Robotics final presentation

Motion control on Turtlebot

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17/05/17

UBFC

Summary

I. Introduction

II. Methods & Setup

III. Control of the robot
   - Basic moves
   - Sensors
   - SLAM and AMCL

IV. ROSifing the PhantomX

V. Conclusion & future work

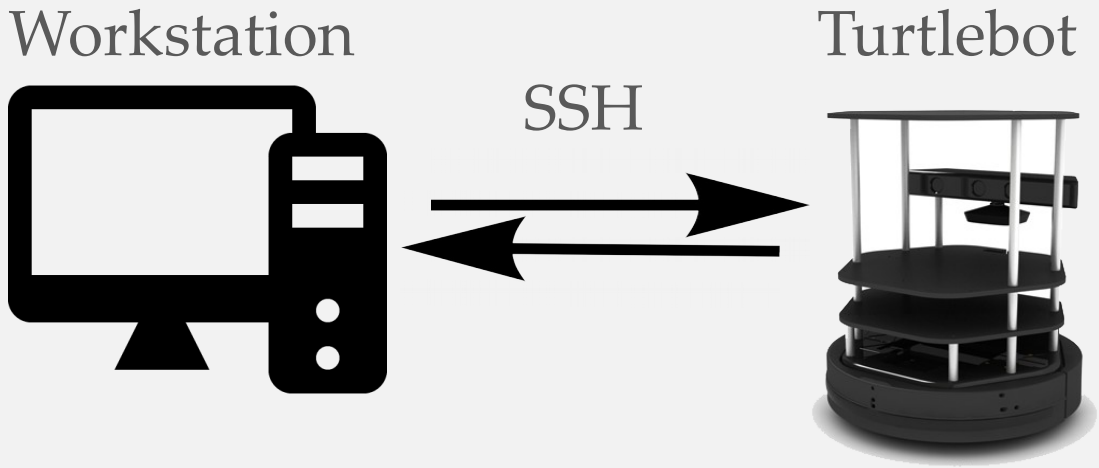
VI. Demonstration

I. Introduction

- Discovery:
  - ROS middleware
  - TurtleBot hardware
- Innovation:
  - TurtleBot and PhantomX arm pincher merging

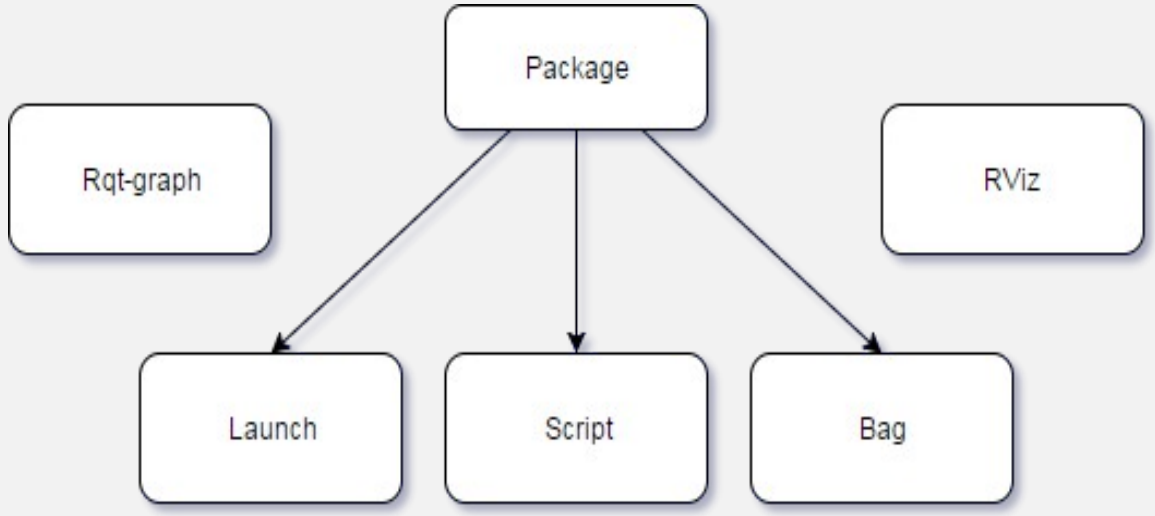
II. Methods and Setup

- Network management:
  - Predefined network setup
  - SSH remote control
  - Bashrc file modification



