

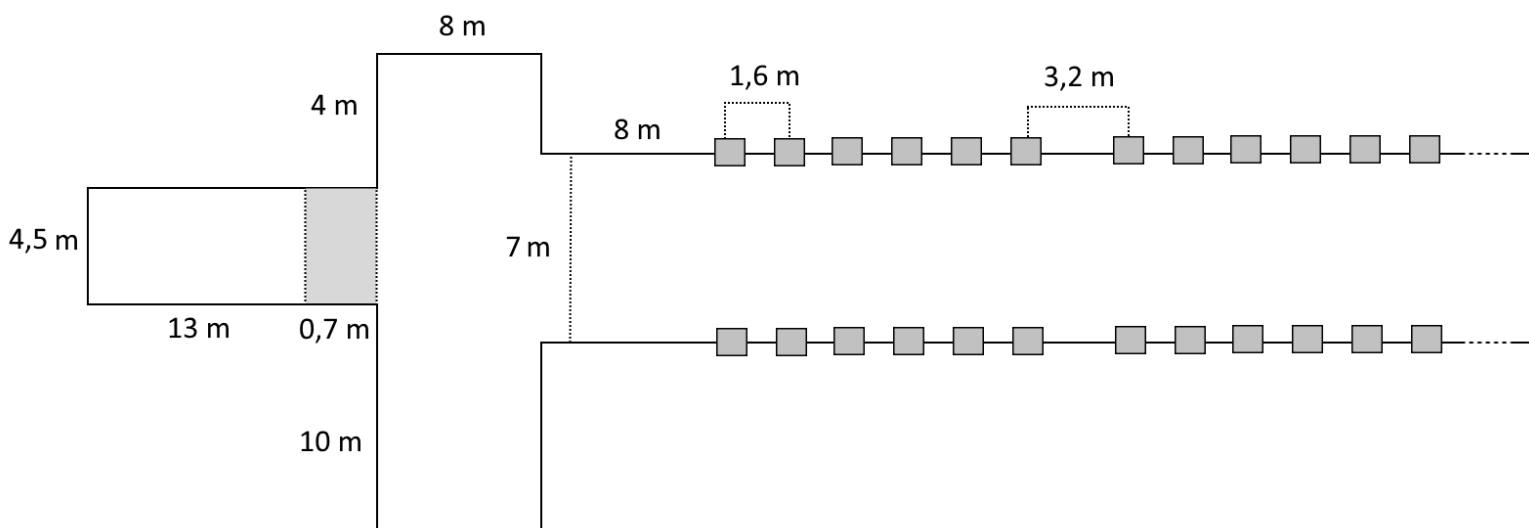
AGV Manager and RAT

This exercise is meant to start designing and drawing a real agv plant; you will be asked to handle a system where 4 AGVs must move among the stations of the map, performing a load and unload work.

1. The plant

This plant is a production line with 96 machines, put in two lines of 48 ones. These lines are 7 m far one from the other (see picture below). Each machine is 1.6 m far from the others and they are disposed in groups of 6. Between two consecutive groups there is a space of 3.2 m.

8 m left to the production area there is a bigger space where agv can be parked or where 2 battery charge stations will be put. Since the part below is wider than the upper one, it is suggested to put there the two charge stations.



In the left part there is another room, where 4 unload stations must be put (it is up to you to choose their position). Keep in mind that there is a door to go this room, on a 0.7 m long space (highlighted in gray) where it is forbidden to agv to stop or to do any operation.

