Getting Started Guide
AIV OMRON LD-60

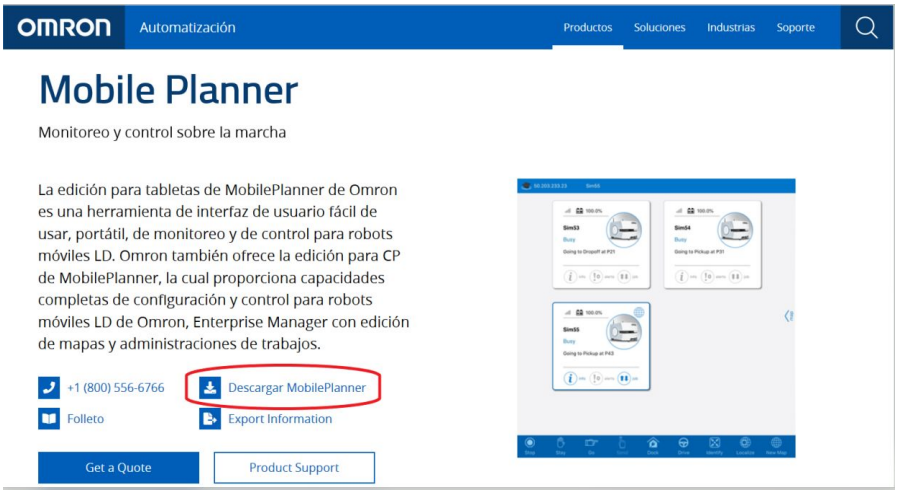
1. Setup

1.1 Software (Mobile Planner)

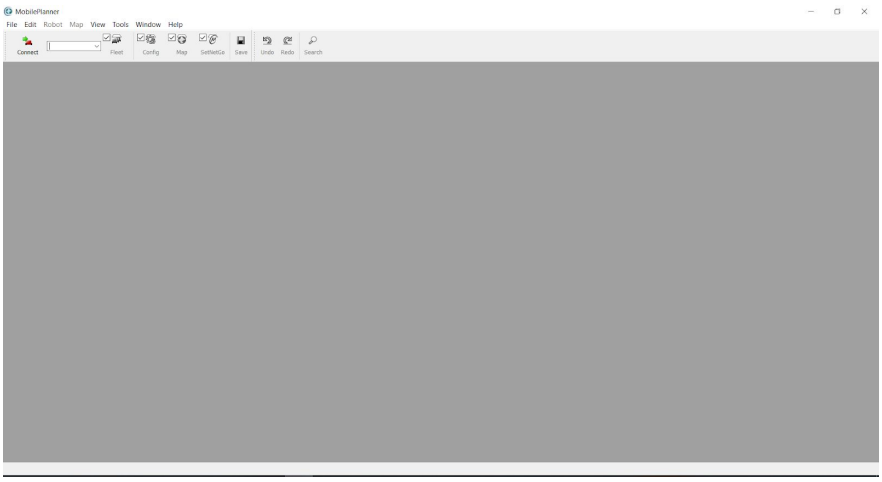
The OMRON AIV LD-60 works with a software called **Mobile Planner**. This can be downloaded in the following link:

https://automation.omron.com/es/mx/products/family/Mobile%20Planner

The web page should look as follows and click on the option “Descargar MobilePlanner”:



Unzip the downloaded file and proceed with the installation of the software. This will take a couple of minutes. Once the installation is concluded look for the MobilePlanner application and execute it. The application should look as follows:



1.2 OMRON LD-06 Mobile Basic Components

The robot is divided into three parts (**For more details of the components, please refer to the official manual of the OMRON LD-60**):

- **Joystick:** Allows the robot to be operated manually by the user and it works by pressing the ***Trigger Button*** and move the **Drive Button** to the desired direction. Additionally it is possible to regulate the velocity of the robot with the **Speed Button.** This is particularly useful to perform the **Mapping** of the environment and also to move the robot from one place to another without using the **MobilePlanner**.

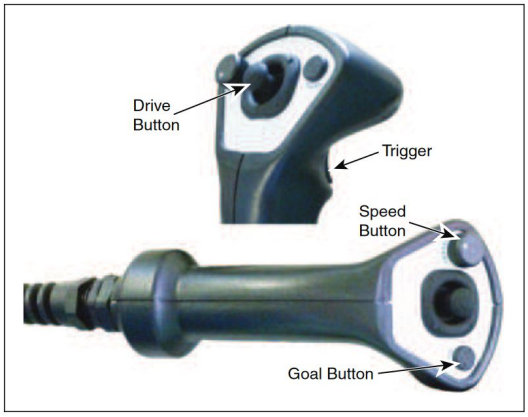


Figure 7-9. Joystick Buttons and Trigger

- **Dock Station:** The dock station charges the battery of the robot. This can be done manually (By pressing the **Release Brake Button**) or by a command (**GotoDockStation** in the MobilePlanner).

