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# IC382 Final Presentation

# Overview

Project Overview

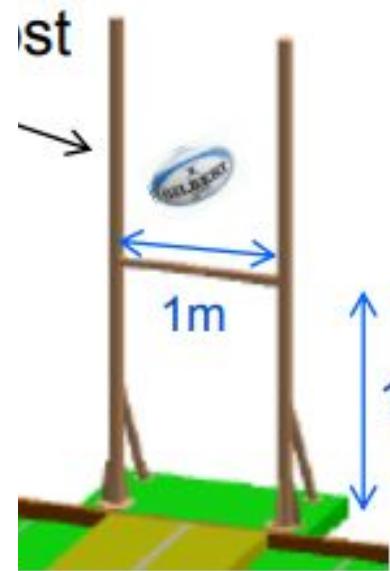
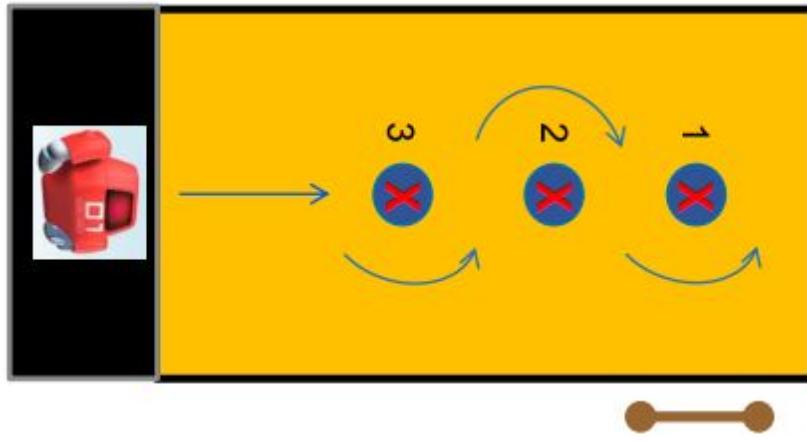
Electrical Part