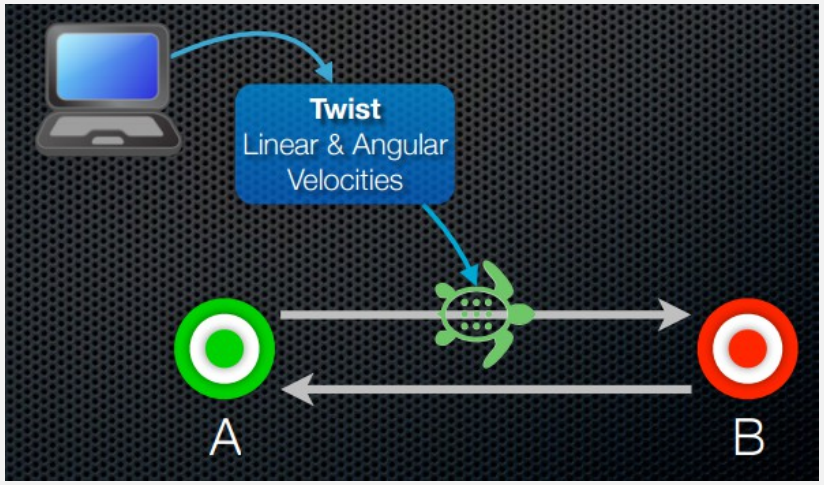
II. Methods and Setup

- ROS organization:
  - Strict layout
  - Bag file recording
  - Powerful management tools
  - ROS by example book



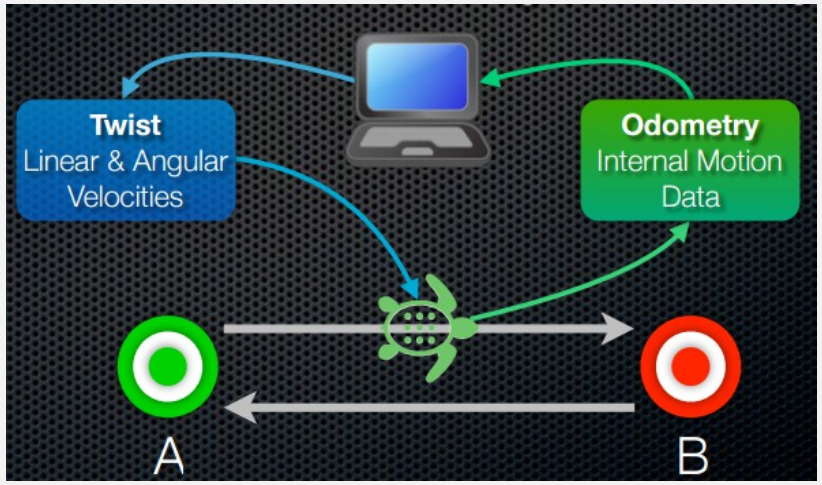
III. Control of the robot\Basic moves

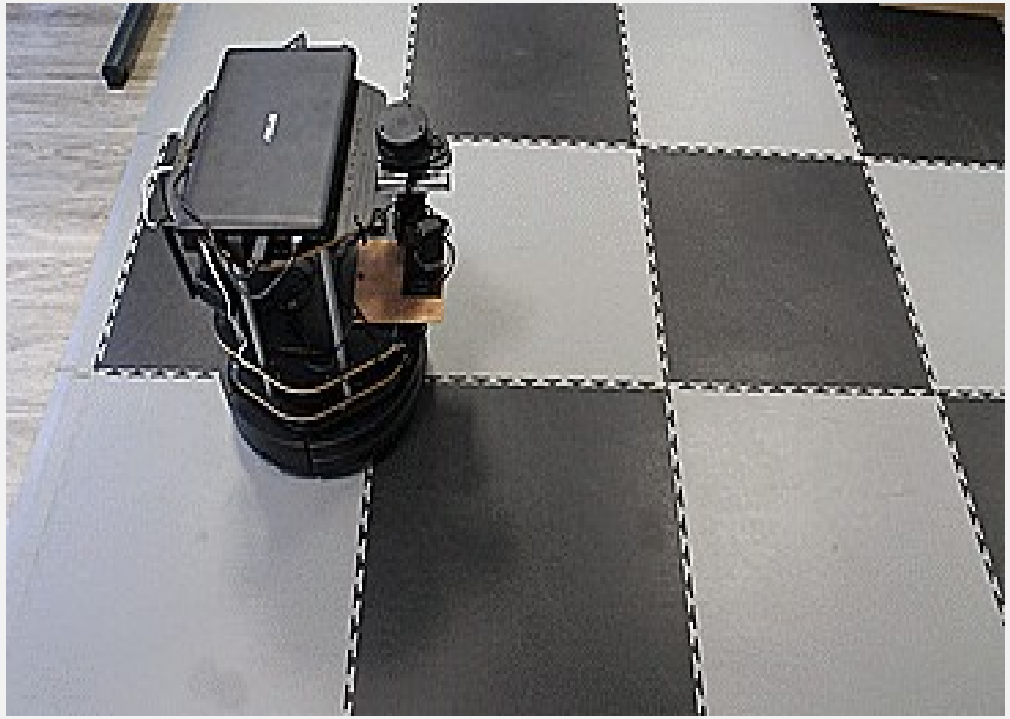
- Moving forward by publishing a twist message