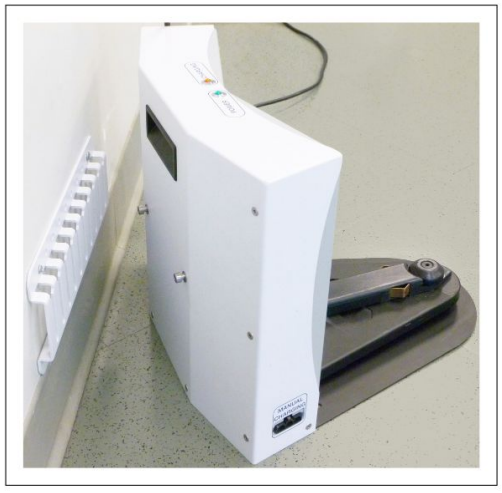


Figure 3-17. Rear View of Docking Station with Wall Bracket

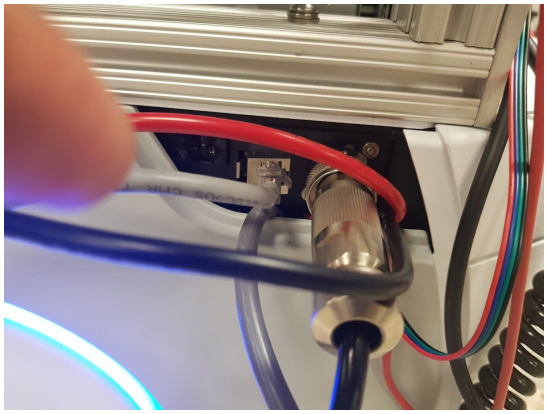
- **Mobile:** The robot has many components but only some of them will be mentioned.
    - **Battery:** It is located in the back of the robot and it provides all the energy to the mobile.

Figure 3-12. Battery Compartment, Connectors

    - **Operator Panel:** It is located in the top rear of the mobile. The **Screen** displays information about the current state of the mobile, IP address , and the percentage of battery remaining. The **Emergency Stop Button** when pressed stops any task performed by the mobile immediately and when it is released the robot will not execute any task but it is able to do so. The **Brake Release Button** allows the user to move the mobile even if it is not powered up.

Figure 5-7. Standard Operator Panel

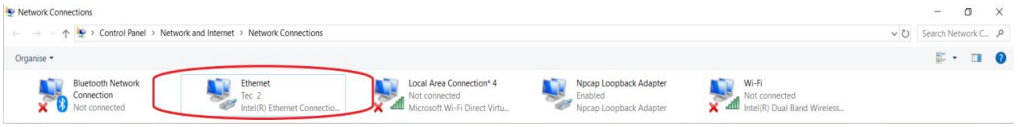
- **External Ports:** Located in the left rear of the robot two ports are placed. The first one is the Joystick port and the second port is the Ethernet which allows the communication of the mobile with a computer via ethernet.

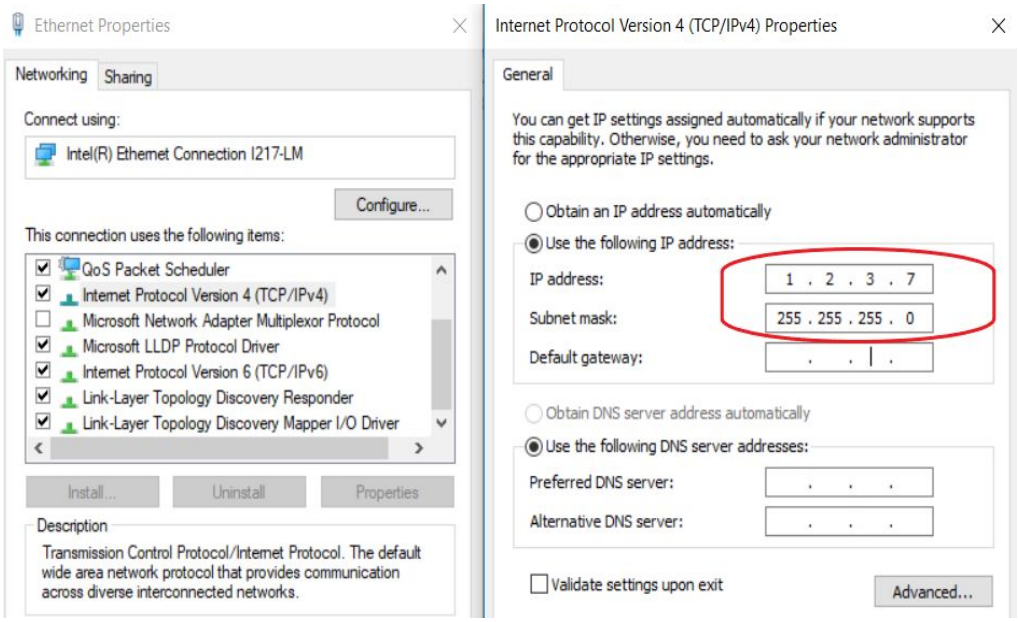


1.3 Communication to the mobile

There are two different ways to connect:

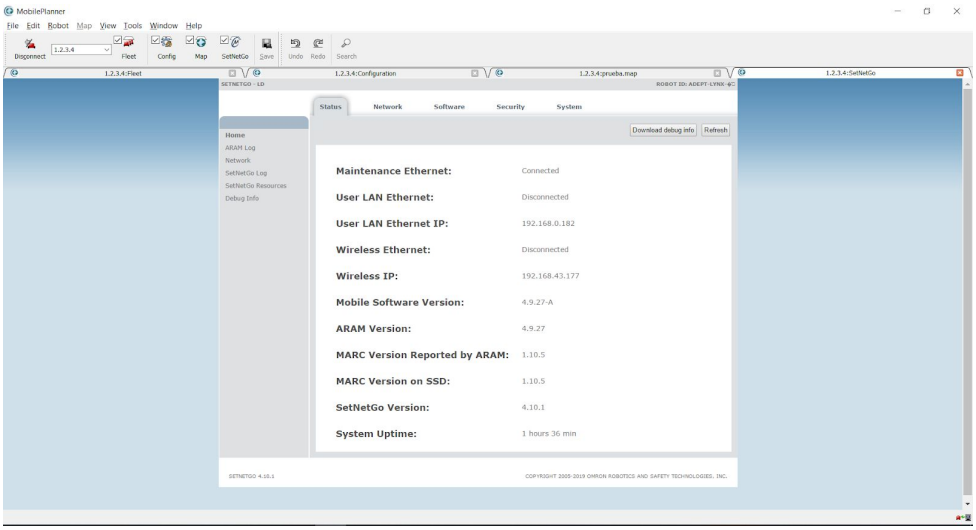
- **Ethernet:** To establish the communication with the mobile follow the next steps:
    - Plug an Ethernet cable to the desired computer and to the Ethernet Port mentioned in the previous section (External Ports).
    - Go to the Network connections in the computer and change the IP Address as shown in the following images:



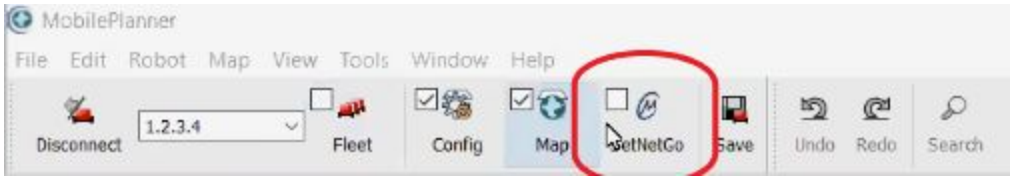


- Open the MobilePlanner application of the computer and connect to the IP Address 1.2.3.4 (This is by default the Ethernet IP address of the OMRON LD-60).

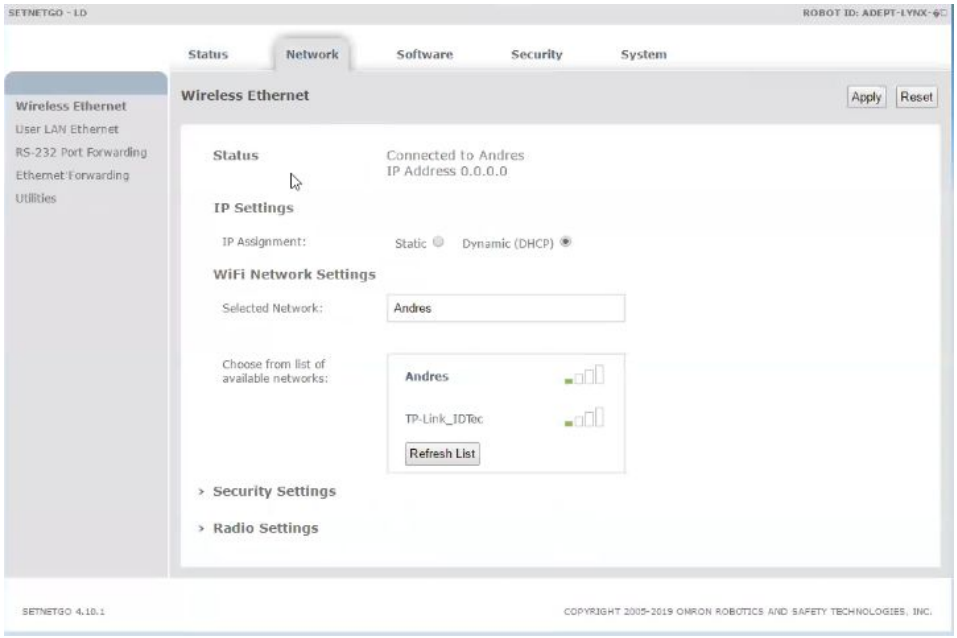
- If the connection was successfully established the window should display the following:



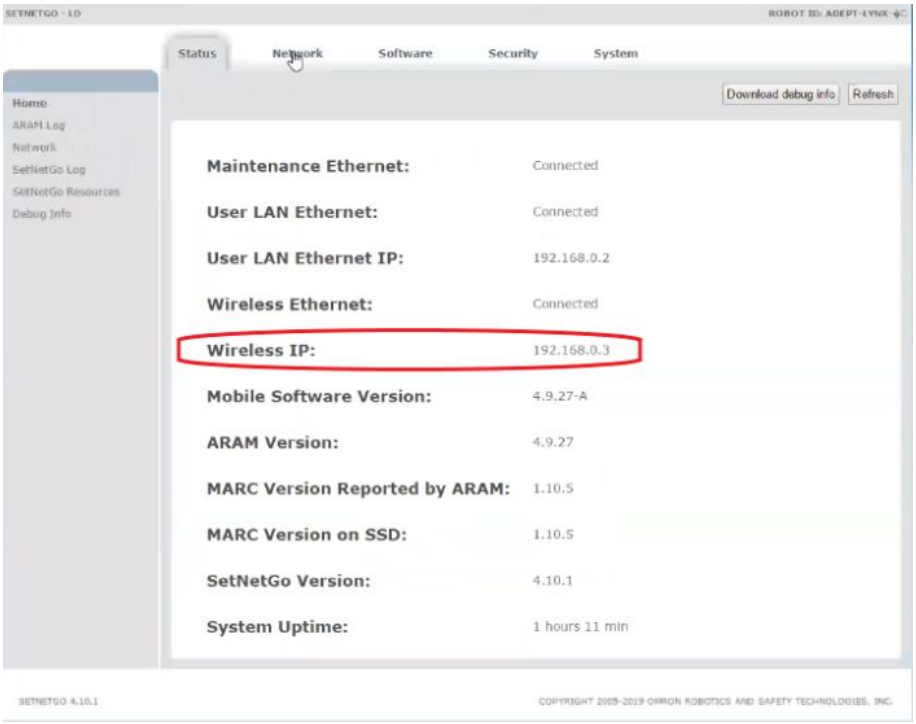
- **Wireless Connection:** To establish the communication with the mobile follow the next steps:
    - Do all the steps from the Ethernet connection.
    - In the MobilePlanner go to the SetNetGo located in the toolbar options as shown in the image.



    - Look for the **Network** Tab and connect to the desired Network that is of your interest. In this example the network name is **Andres**:



- Verify the IP address in the **Status** tab for the proper connection of it. It is also possible to find the IP address in the **Operator Panel**:

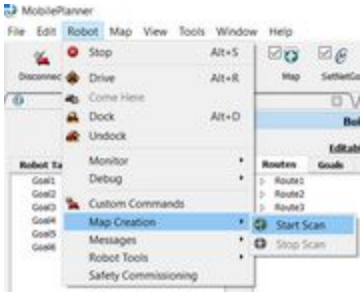


- Now connect the laptop to the same network and once both of the devices are connected to the same network go to the MobilePlanner and click on the **disconnect tab**, this will close the ethernet communication with the IP address 1.2.3.4. Additionally remove the Ethernet cable from the computer and the mobile.
- Replace the address “1.2.3.4” with the Wireless IP address of the robot as shown in the image above, in this case that is “192.168.0.3”. Then click on the connect button. If all the steps were properly followed the connection must be established.

2. Mapping the environment

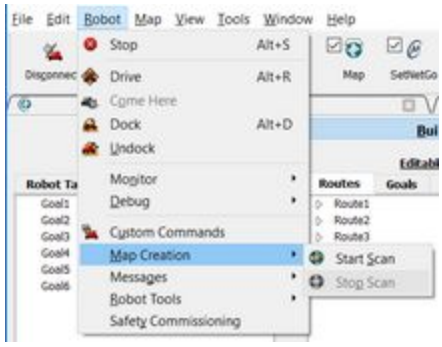
In this chapter you will learn about the creation of mapping the environment which is a must for the functionality of the mode autonomous of the OMRON AIV LD-60. Follow the next steps for the correct mapping:

- Go to the MobilePlanner and look for the **Robot** tab, **Map Creation** and **Start Scan**.



