

# SECOND ROBOTICS PROJECT

ROBOTICS



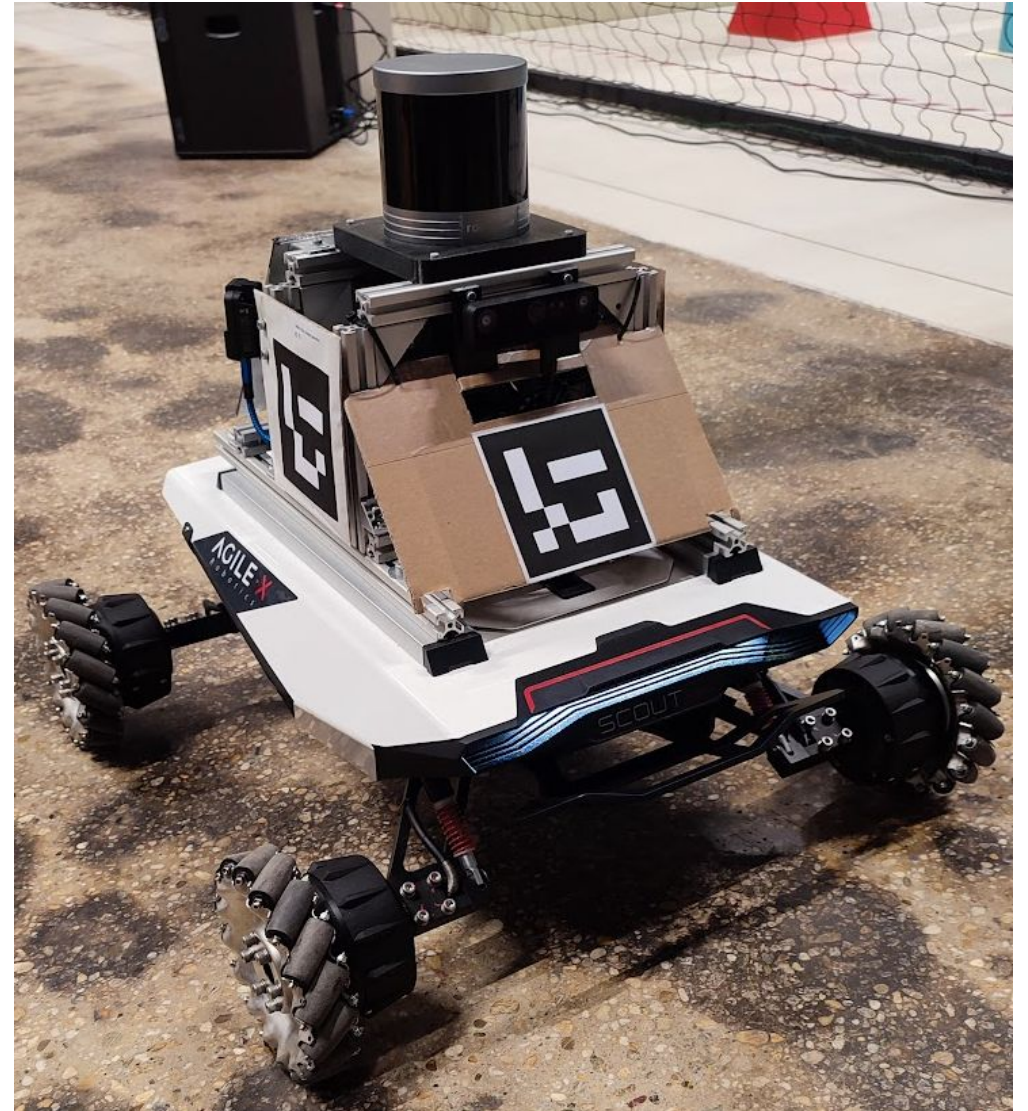
**POLITECNICO**  
MILANO 1863

# THE PROBLEM



Provided data:

- Odometry from the robot
- PointCloud



# DATA



Format: ROS Bag file

**play the bag with the command:**

**roslaunch play --clock robotics2.bag**

Data:

- 
- /ugv/odom odometry from encoders
- /ugv/rslidar\_points pointcloud from lidar



# THE PROJECT (Task 1: mapping)

- Use the bag to create a map of the environment
  - Use the preferred mapping package
  - Write a launch file that starts:
    - all required nodes to perform data conversion
    - the mapping node
    - rviz with config file to show the map, the lidar and the tf, set global frame to map
- You can use pointcloud\_to\_laserscan package to convert the pointcloud data



## THE PROJECT (Task 2: navigation)

- Setup a realistic simulation of the robot using real robot data and the map created in task 1 (using stage)
- Robot data available here: <https://global.agilex.ai/products/scout-mini>
- Setup the navigation stack to receive goals and move the simulated robot avoiding obstacles in the generated map
- Write a goal-publisher node that reads a sequence of goals from a csv and send them to the robot. A new goal is sent when the robot reach the previous one or it's aborted
- an example csv file is provided



## THE PROJECT (Task 2: navigation)

- Provide a launch file that starts:
  - stage simulation with the robot and the map
  - movebase configured to localize in the provided map and drive autonomously the robot avoiding obstacles
  - the controller node that publish the goal after reading them from csv
  - csv structure: x,y,theta
  - rviz configured to visualize the map, the tf's, the particle cloud (if amcl is used), the laser scanner, the paths and the goals

# THE PROJECT (Task 2: navigation)



- Also provide a map folder with:
  - png file of the reconstructed map (mandatory)
  - serialized map if slam toolbox is used



<https://goo.gl/GonArW>

**Second\_Project** folder





# Deadlines and requested files

- Send **only** a tar.gz file
- Send via e-mail both to Simone Mentasti and Matteo Matteucci
- name the e-mail “SECOND ROBOTICS PROJECT 2024”
- Inside the archive:
  - info.txt file (details next slide)
  - folders of the nodes you created (with inside CmakeLists.txt, package.xml, etc...)
  - map folder
  - **do not send** the entire environment (with build and devel folders)
  - **do not send** the bag files



# Deadlines and requested files

File txt must contain only the group names with this structure

**codice persona**;name;surname

You can add another file called readme.txt with additional info. I will not always look for it. But if something goes wrong I'll check for explanations.



## Some more requests

Name the archive with your **codice persona**

**Don't use absolute path**

**The project need to be written using c/c++**



# Deadlines and requested files

Deadline: 23 June (1 month)

Max 3 student for team

N.B.: If the grading is needed earlier you can send the project before the deadline. Specify the need for earlier grading in the message and mail title

Questions:

- write to me via mail ([simone.mentasti@polimi.it](mailto:simone.mentasti@polimi.it))
- do not write only to Prof. Matteucci



## Additional info

- Set the simulated time in the launch files
- `rosparam set use_sim_time true`
- `<param name="/use_sim_time" value="true"/>`
- You can first test the navigation of the robot sending goals manually
- Use actions to send goals, not publishers
- Minimal changes to the map generated to use it in the simulation are allowed, mostly to clear noise and unrealistic obstacles

# Changelog



-