III. Control of the robot\Basic moves

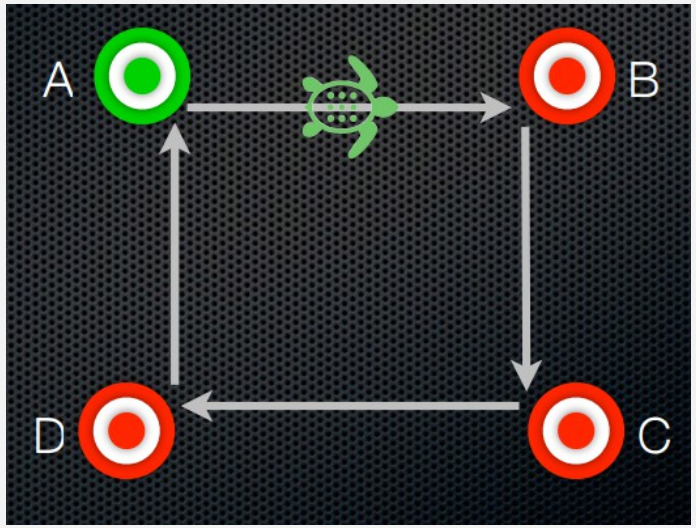
- Improving accuracy using odometry

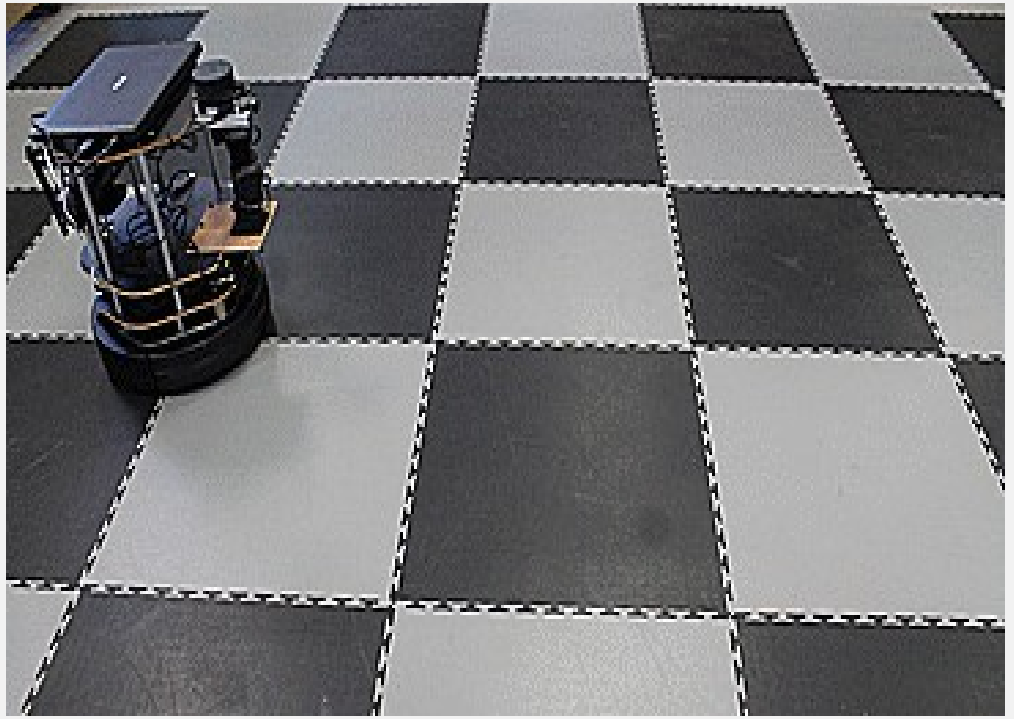




III. Control of the robot\Basic moves