Mechanical Part

ROBOCON Robot



# Project Overview



# Electrical Part

Wheel selection  
and configuration

1

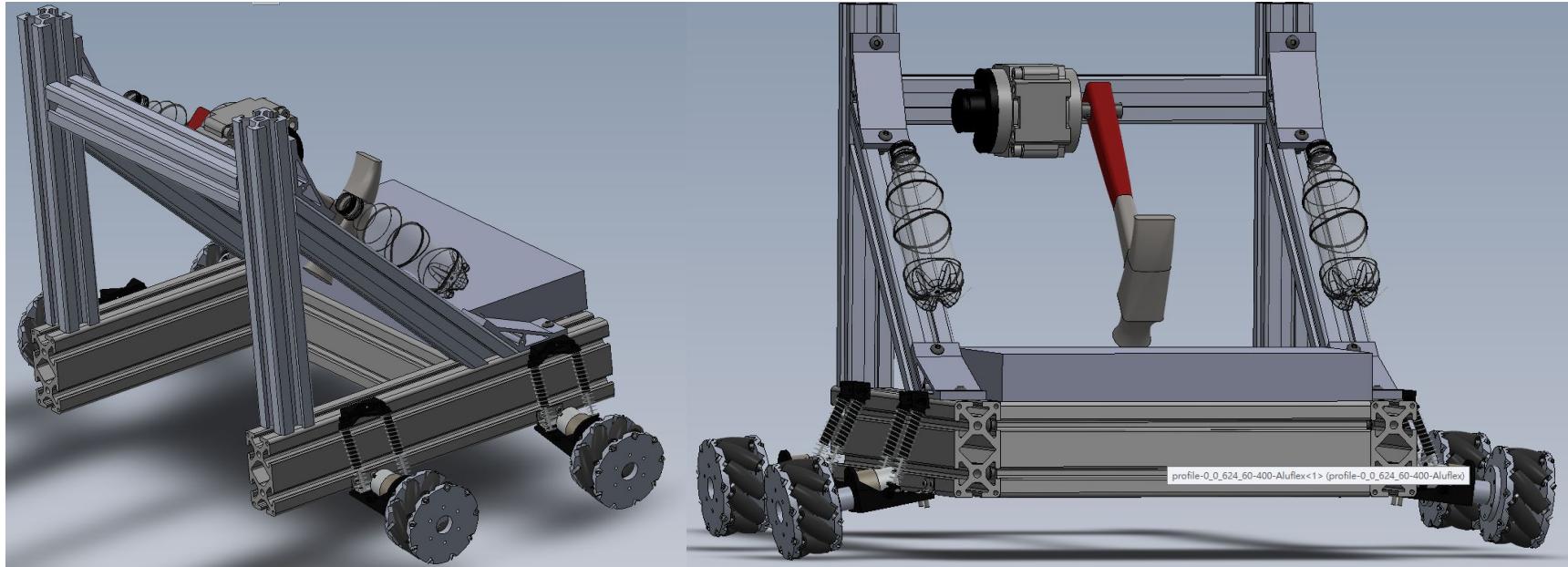
Joystick - move  
and rotate

2

