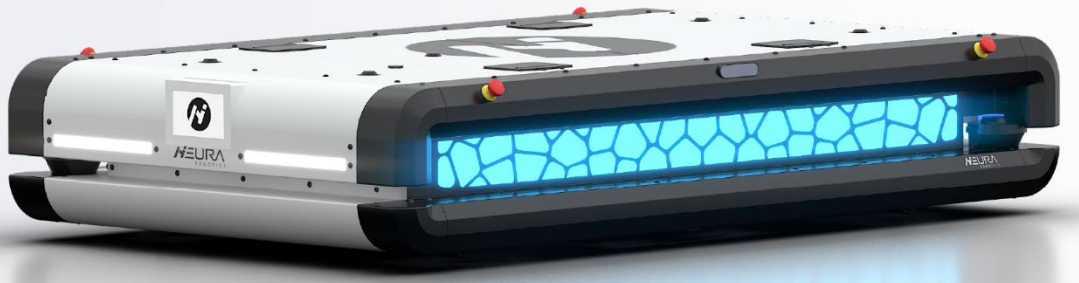
NEURA ROBOTICS

MAV®



Quick Start Guide

Edition : 02 / 10.2022
Language EN

1 INTRODUCING MAV SOFTWARE

NEURA Robotics works together with Nativec System to automate MAV. Thanks to the Navitec experience and NEURA Know How and innovative thinking, MAV can work in every possible application.

To automate MAV, a natural feature navigation, also called SLAM (simultaneous localization and mapping) navigation, is used. Laser scanners identify objects in the environment and the system compares these measurements with previously created map points to position and navigate MAV.

If needed, a highly flexible fleet management solution is available. High traffic density, dead-lock free, complex route systems, precise docking, automatic pallet/load finding. Fully integrated with the factory environment.

Different vehicle types and third-party vehicles in the same system are possible (VDA 5050).

In this user guide you will fine only a short Introduction about the software. This introduction will help you to make the first steps using and programming MAV.

The complete Software Guides are available:

- Navithor Tools
- Navitrol Monitor
- Navitor Fleet

Please contact NEURA Robotics or your Integrator to get the Software guides if needed.

1.1. Connecting to MAV

Step1: A connection to the vehicle's internal router must be established.

- Connect your system (computer, cell phone, etc) with the WiFi of MAV. The WiFi name corresponds to the MAV Serial number (e.g.: NR226851). The Serial number can be found in the identification plate.
- MAV WiFi Password: **NeuraRobotics**

Step2: Go to network settings and reconfigure the "IPV4" your computer using the following IP address:

- IP address: 10.10.6.157
- Subnet mask: leave empty (it will be filled in automatically)
- Default gateway: leave empty (it results from establishing the WiFi connection)

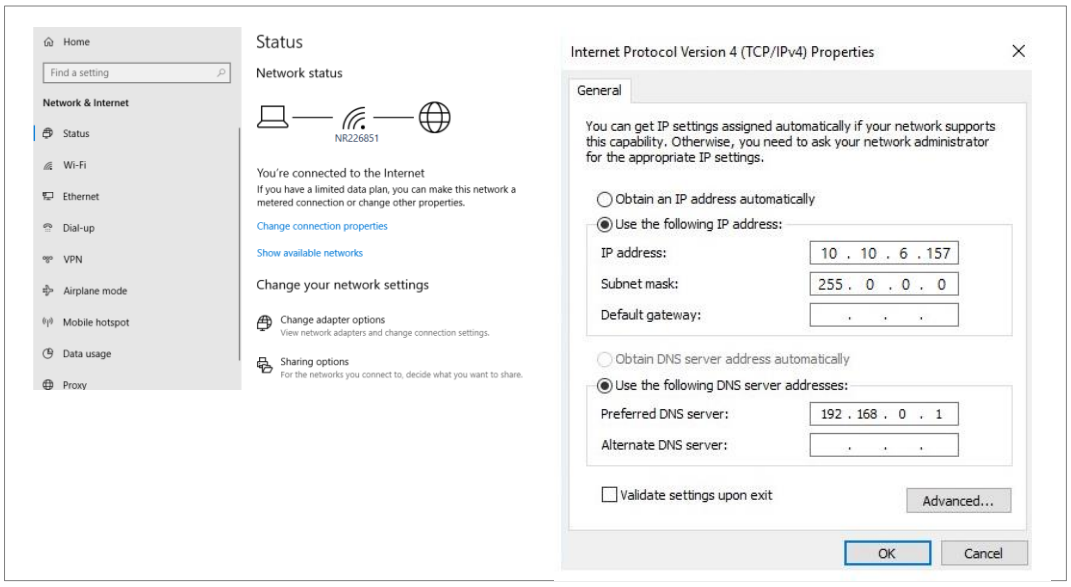


Fig. 1: IPV4 Parameter.

Step3: Open your Browser and enter the following IP 10.10.6.100 in the addres bar.

The System Page opens and the AGV can be moved manually after the Request Control-> Manual "on" is activated (in the upper right corner)