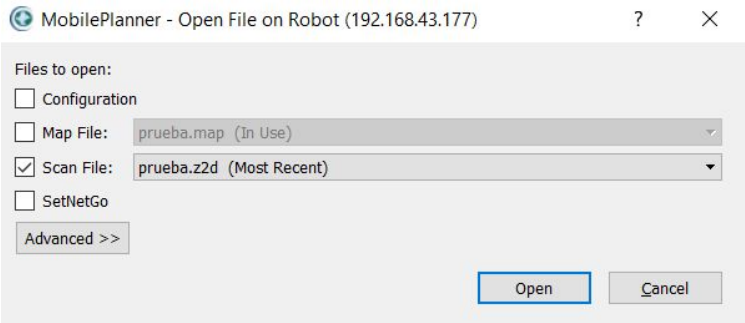
- Now that the scan was selected, you can move the robot by using the joystick to perform the mapping of the desired environment. **IMPORTANT:** It is advisable to end in the same place that you started. Also whenever there are many objects try to turn the vehicle in the same place to obtain a more detailed mapping of that particular place.

- Once the robot finished the scanning process, go to the MobilePlanner and connect the computer with the Vehicle and go to the **Robot** tab, **Map Creation** and click on the **Stop Scan** option.

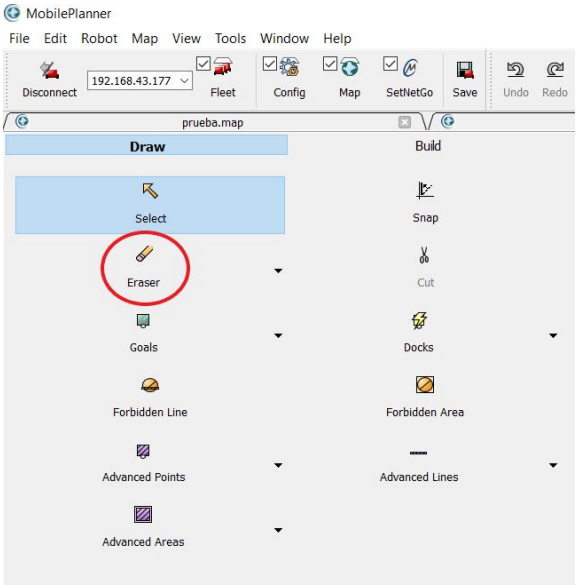


- After that go to the **File** tab, **Open on Robot** and select the IP address that you are connected as shown in the following image:

- A new window will pop up and only check the **Scan File** box and click **Open**

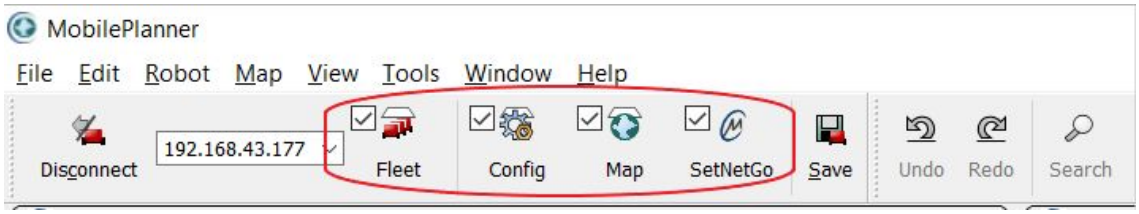


- Save the mapping with any name and click on Finish. This concludes with the creation of the mapping, however, there might be some undesirable points located on the map. To solve this problem go to the **Draw** tab located in the left part of the ".map" and click on the **Eraser** to remove the undesired points located in the mapping.



3. Toolbar

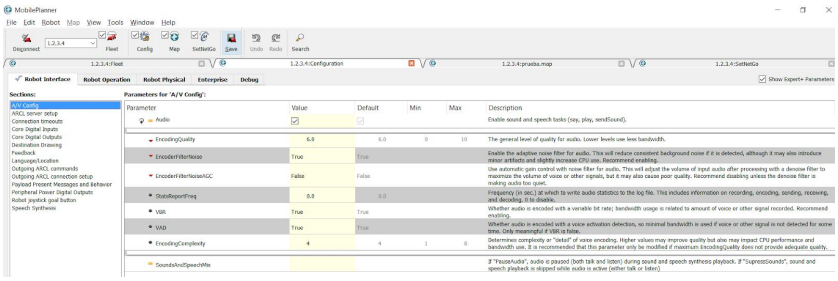
In this chapter it will be discussed the most useful commands to manipulate the OMRON AIV LD-60 remotely. There are four important tabs located in the toolbar (**Fleet, Config,Map, SetNetgo**), each of them will be described:



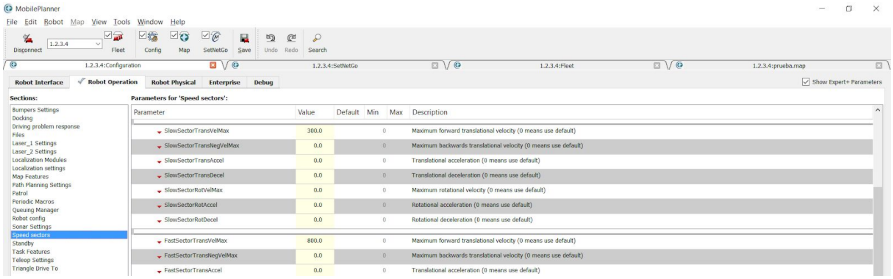
- **Config:** This option provides the user with the control of all the parameters from sensors, actuators, I/O. All the parameters are set by default to predefined values, however, the user can change them in this area.