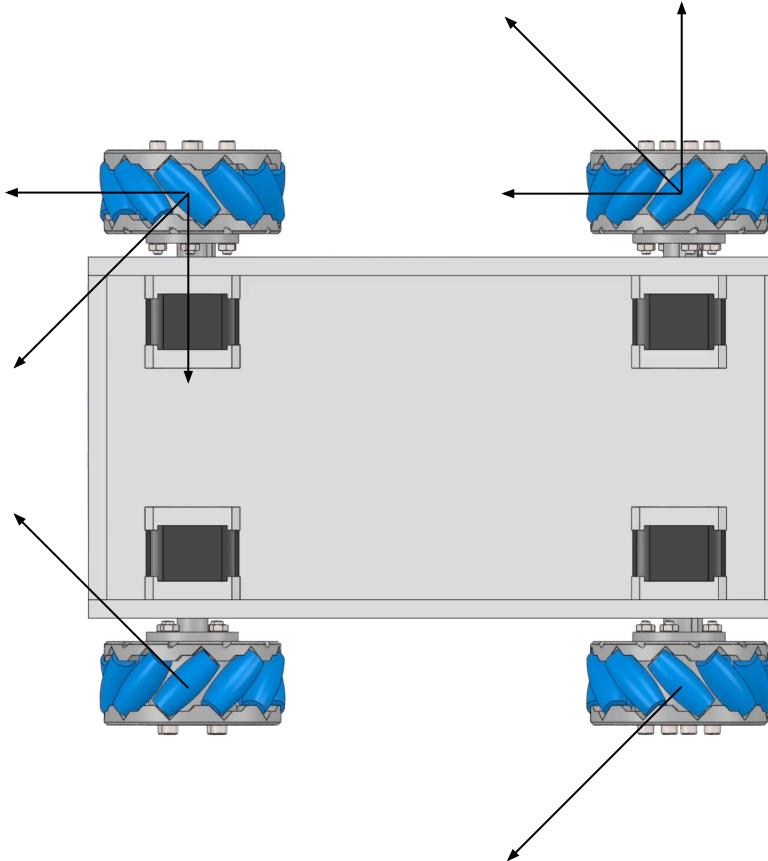
Button - release  
the actuator

3

# Original Design: 4 Mecanum wheels



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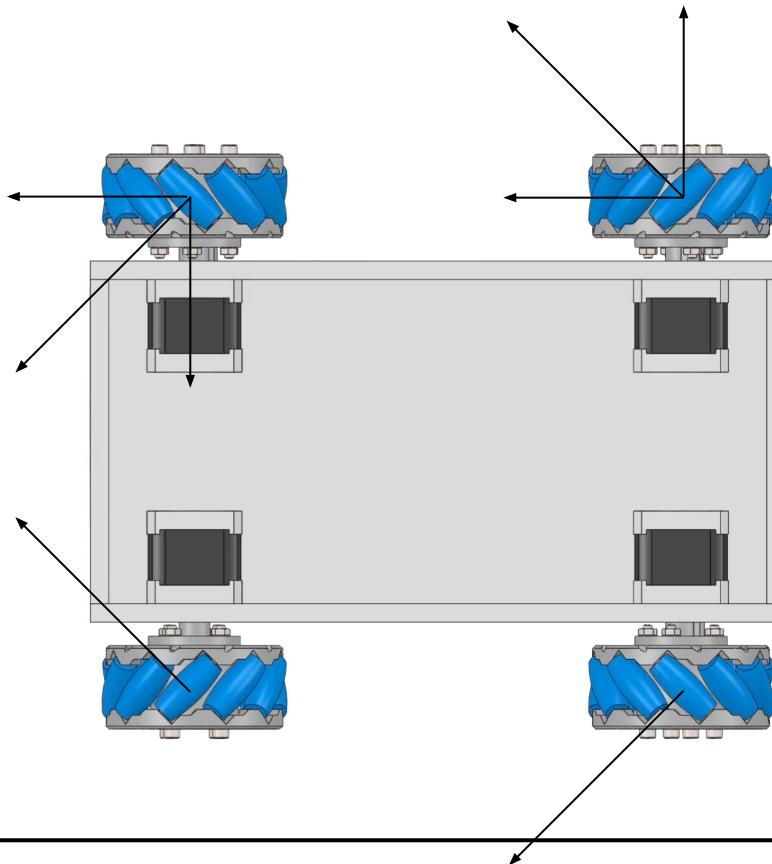