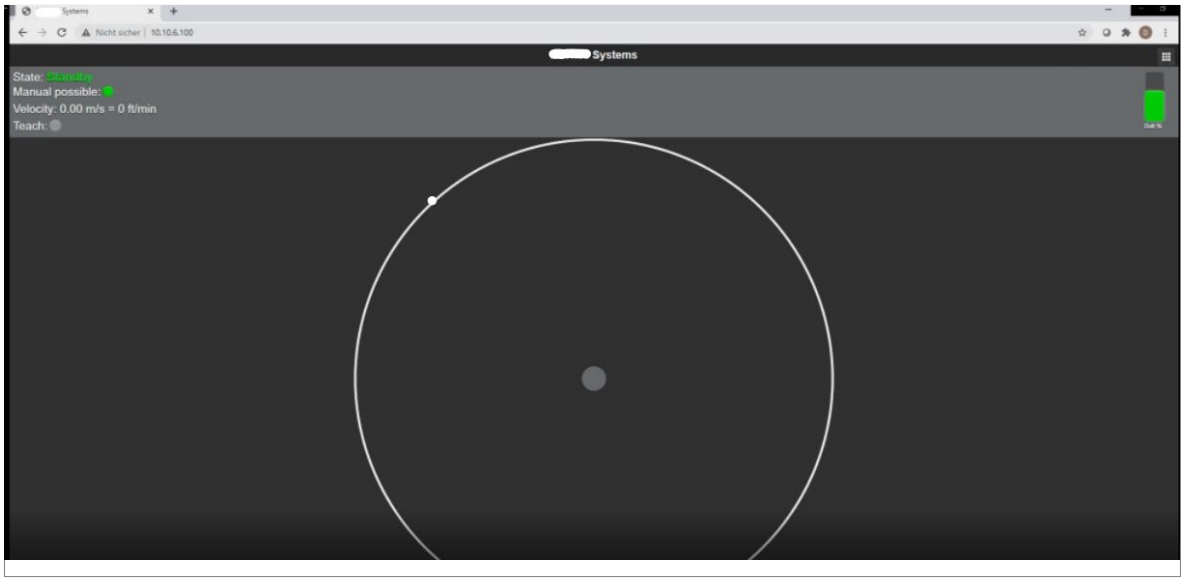


Fig. 2: System Page in the Web Browser.

⚠ WARNING

Before driving MAV following checks and activities must be carried out:

- MAV has no visible damage.
- No loose or broken parts. These can cause serious injury during startup
- Guards are fully functional and properly installed.
- Persons are outside the danger zone.
- Identification plate corresponds to the purchased product.

Step4: Go back to the main window and use your finger or mouse to move MAV.

NOTE: be careful not to accelerate too fast.The finger swipe must be smooth.

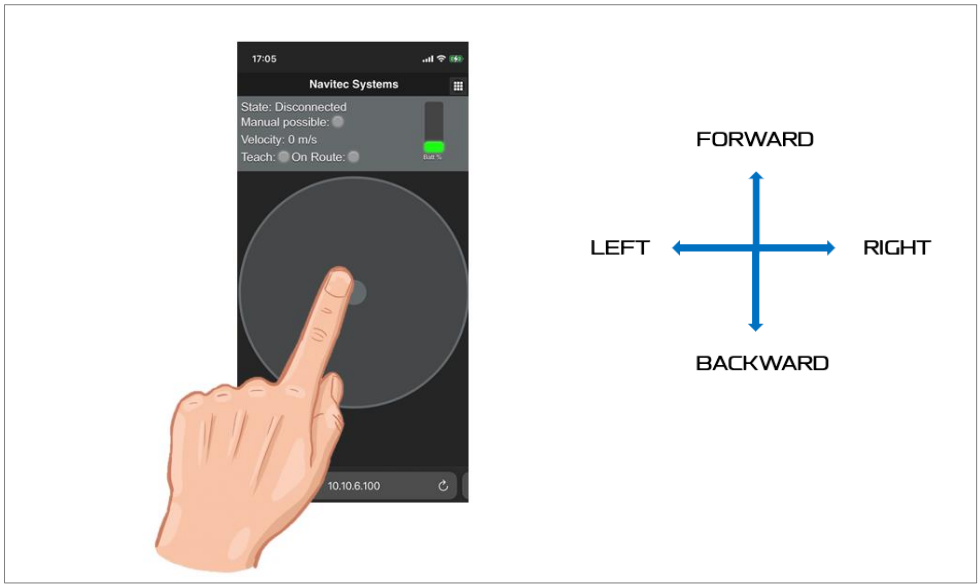


Fig. 3: Moving MAV Manually

Step5: The enviroment can be scanned and saved to be used in the route planning as a map. To do that the software must be in "Teach Mode".

- In the same "Request Control Menu", activate "Teach" to start saving the enviroment.
- Move MAV through the area you want to scan to later create a map. The vehicle has to be moved manually in the entire environment in order to generate the data. If the "non-stop" is activated the teach process must be started again.
- Stop the "Teach Mode" when the desire environment is scanned. The data is saved as a file and contains all relevant information.

An additional Windows based **Tool** is used to export the recorded data to a model.

Fig. 4: Request Control Menu

1.2. Introducing to Navithor Tools

1.2.1. Creating a new Project

Step1: Open the software Navithor tools: "Navithor tool.exe."
Step2: The login window will show up. Default password for login is **ntnavitec**.
The password can be reset or changed if needed.