2. Production machine data

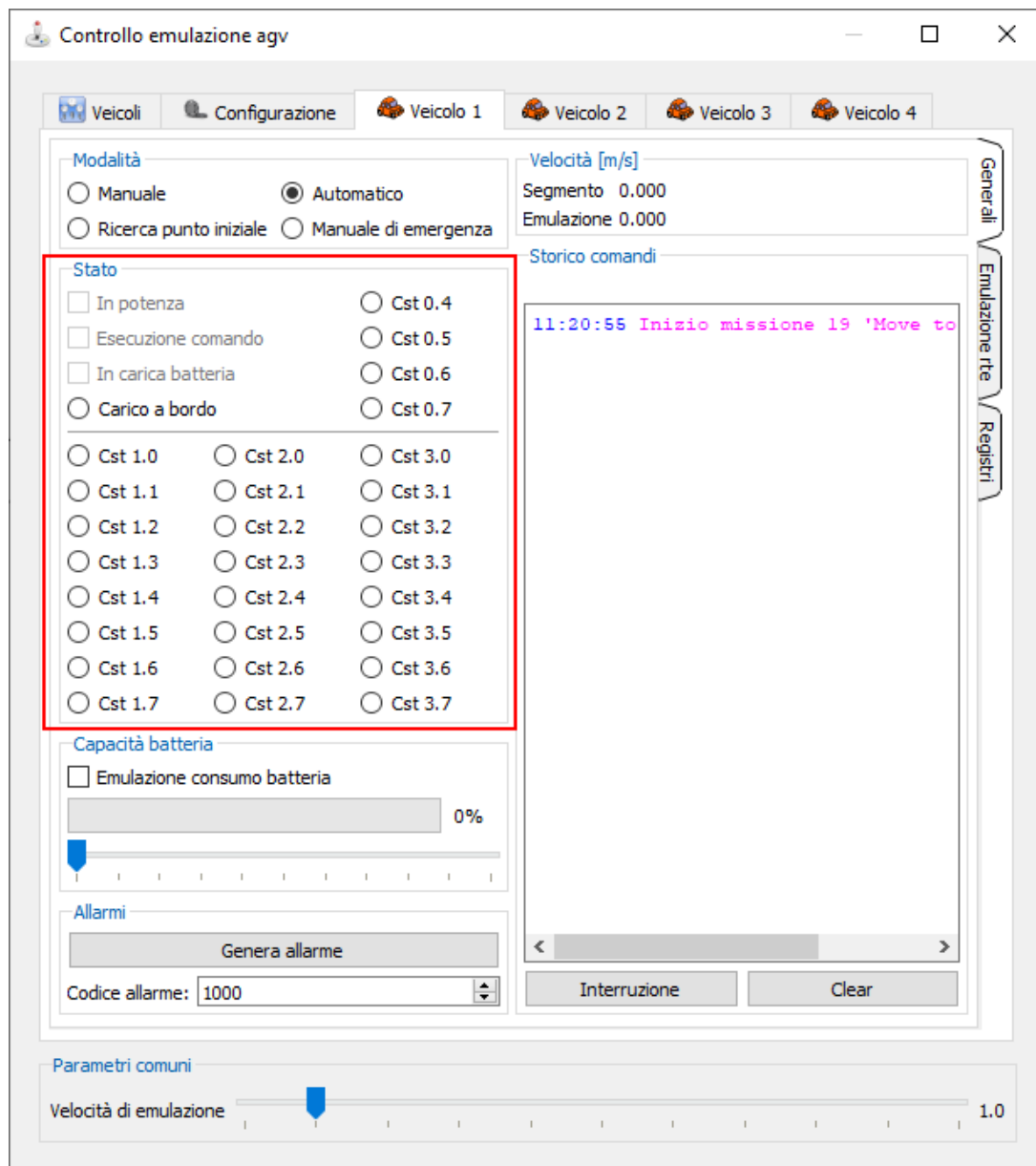
Each one of the 96 machines in this plant is able to produce 350 products per day. When the current product is finished, it is necessary to pick it away before 9 minutes to avoid the next incoming product to crush it.

3. Agv data

The agv model used for this plant is a 1.8 m square fork agv which can perform load and unload operations from its left side. Each one of the 4 agvs in this plant has to go to the most urgent production machine, make the load operation, go to one of the unload stations to drop the product and start again.

Each agv has a low battery bit written by the R3 rule in the vehicle status 0x2000. If it is set, the agv should finish current load and unload (if any), then find a free charge station and go there to charge. If no charge station is free, it must go to the parking point.

If the agv is emulated, status bits can be set in the emulation window, as shown below.



4. Draw a map with RAT (Robox Agv Tool)

Make a folder to store this project and save your xml map file in a subfolder called “map”. Open RAT and draw a map respecting drawing shown in section 1:

- 2 horizontal lines with 48 load stations each (96 in total). A curve may be used to join them on the right side, at the end of the production machines area.
- 4 unload stations put in the left room, keeping distance from the door reserved space. A curve may be used to join two lines.
- 2 charge station in the big room between load and unload. Try to think a clever way to arrange them. Some park points may be useful too.
- Create 4 agvs in the RAT project to be played in this sample.
- Always remember the agv size when you draw lines: since its side is 1.8 m, remember that any line must be at least 0.9 m far from the wall.

5. AGV Manager project

In the project folder you should make your AGVM project. Set AGV as emulated, since in this sample there is no Robox controller connected to a real agv.

You must write a xScript that makes production simulation and moves agvs to perform load/unload missions (simulate the operations with 5 s timer). The agv queue algorithm may be used for this task (see AGVM tutorial 3).

If status bit 0x2000 of an agv is set, it must perform a charge mission (go to a free charge station, remain there, wait 0x2000 status bit to go to zero and then wait other 5 s).

6. Debug

Start AGVM and make the system work. Let the system work for one hour to prove the stability and to see if no deadlock happens.