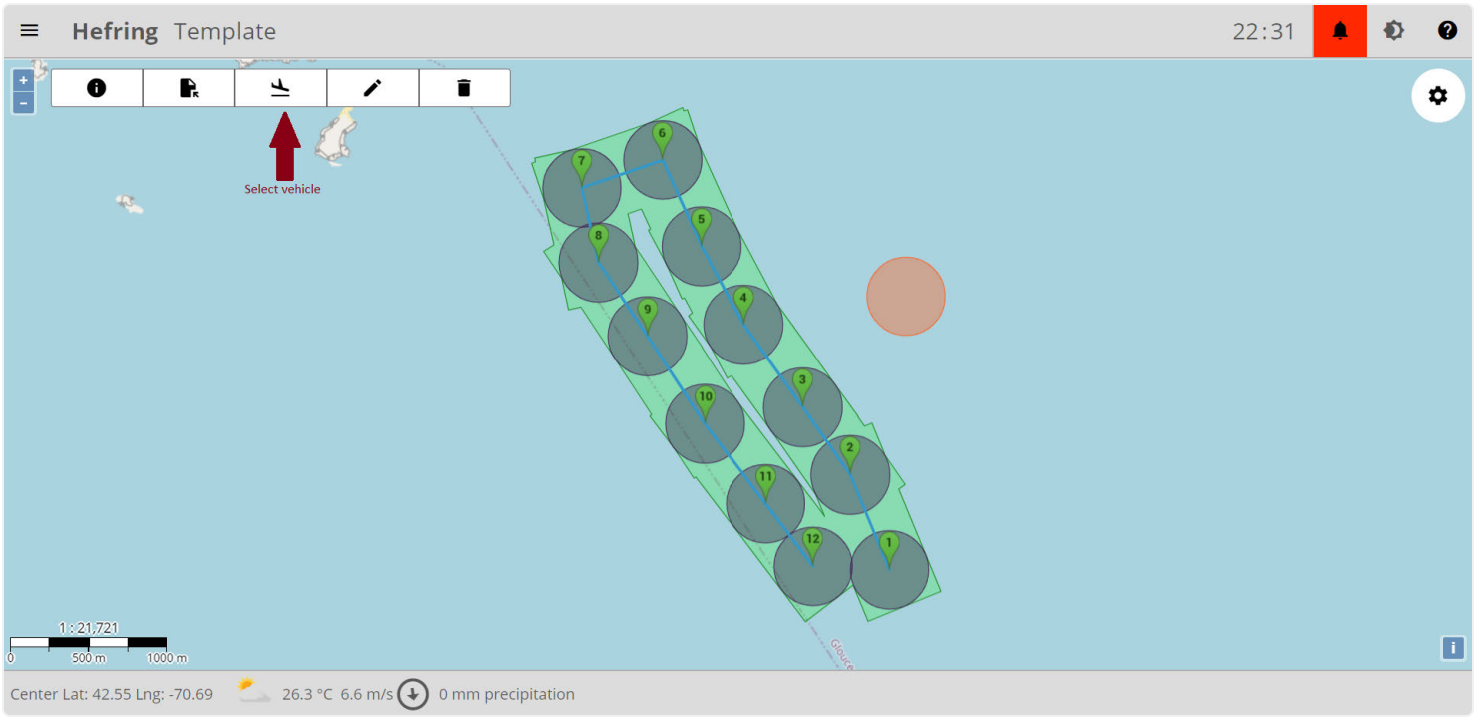
Other settings

Other sampling settings may be enabled here for different functions or payloads.