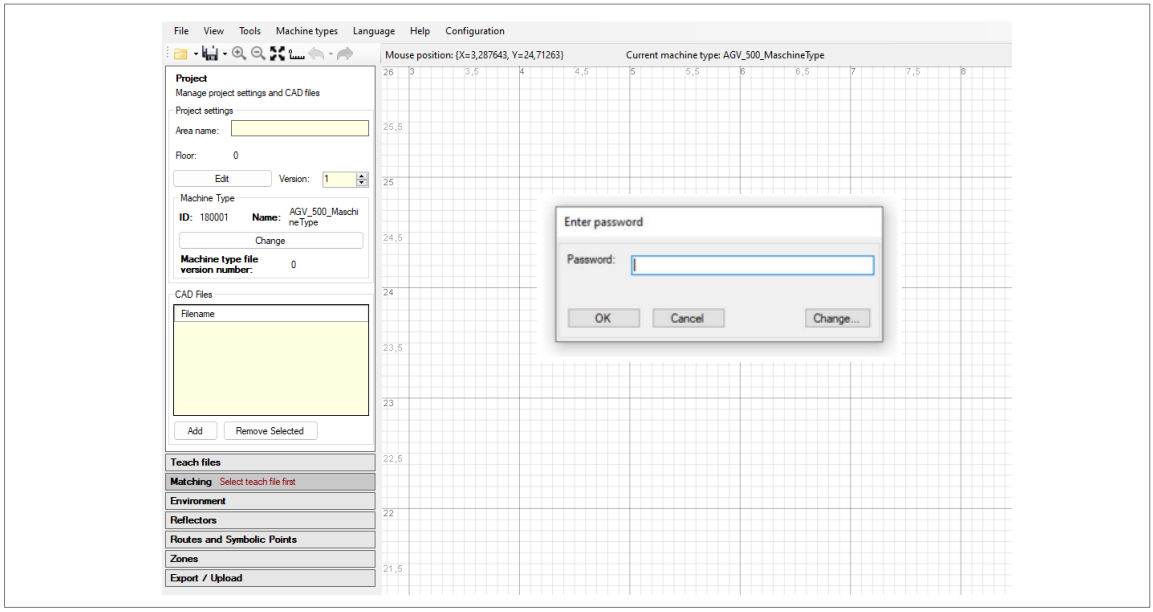


Fig. 5: Navithor User Interface.

Step2: The login window will show up. Default password for login is **ntnavitec**.
The password can be reset or changed if needed.

Step3: Open or create a new Project.

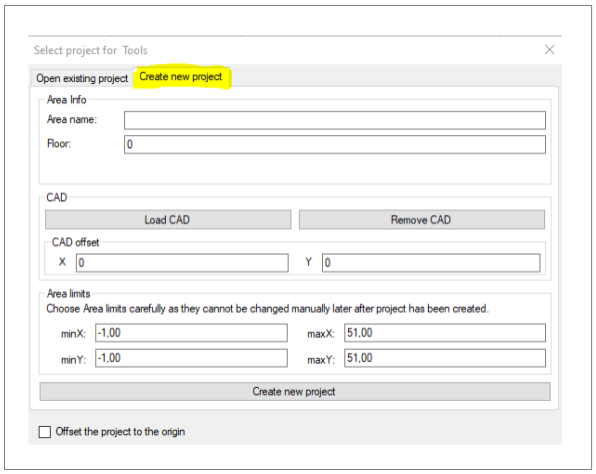


Fig. 6: Project window .

Step 4: Assign a name; define area limits and create new project.

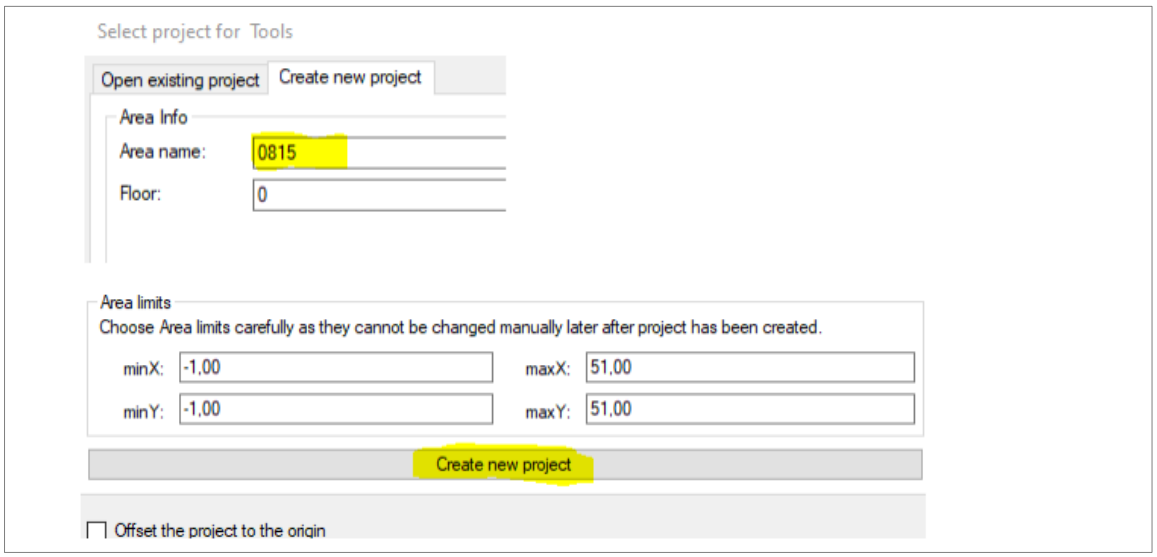


Fig. 7: Create a Project.

Step 5: The machine parameters must be selected an added into the project. Select the parameters according to your AGV when the program ask for it.

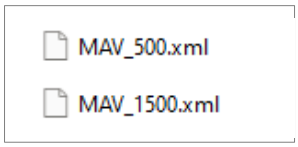


Fig. 8: Machine Parameter

1.2.2. Selecting and Loading Teach files from AGV

Step 1: After scanning an area (as explained in 6.1.1 , step 5), go to the Teach file Menu and load the teach files from the AGV .

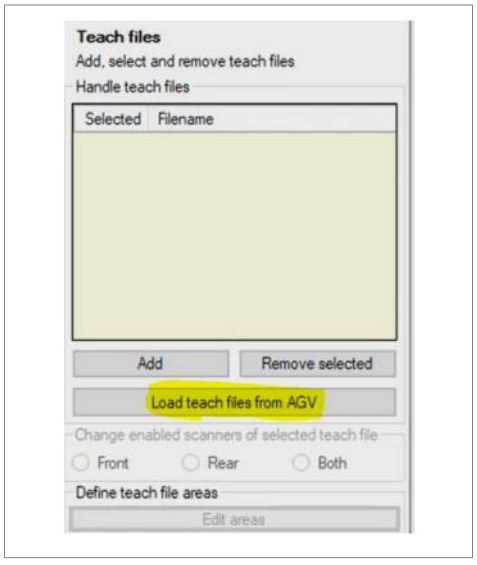


Fig. 9: Teach files menu

Step 2: Select the corresponding AGV for your project and press “Connect and Search for files”.