- Performing a precise square-shaped movement



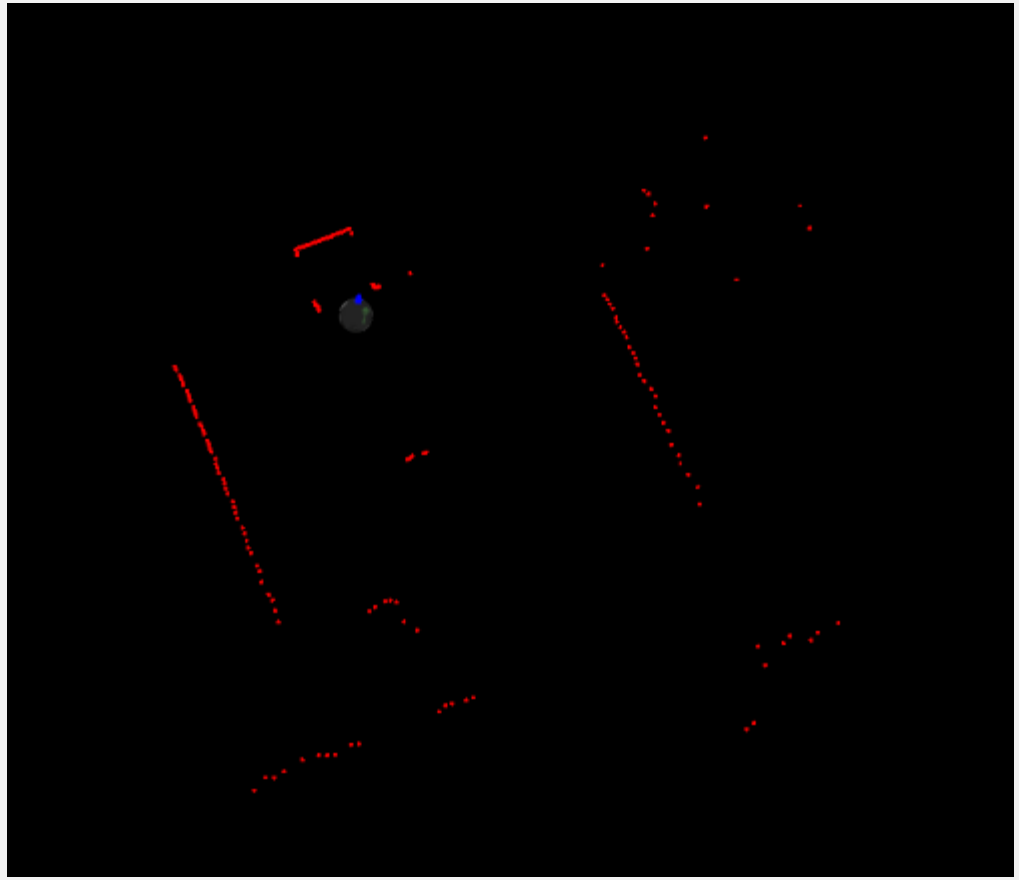


III. Control of the robot\Sensors

- Internal sensors:
  - Bump, cliff, gyroscope, …
- External sensors:
  - Kinect
  - RPLIDAR