  This tab is divided into four options:

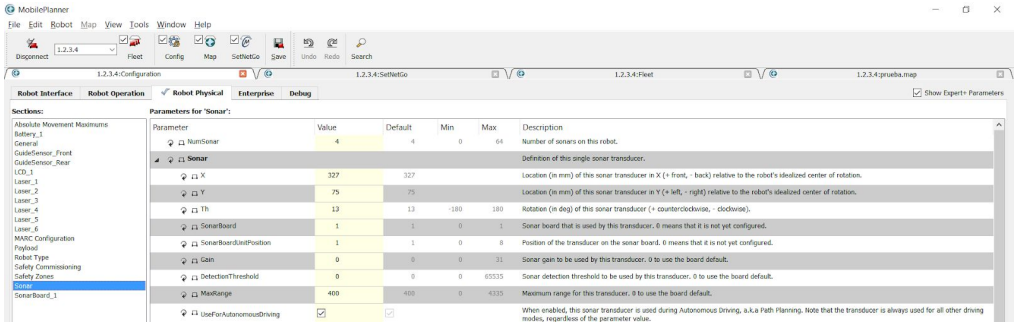
  - **Robot Interface:** This option provides all the setting configurations for the robot **interface** such as the I/O (more detailed configuration like the **Inverted logic**), **connection timeout**, the **ARCL setup server** which enables the communication to other devices and more.



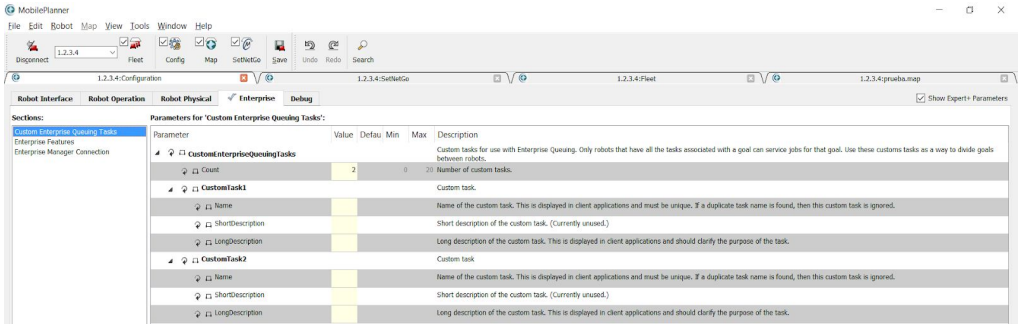
  - **Robot Operation:** In this section the information from the **operation** of any task is available. The user is able to change parameters like: Automatic dock station, sensors filters, maximum speed of the vehicle, and much more options.



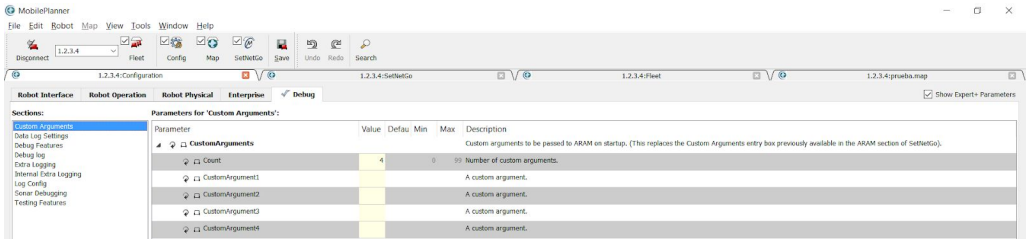
- **Robot Physical:** It allows to modify all the actual **components characteristics** such as: Battery properties, Sonar detection threshold, Payload values, and more functionalities.



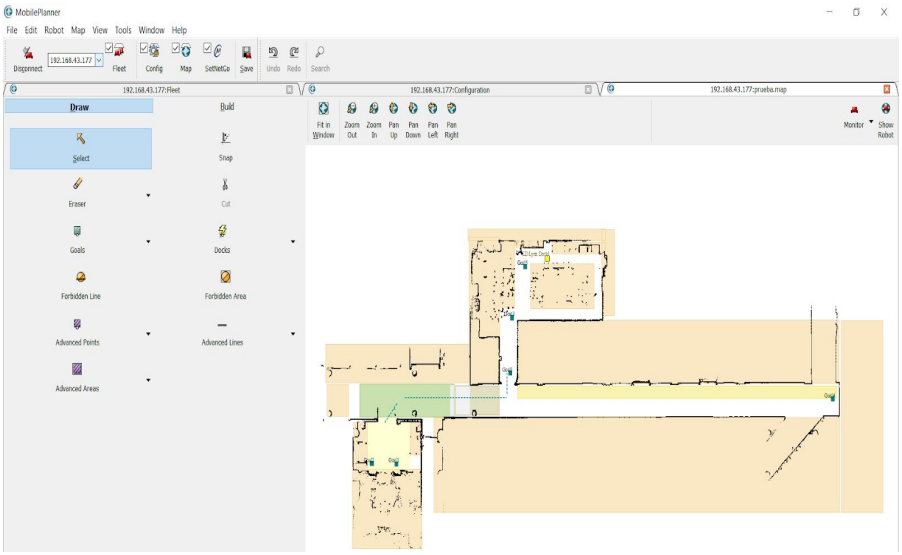
- **Enterprise:** The option enables the **setup of multiple robots** working in the same environment and the same tasks.