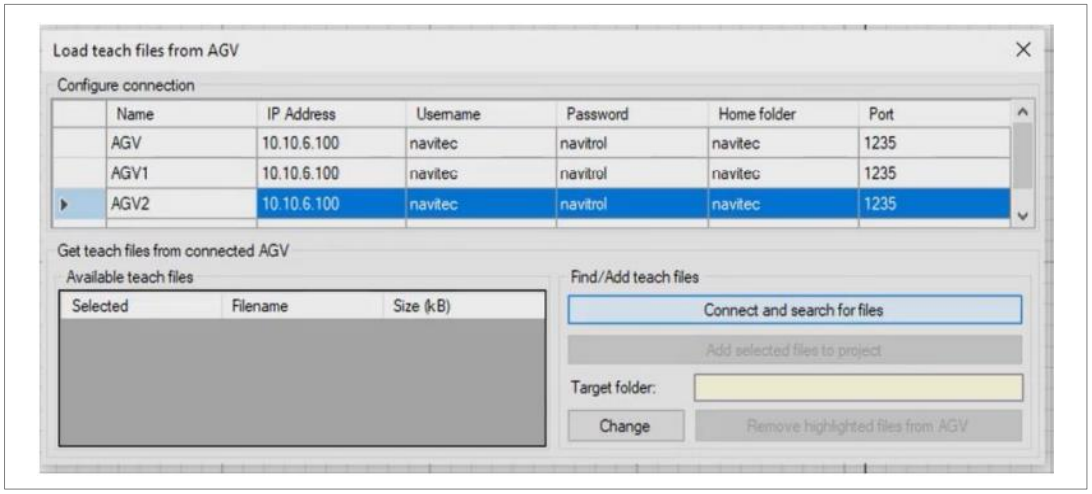


Fig. 10: Teach files window

Step 3: Select the desired map (usually is the newest one) and "add selected files to project". Be careful to select only one map.

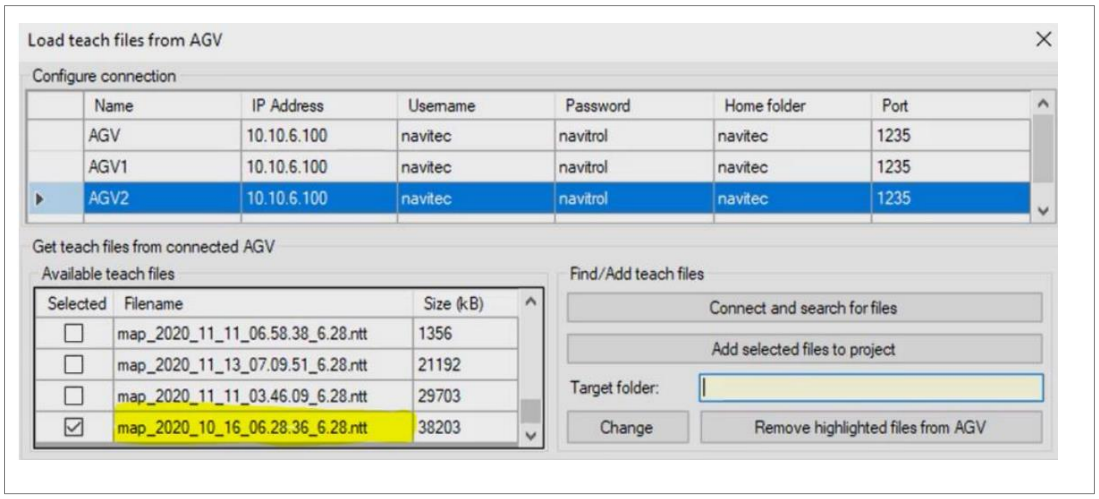


Fig. 11: Selecting teach files for the project.

This procese could last a couple of minutes

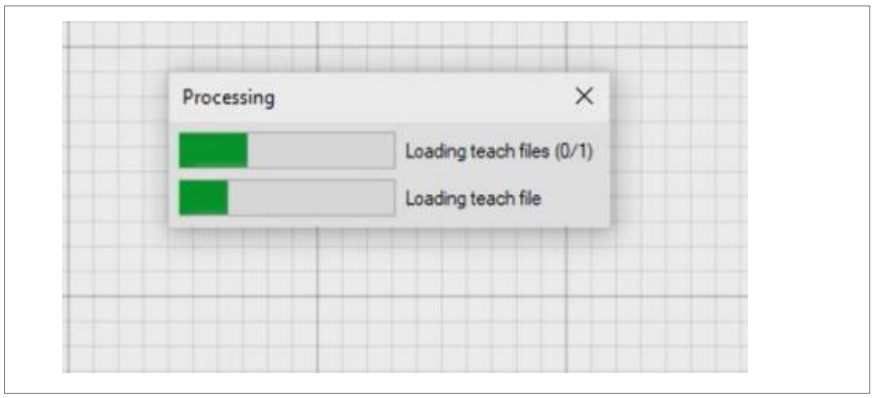


Fig. 12: Loading a map to the project.

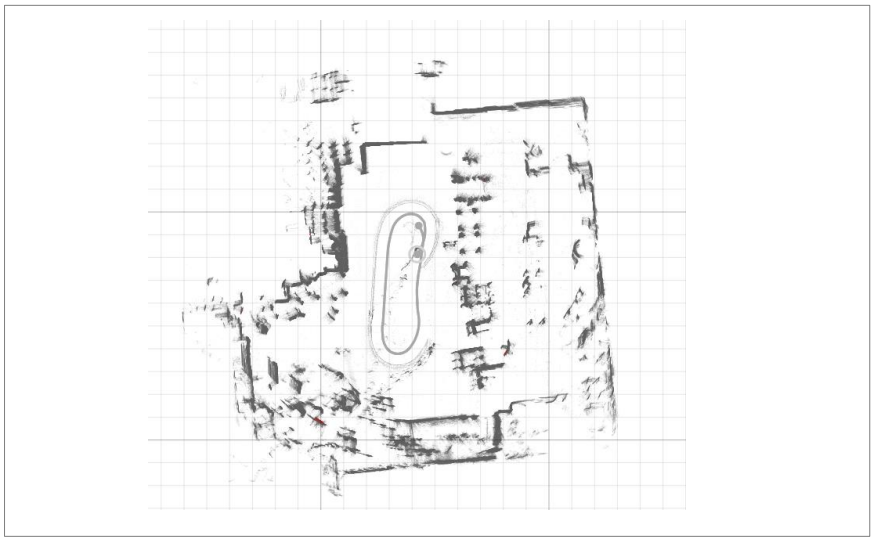


Fig. 13: Selected teach files from the AGV.