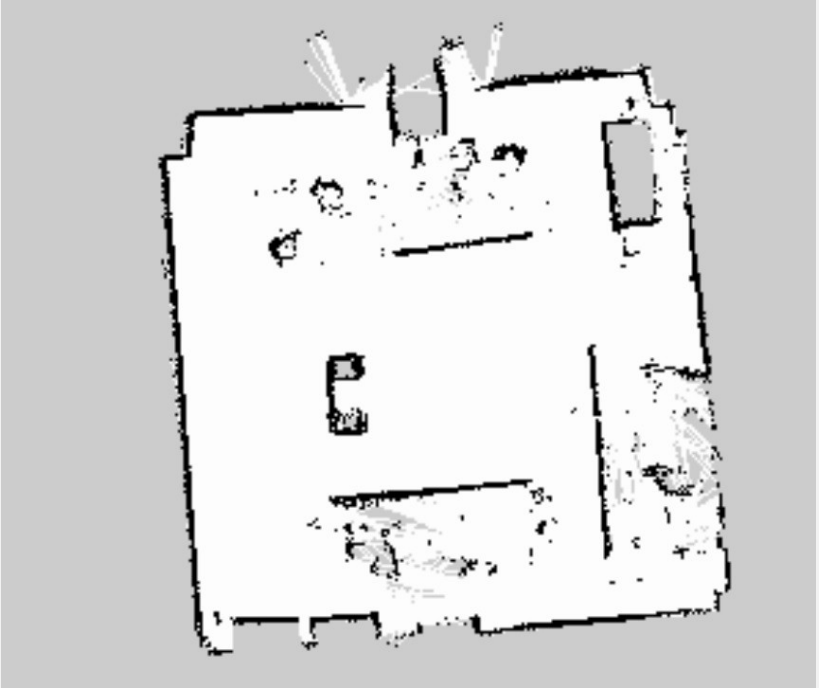
III. Control of the robot\Sensors

- RPLIDAR:
  - “Plugin”
  - Spatial information
  - Feedback using Rviz
  - Localization sensing
  - Mapping



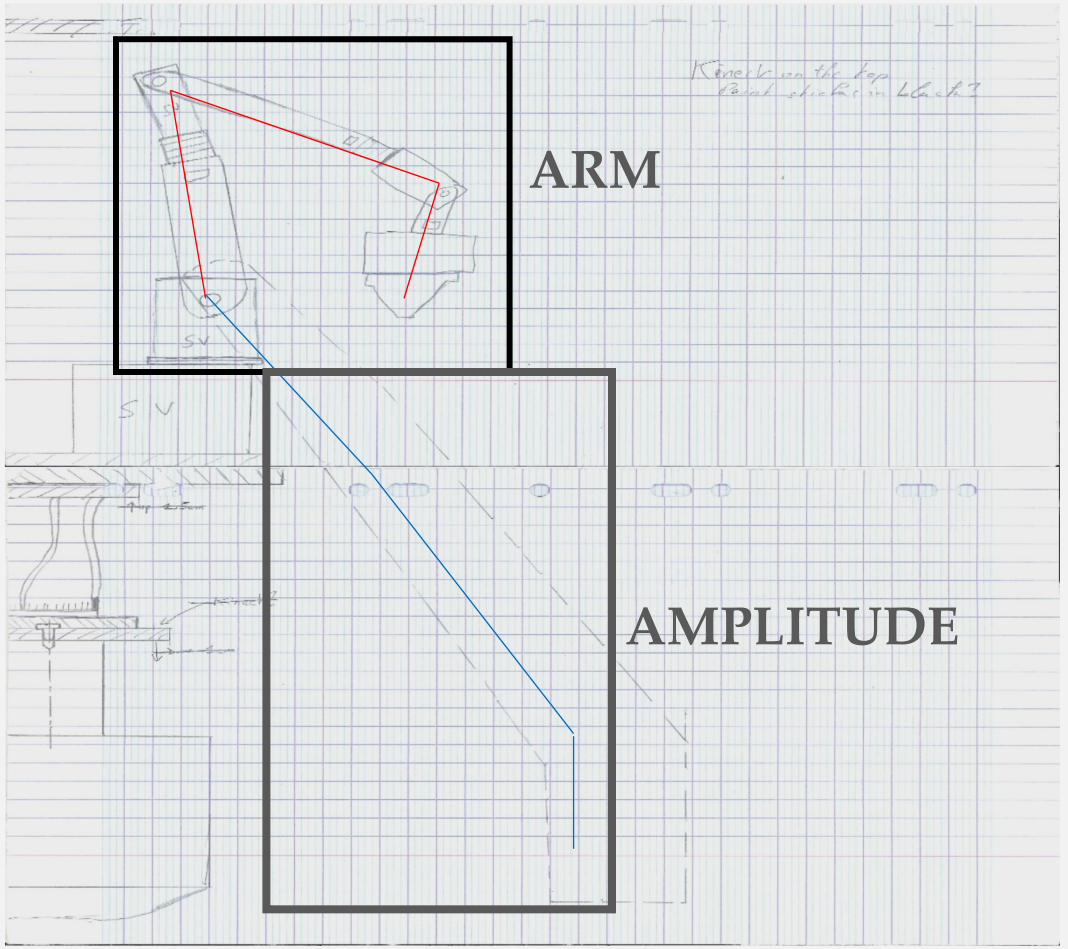
III. Control of the robot\SLAM and AMCL

- SLAM: Simultaneous Localization And Mapping
- AMCL is a probabilistic localization system for a robot moving in 2D