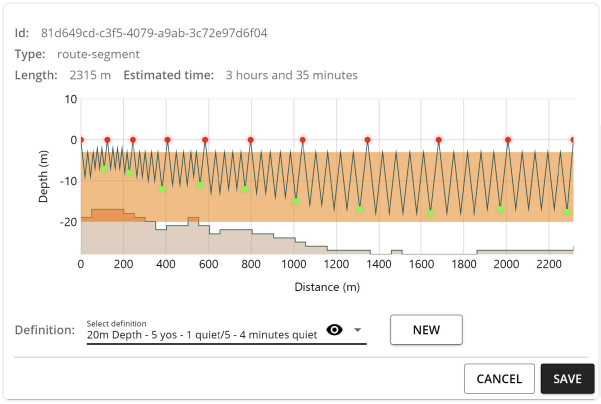
If you don’t want to edit each individual waypoint/segment with the same mission details (same depth, same scientific data, etc.) you can program in definitions for waypoints and segments that you wish to use repeatedly. These can be created and saved under “Templates” → “Definitions” and then accessed when creating routes.

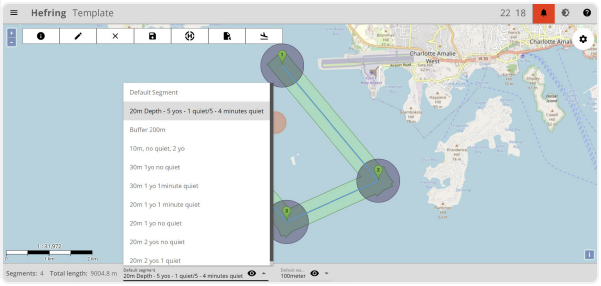


You can also set new routes to be created with set definitions so you don’t have to change each individual waypoint/segment to the given definition.