1.2.3. Matching and Generating Environment Points

Matching

The purpose of matching is to create uniform map from the raw measurements. Select “Matching” in the menu.

In the menu the option “Inter Match” can be selected as standard for the uncomplicated maps:

- Select the map with doble click. The completely scann must turn pink.
- Click “intern Match” and after some seconds you can select “finalize selected”.

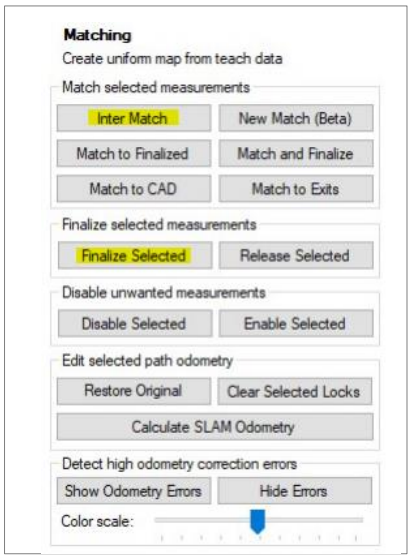


Fig. 14: Matching Menu.

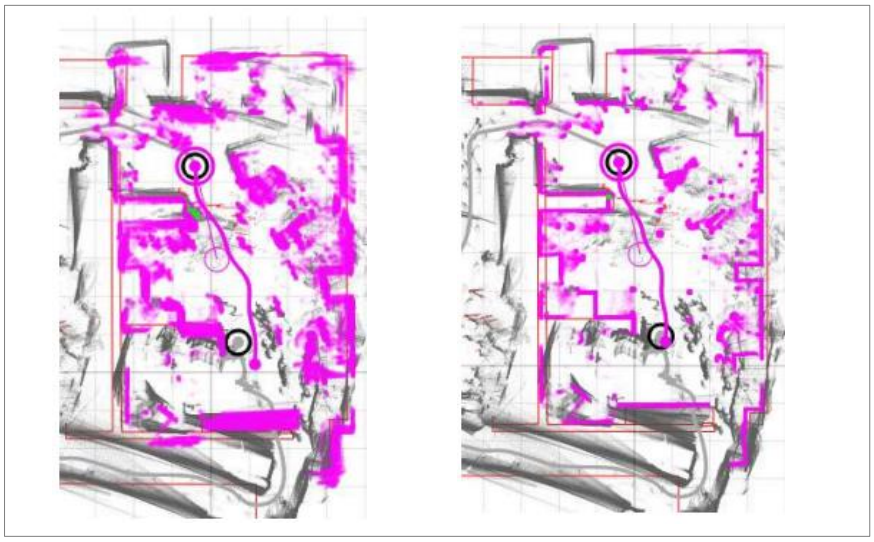


Fig. 15: Data without matching (left). Data with matching (right).

Environment

Environment point generation is the next step after the measurements have been matched. Select “Environment” in the menu.

Step 1: Select Generate Environment > Generate.

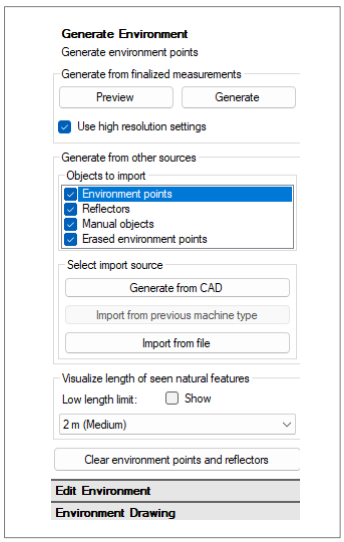


Fig. 16: Environment Menu.

Step 2: Edit environment> Manual erase tools> Erase: It is important to remove all contours that do not correspond to fixed objects. For example: persons, chairs, etc. This will avoid the software looking for non-existent objects when moving.

NOTE: the erased areas will only be deleted internally in the software.

Fig. 17: Erase unrelevant areas.

1.2.4. Routes and Symbolic Points

Routes and Symbolic points menu are used to configure what routes AGV's are allowed to drive, adding speed limit to specific route segment(s) and defining symbolic points to represent interactable locations.

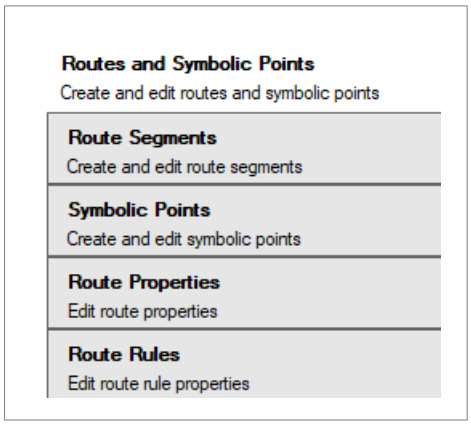


Fig. 18: Route and Simbolic Points.

Route segments

Routes consist of nodes and segments between nodes. Each node may be linked with segments to one or several other nodes. Nodes are defined by two properties, location and direction. When two nodes are linked, a route segment is automatically formed between the nodes.