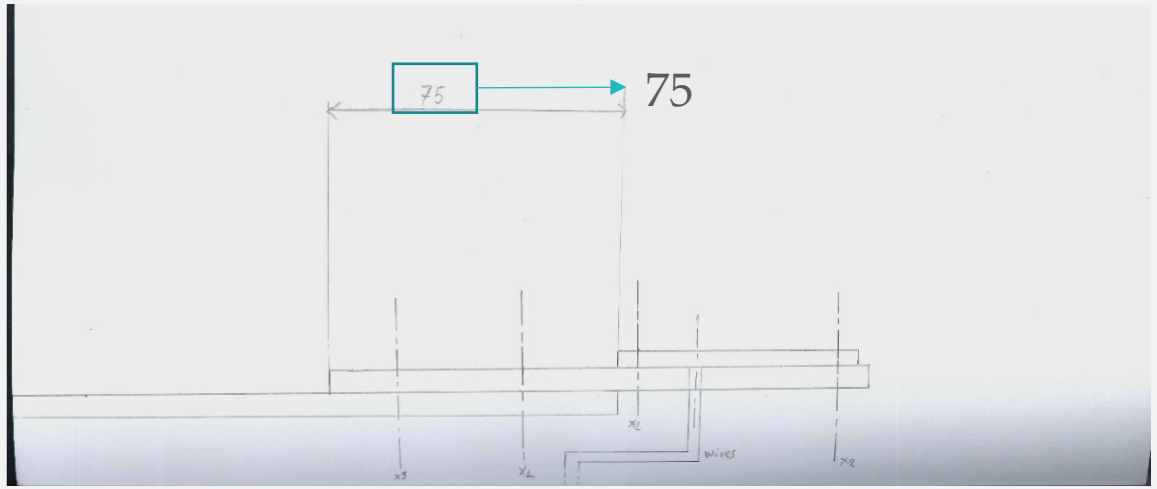
IV. ROSifing the PhantomX

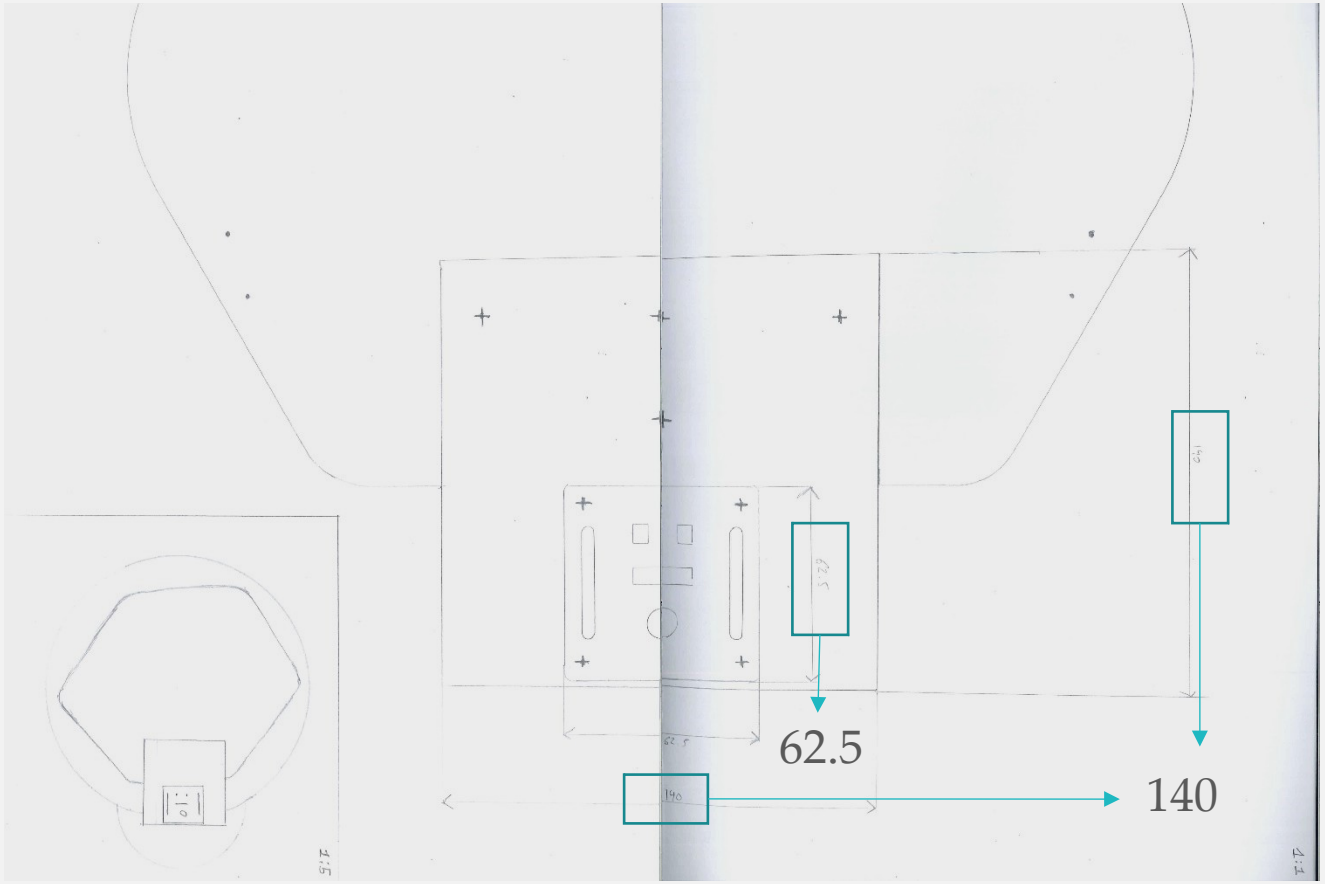
- Homemade design:
  - Position of the arm on the TurtleBot
  - 1 to 1 scale between the arm and the TurtleBot