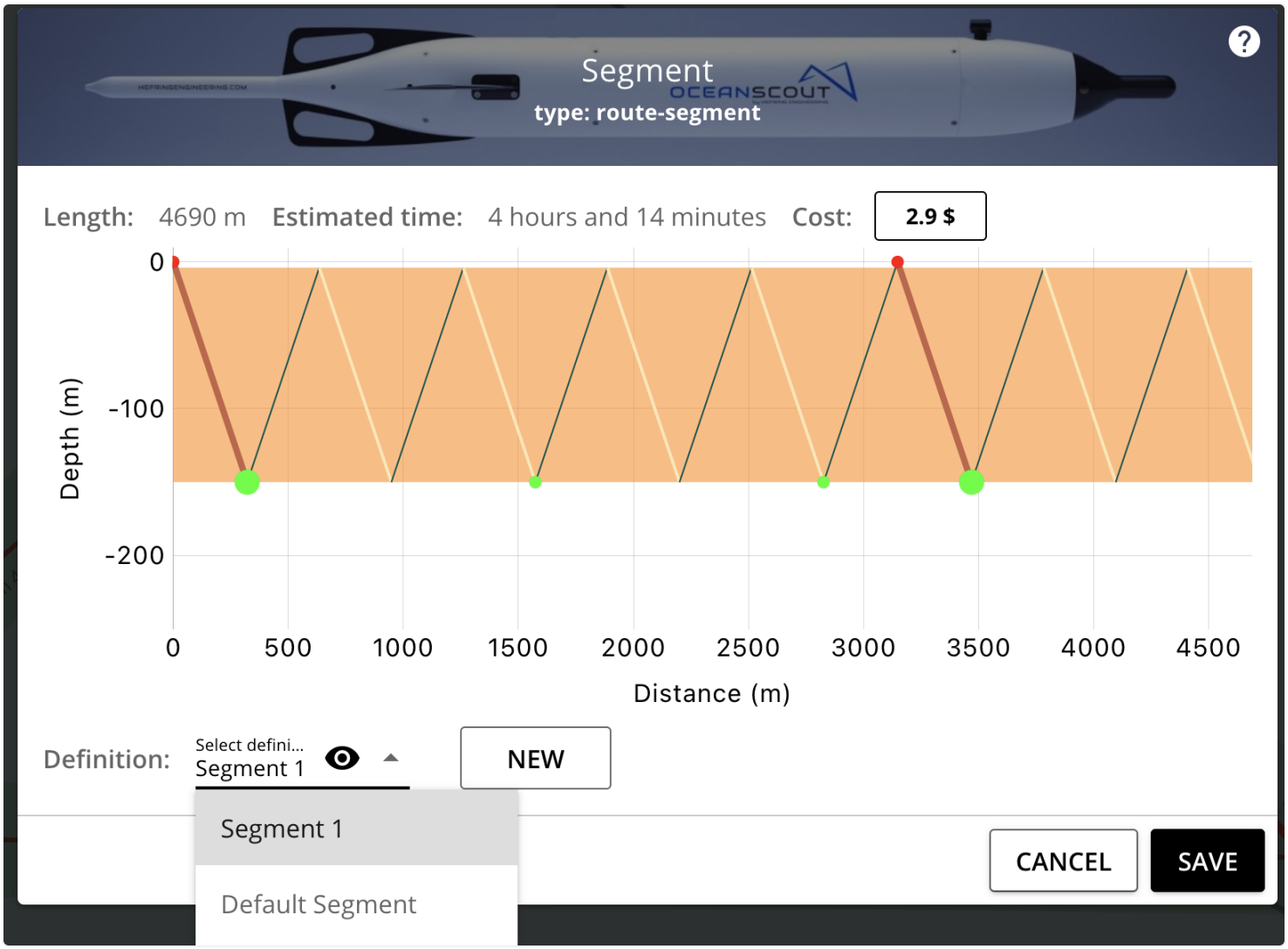


Be sure to save waypoints and segments when you edit them as well as saving the final route when you’re done working on it. You can always edit it again later, but the route must be saved to deploy it to a vehicle.