- Select "Draw Routes" and create a segments

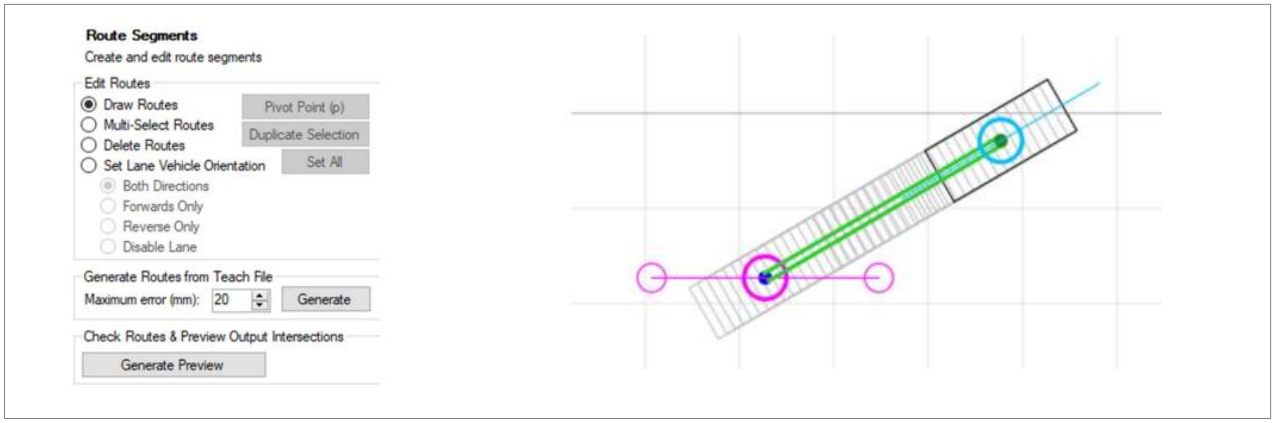


Fig. 19: Route Segments Menu (left), creating a segment (right).

- If no node is selected, clicking empty space creates a new node. A node can be selected by clicking it and deselected by clicking it again.
- When a node is selected its location can be changed by dragging the node. The direction of a selected node can be rotated by dragging the direction vector of the node.

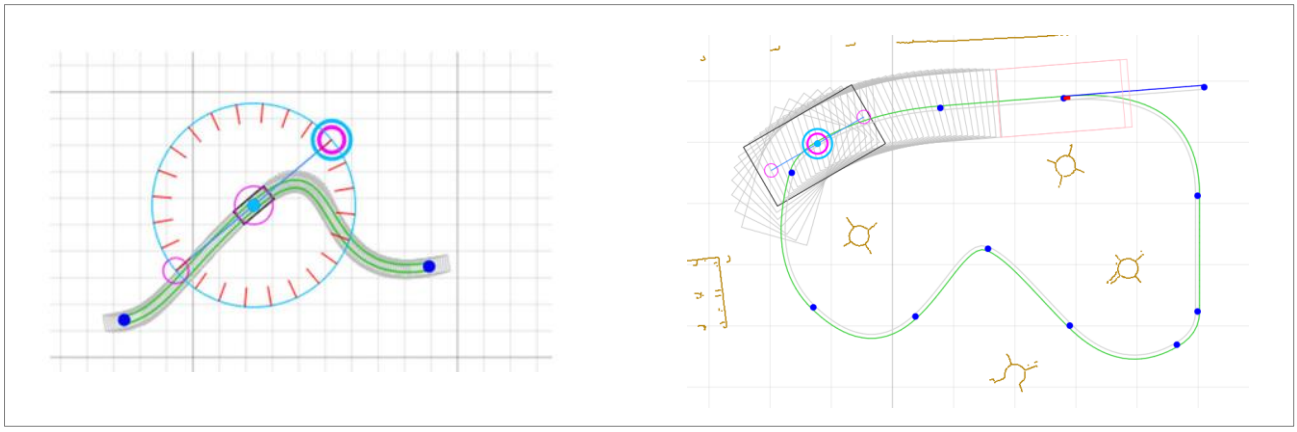


Fig. 20: Rotating a node (left), Moving a node on segment (right).

- Each route segment can be driven in different directions.
- Different route properties and rules can be modify as well in the options.

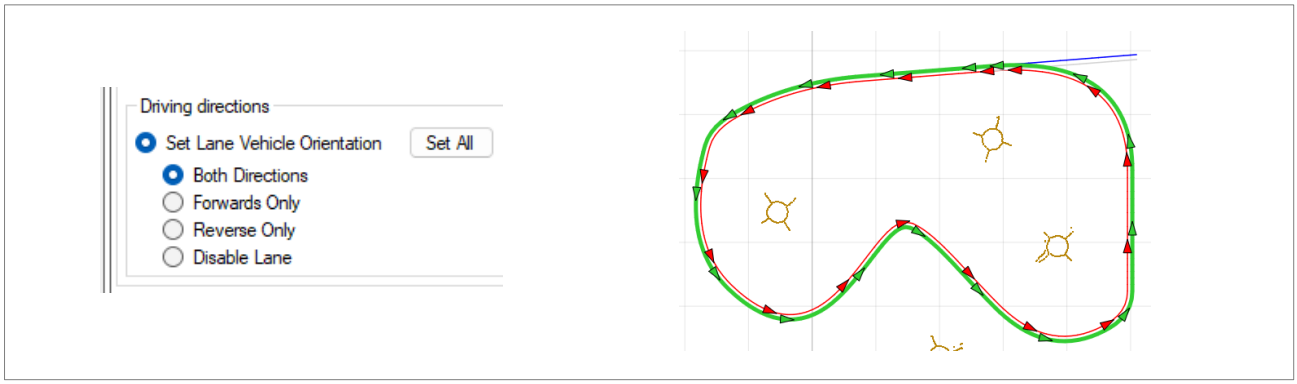


Fig. 21: Segments with a reverse and a forward direction.

Symbolic Points

Symbolic points are the target points to which vehicles can be driven to and where various actions can be executed.