- **Debug:** It allows debug tools with support to almost all components from the OMRON LD-60.

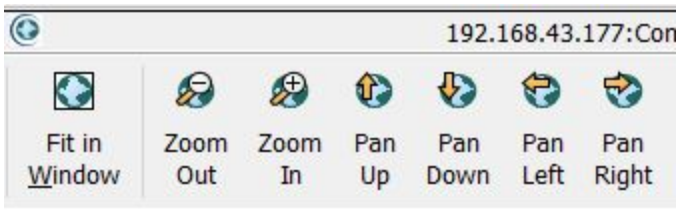


- **Map:** It shows the mapping and all the available options to start programming the robot as shown below:

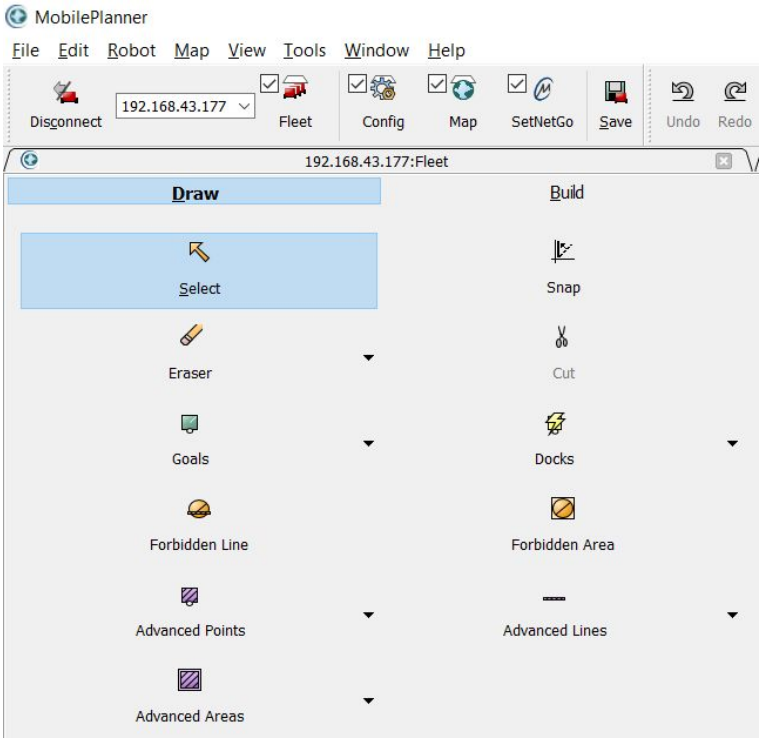


There are two ways to interact in this mode. The first one is when the **Show Robot** button is active, in this mode it is allowed to see the behaviour of the robot in **Real Time Operation.** The other mode is available when the **Show Robot** button is disable, in this mode the user is allowed to develop the program for the AIV.

  - **Programming Mode (Show Robot Disable):** On this mode there are a couple of commands useful to locate the map at any position by using the following commands:

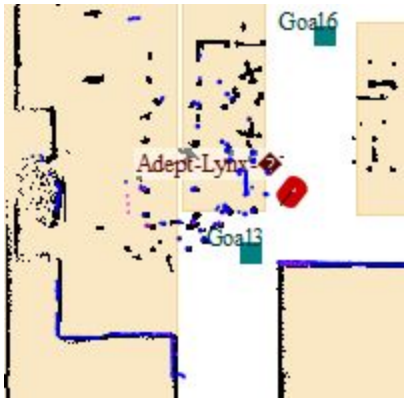


The **Draw** tab is available only in this mode and it allows the user to develop some programming in the existing mapping. The most useful commands are:



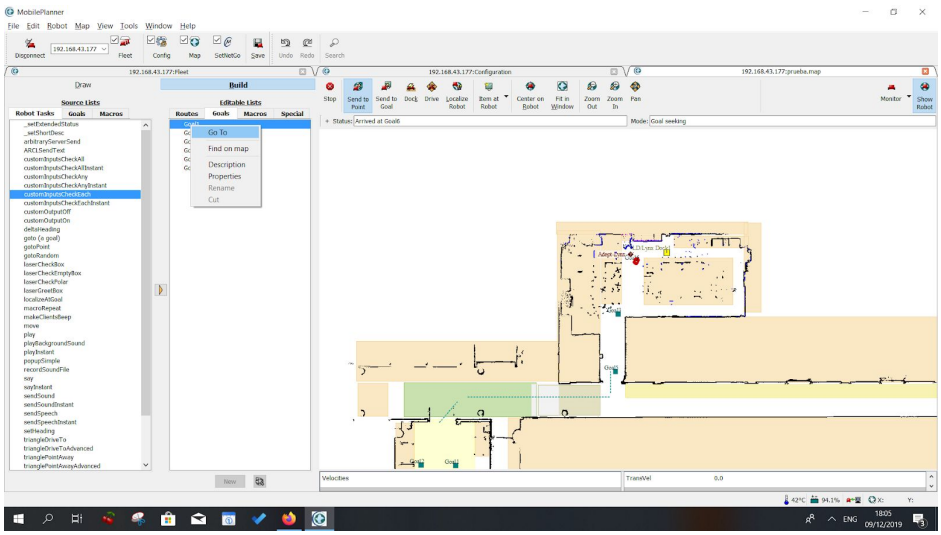
- **Goals:** They can be described as points in the map that are stored in memory.
- **Forbidden Area:** Area in which the robot is not allowed to navigate.
- **Advanced Areas:** Area in which the robot can have several configurations. The most common ones are the regulation of speed.
- **Advanced Lines:** It allows the user to create lines that can have different properties. The most useful command is the **PreferedLine** which provides information to the robot of the desired path.
- **Docks:** It provides with the command to locate the Dock Station in the map.

- **Real Time Operation (Show Robot Enable):** In this mode all the information from the sensors is displayed. The lasers from the OMRON AIV can be represented with a blue color (Detected with the lasers located at the front top of the vehicle) or pick color (Detected with lasers located in the front bottom of the vehicle) as shown in the following image:

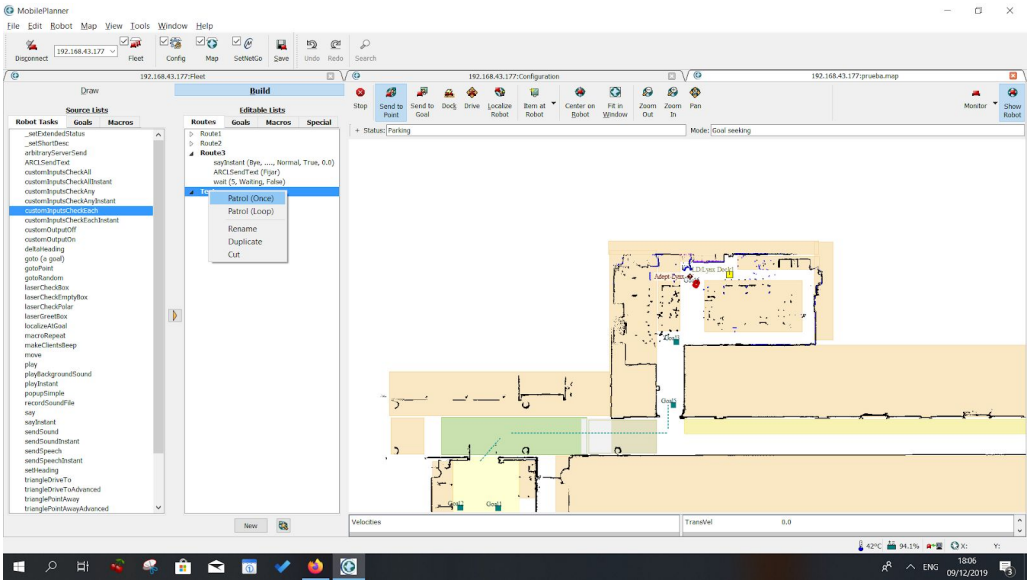


Additionally in this mode it is possible to execute four different types of commands located in the **Build** tab. However, only two of them will be covered fully as this is a basic tutorial and the other commands will be described briefly.

- The **Goals** tab is only available when the user add it previously to the map in the **Programming mode.** To execute a goal command just right click on the desired goal and click on the **Goto** option as shown in the image.



- The **Routes** tab can be represented as a set of commands executed in a top to bottom sequence. The commands that are inside a route can be **goals**, **macros**, and **special commands**. To execute a Route simply right click on the desired Route and click on the Patrol Once or Loop options.



- The **Macros** tab is useful for creating a group of commands that are typically together. This simplifies the construction of the **Routes** development with fewer lines.

- The **Special** tab has several “special functions” to be applied in the Vehicle.

- **Fleet:** This option is available for multiple AIV working in the same environment (A License is required). It has the same features described in the **Map** tab.

- **SetNetGo:** This section was already discussed in the first chapter, the main purpose of it is to developed the network connections and some other configurations.