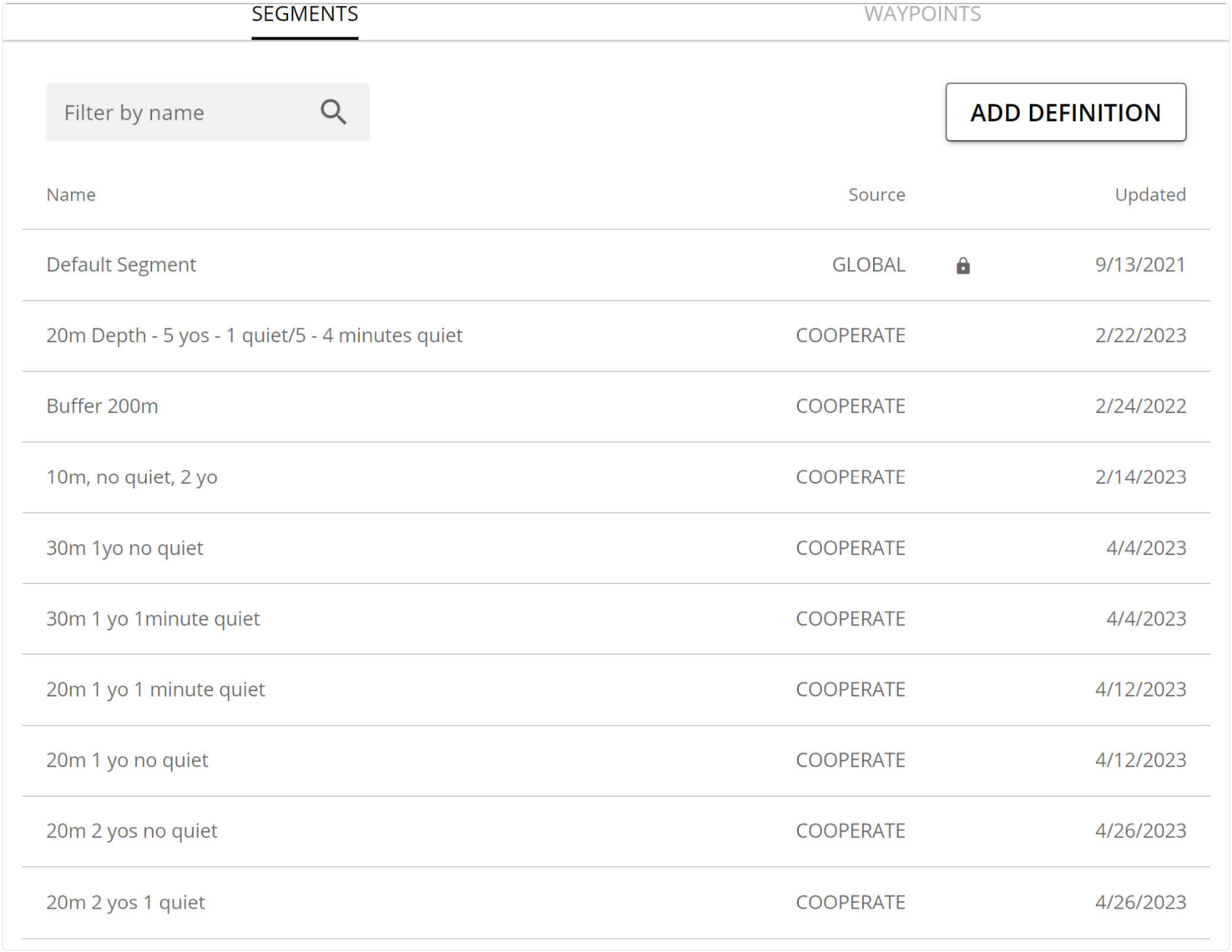


Mission segments can also be set to the same definitions of other previously custom-defined segments of the same mission, even if they are not saved as presets. Simply set the definition for a segment, then select that segment definition ("Segment #") from the dropdown menu on the segment(s) that you would like to match it. This is very useful when creating a mission with many segments that share the same definition.



Running a Deployment

To start a deployment from a saved route, open the route, then click Select Vehicle in the top bar.



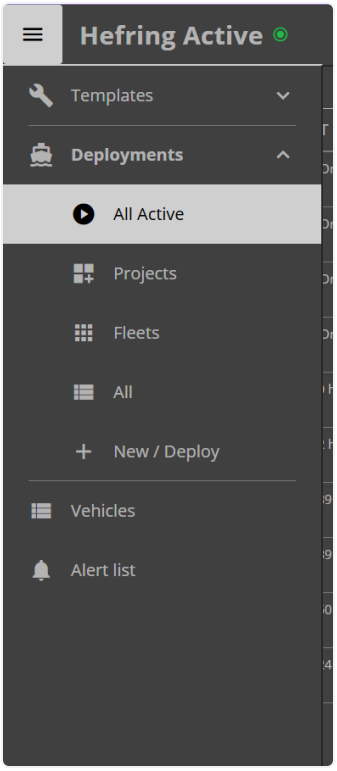
The Deploy Route to Vehicle button has now appeared. Click it.

This will open a pop-up titled ‘Upload route & dive.’ Select the Continue at the bottom.

Viewing deployments

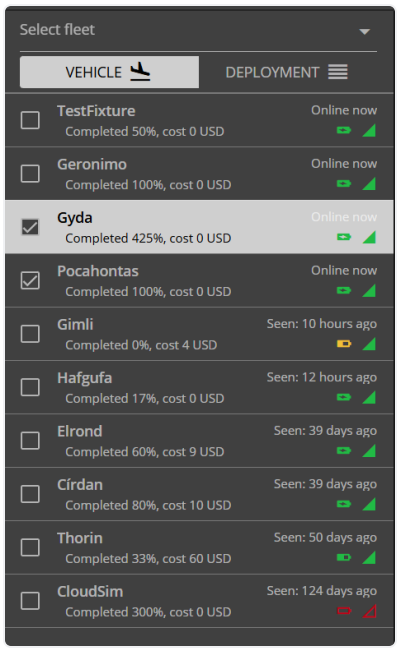
In the main side menu, you have different options for viewing deployments:

- **All Active**: Displays deployments that are currently active.
- **Projects**: Shows deployments grouped by project. You can also choose to view completed deployments.
- **Fleets**: Shows deployments grouped by fleet. You can also choose to view completed deployments.
- **All**: Displays a table with all deployments.



> ¡ We recommend using multiple projects to easily distinguish between deployments.