- A new symbolic point is created by clicking on a route node.

- Symbolic point properties can be changed via the tool menu on the left.

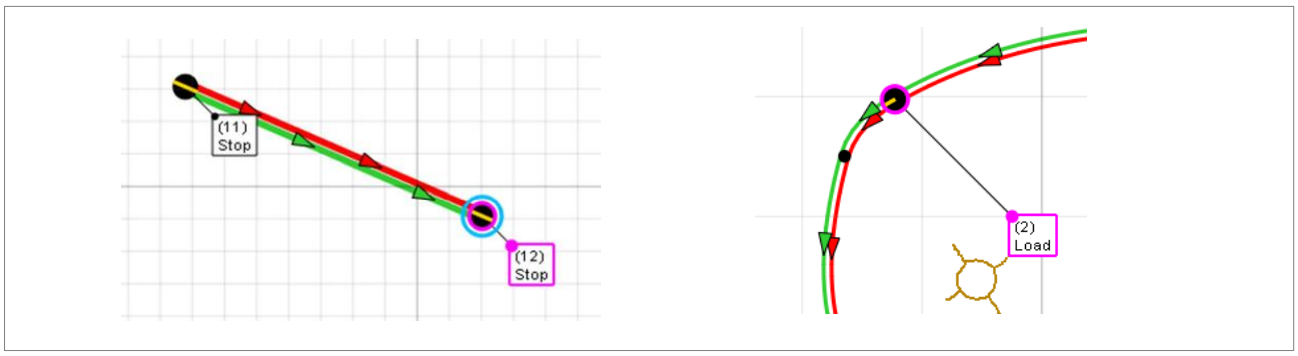


Fig. 22: Segments with simbolic points.

1.2.5. Export /Upload

When the driving area is defined, data needs to be transferred to Navitrol/MAV.

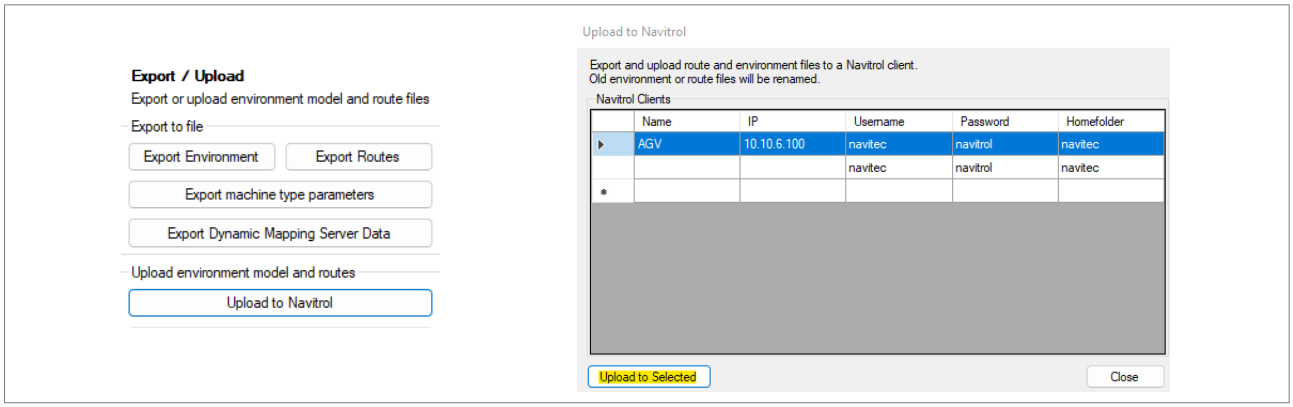


Fig. 23: Uploading to Navitrol.

1.3. Introducing to Navitrol Monitor

1.3.1. Starting Program and connecting to MAV

Step1: Open the software Navitrol tools: "NavitrolMonitor.exe."

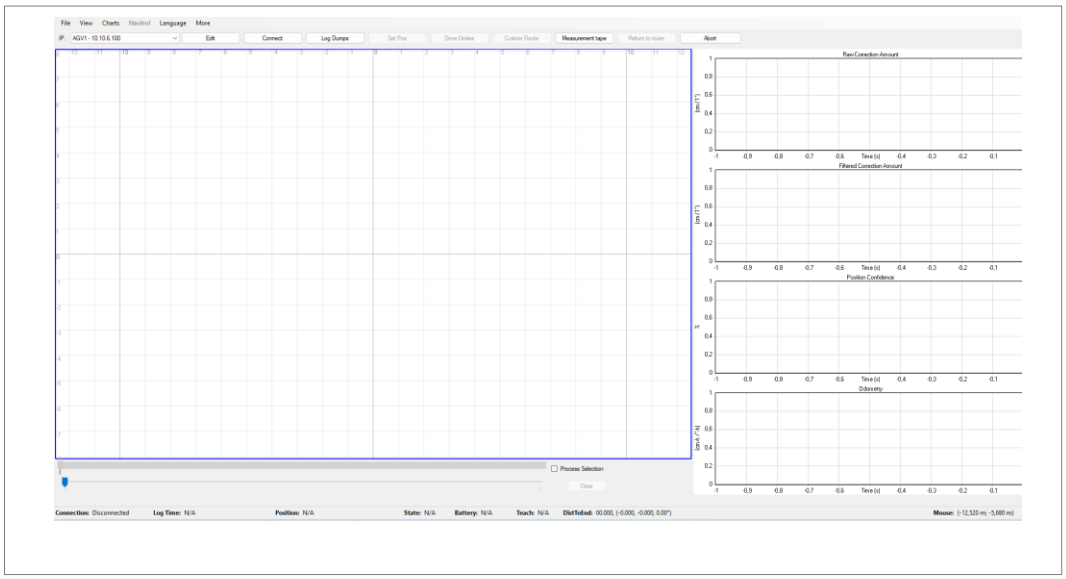


Fig. 24: Navitrol User Interface.