IV. ROSifing the PhantomX

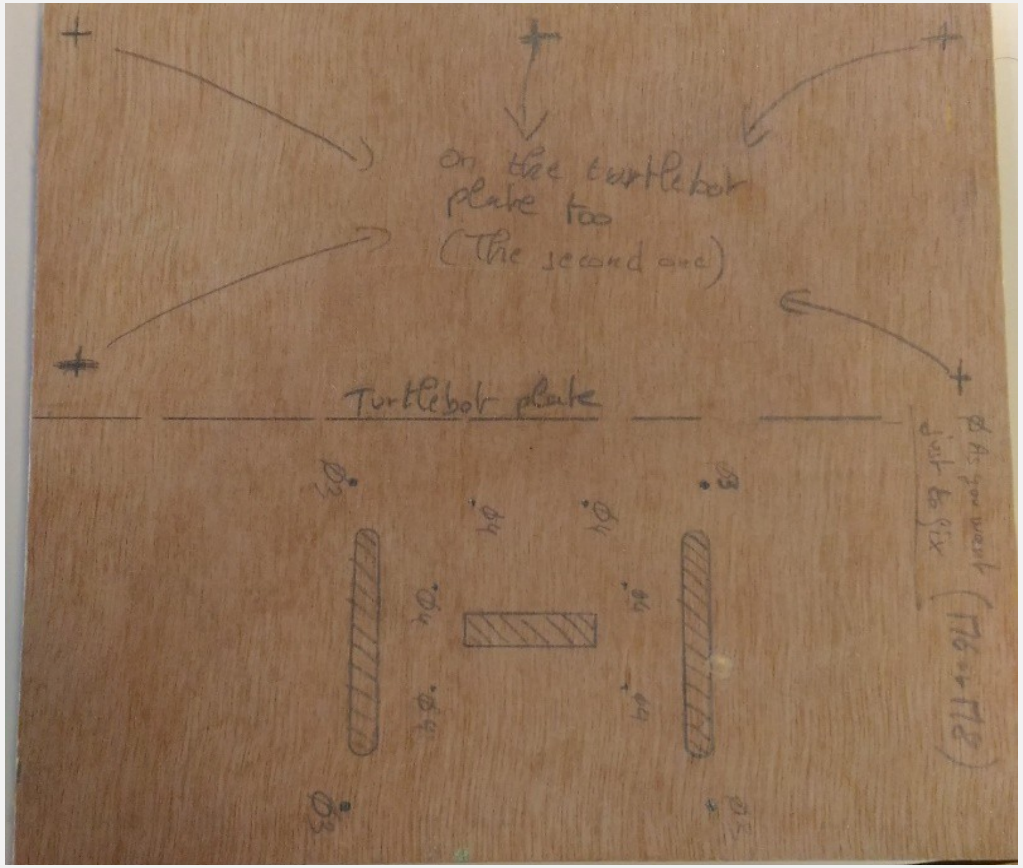
- Homemade design
  - Support plate between the TurtleBot and the PhantomX Arm Pincher