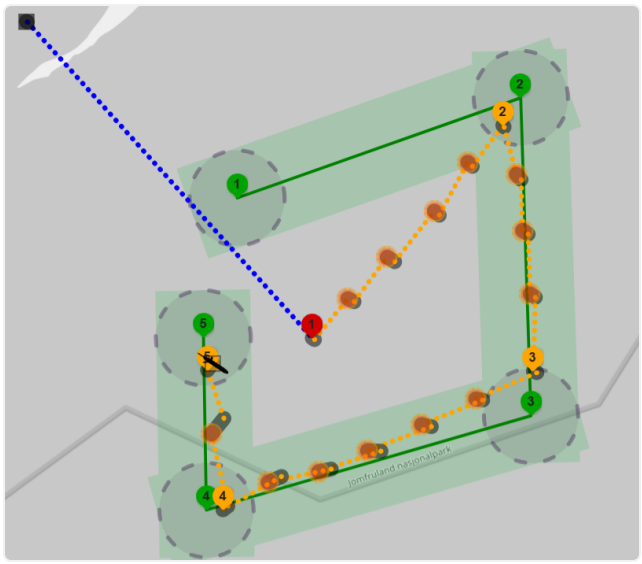
Deployment data



You can view multiple deployments on the same map by using the checkboxes to select the ones you want to see. One of the selected deployments is designated as the main deployment, to which the data and command dialogs are connected. The deployment you select as the main one will have a highlighted background, and its vehicle name and mission name will appear below the command buttons on the map.

> ¡ You can right-click on the deployment-name to zoom the map and display the full extent of the mission.

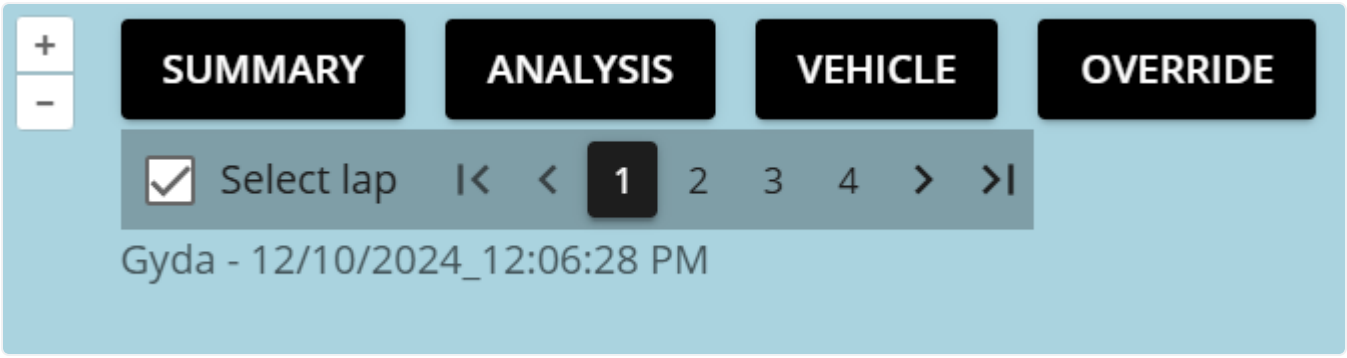
Track and route data



The green line represents the route that the vehicle should follow. The orange line shows the actual track the vehicle is navigating. The blue line indicates the path traveled toward the first start point.

You can click on waypoints, surface points, and segments to view detailed collected data.

Deployment data and command dialogs



At the top of the map, you will find buttons to view deployment data. If the deployment and vehicle are still active, you can manually override the vehicle to navigate differently. If the deployment is set to perform laps, you can also select which lap to display.

> ℹ Please note that these buttons apply only to the main deployment selected in the side menu. The selected main deployment name and vehicle name are displayed below the controls.

- **Summary**: Displays data for the entire deployment.
- **Analysis**: Allows you to select specific parts of the deployment to plot data.
- **Vehicle**: Shows information about the active vehicle. This is only visible if the deployment is still active.
- **Override**: Provides commands to manually navigate the vehicle. This is only visible if the deployment is still active.