Step2: The login window will show up. Default password for login is **ntnavitec**.

The password can be reset or changed if needed.

Step3: Set Name and IP for each AGV you want to connect. IP addresses can be added or modified also later.

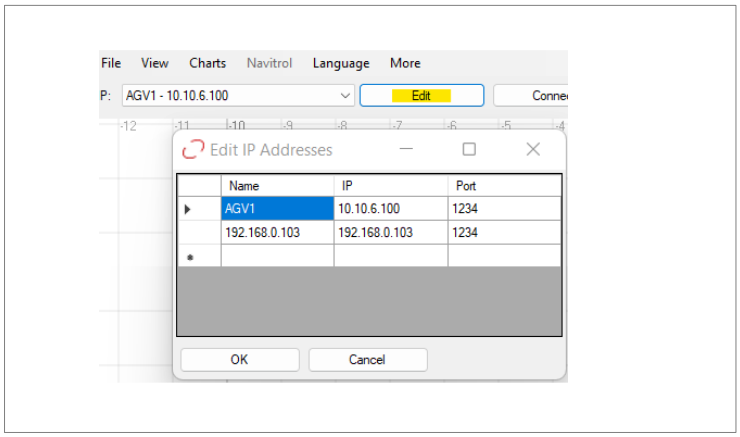


Fig. 25: Editing AGV Parameters.

Step4: Connect to MAV. The connection status can be verified in the lower left corner of the window.

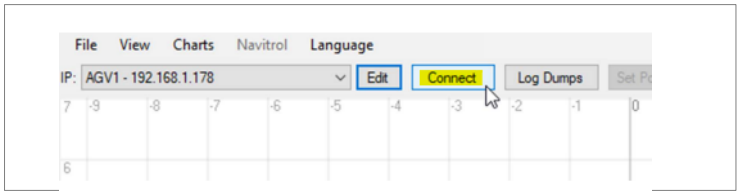


Fig. 26: Connecting to MAV.

Step5: the initial position from the AGV can be set with the “Set Pos” Button.

Pressing the button causes monitor to go into state where machine location can be shown on the map by pressing the right mouse button. Position can be rotated by keeping the right mouse button pressed.

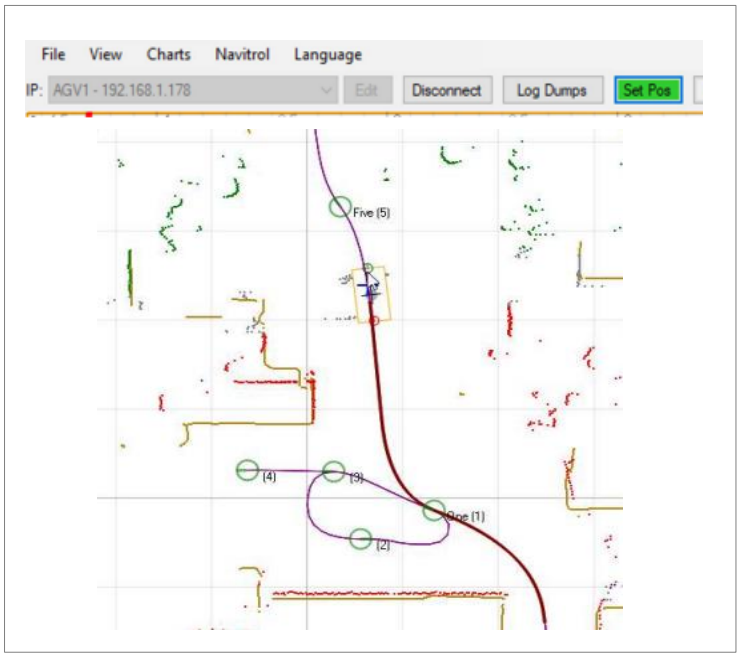


Fig. 27: Setting Position.

Make sure that the installation space according to the robot working space and the size and specification of the electrical control box.

1.3.2. Driving Vehicle

Drive Orders

Step1: with the menu “driving orders” is possible to drive the vehicle.

- Moving the mouse on the map shows whether the route to the mouse location can be found.
- This software can be used to make a production simulation. Stopping points and route points can be selected.
- Wait time at each location can be edited. Drive can be started with Drive button and stopped with Stop button.

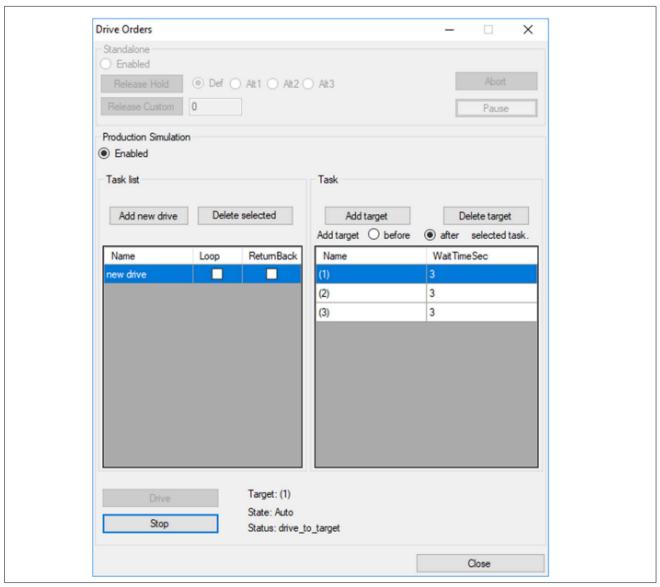


Fig. 28: Drive Orders options.

Custom Route

Pressing Custom Route opens a separate window where the speed can be selected and with right click on the map to a route can be created.

Fig. 29: Custome Route.

NOTICE

Improper use of the AGV

► This User Guide gives only a small introduction about the use of the software. If more detailed Info is require please consult the Software user guide.

DANGER

Improper handling of the AGV

Improper handling of the device can lead to serious injuries.

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