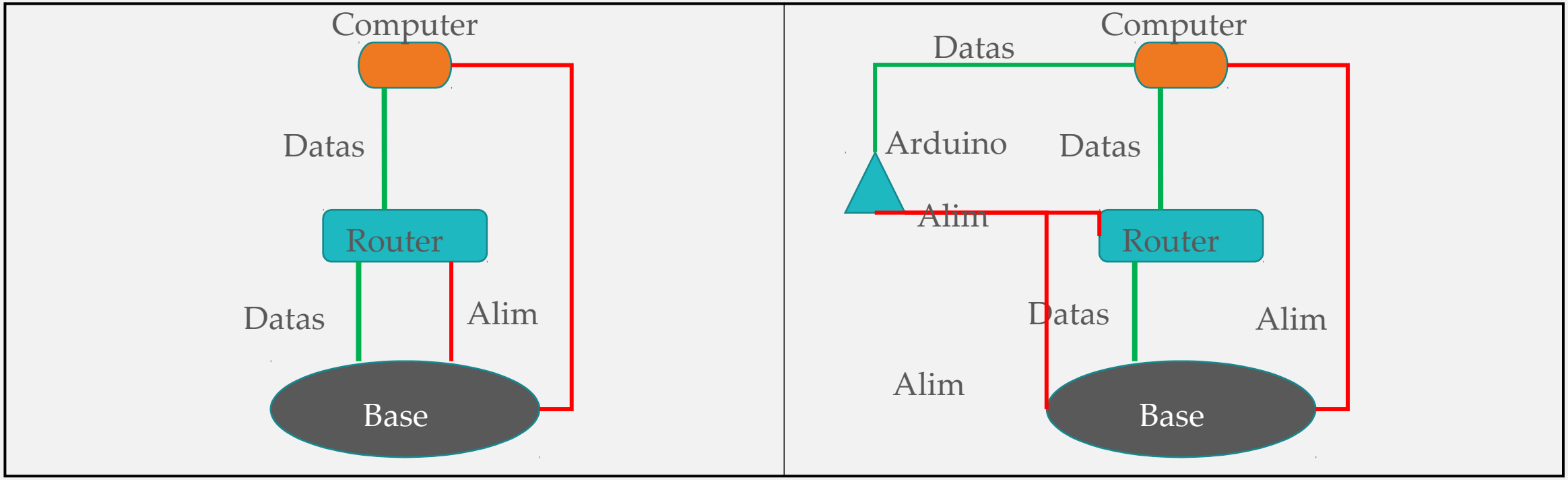
IV. ROSifing the PhantomX

- Homemade design
  - Designed transferred onto the support before preparation



IV. ROSifing the PhantomX

- New alimentation setup



V. Conclusion & future work

- Results:
  - Moving robot
  - Gmapping
  - First step if the PhantomX ROSification
- Moving forward:
  - Gmapping settings improvement
  - Asynchronous control of the arm + TutleBot

Thank you !

Question(s)?

VI. Demonstration 1

Live creation of the rooms' map using Gmapping and a Joystick

VI. Demonstration 2

Live creation of the rooms' map using Gmapping and a Joystick

with the kind participation of
our omnipotent and omniscient
Jury

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Live creation of the rooms' map using Gmapping and a Joystick with the **kind** participation of our **omnipotent** and **omniscient** Jury

Thank you !

Question(s)?

Sources

- Page 3:
  - Ros Logo: http://www.ros.org/wp-content/uploads/2013/10/rosorg-logo1.png
  - TurtleBot: http://www.turtlebot.com/assets/images/turtlebot_2_lg.png
- Page 4:
  - Computer icon : http://simpleicon.com/wp-content/uploads/computer-5.png
  - Arrow: http://www.clipartbest.com/cliparts/Rid/6qq/Rid6qq8nT.png
- Page 9:
  - Kinect: https://upload.wikimedia.org/wikipedia/commons/thumb/6/67/Xbox-360-Kinect-Standalone.png/1200px-Xbox-360-Kinect-Standalone.png
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- Page 17:
  - Turtle Ros : https://cdn.instructables.com/FAI/YQBV/H3M6BTPR/FAIYQBVH3M6BTPR.MEDIUM.jpg
  - Speech buble : http://www.pngall.com/wp-content/uploads/2016/07/Speech-Bubble-PNG-Picture.png

All the images/diagrams not referenced here were produced by our team