## Advantage

Moves in all directions  
with ease

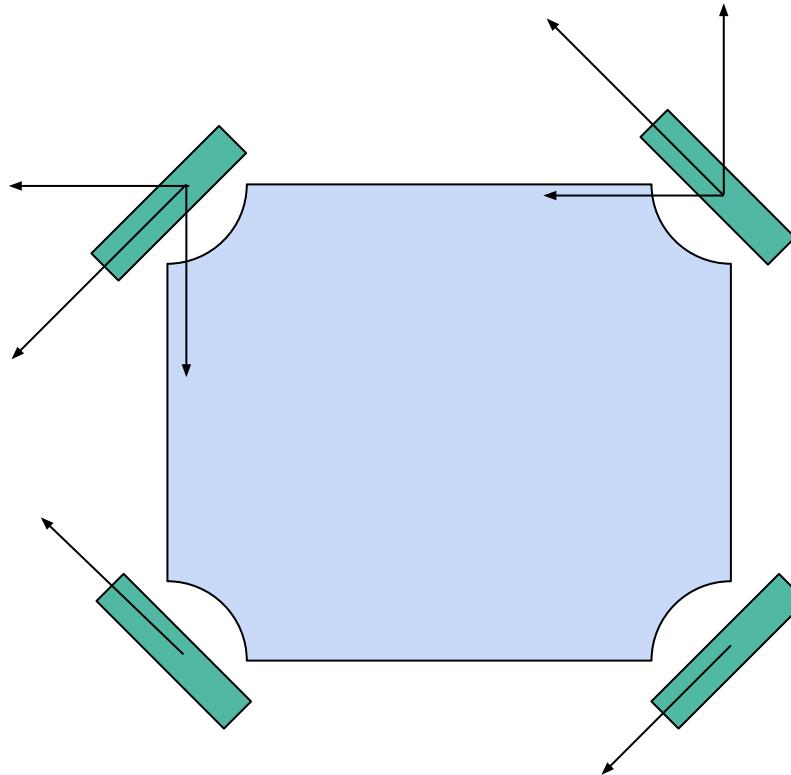
## Disadvantage

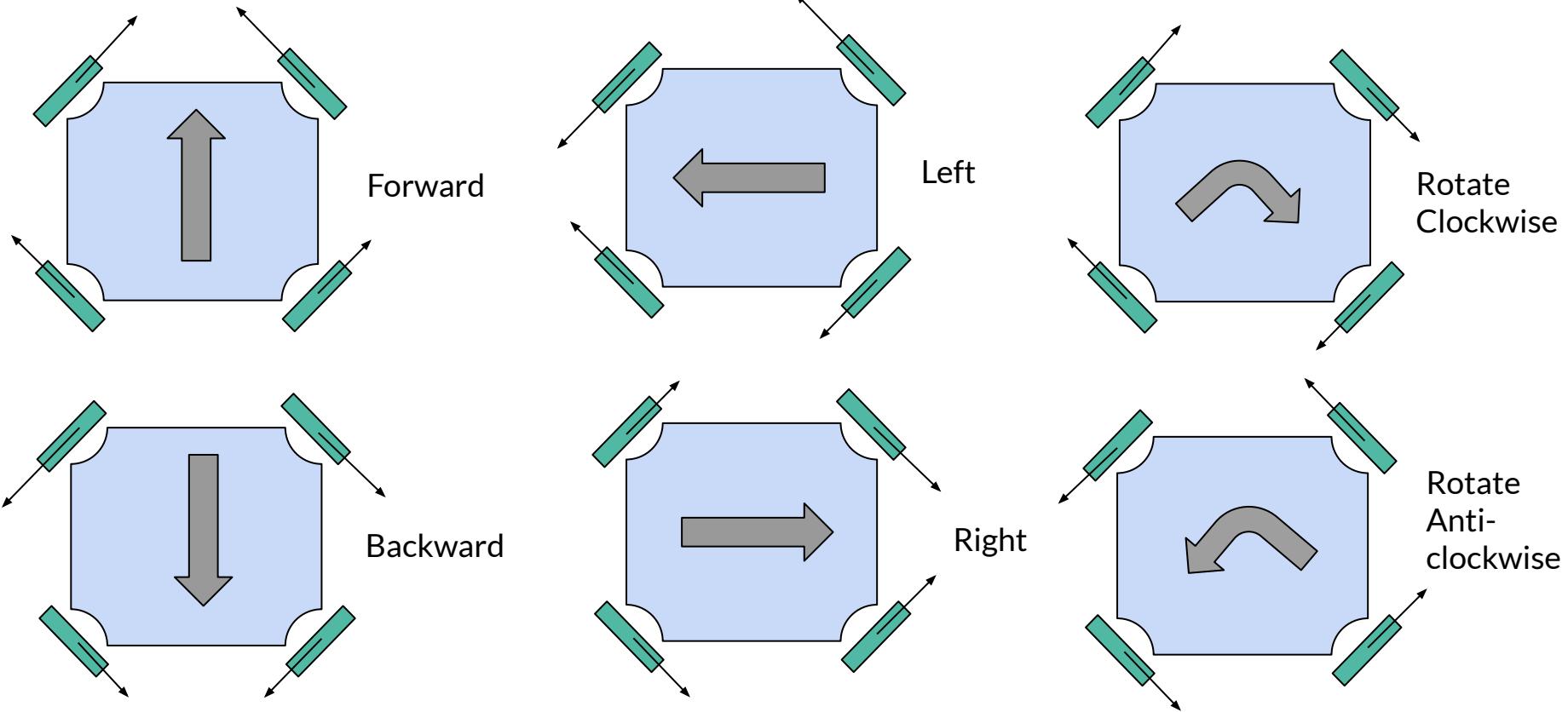
Comparatively  
expensive



## Fix

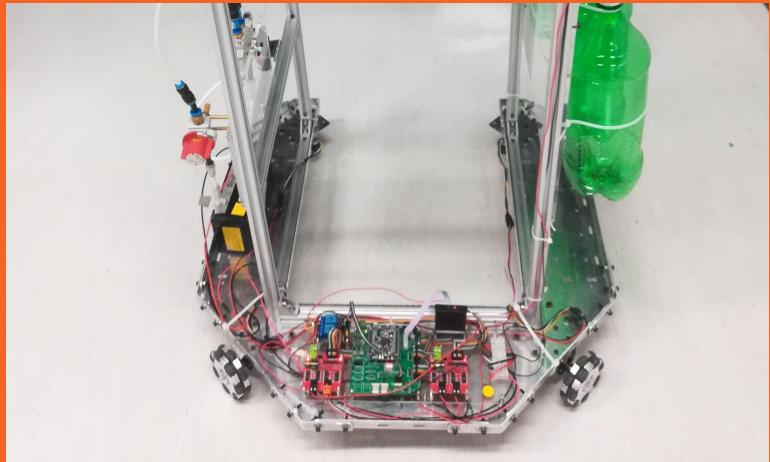
- ❑ Mount four omni wheels sideways
- ❑ Achieve Mecanum wheel performance



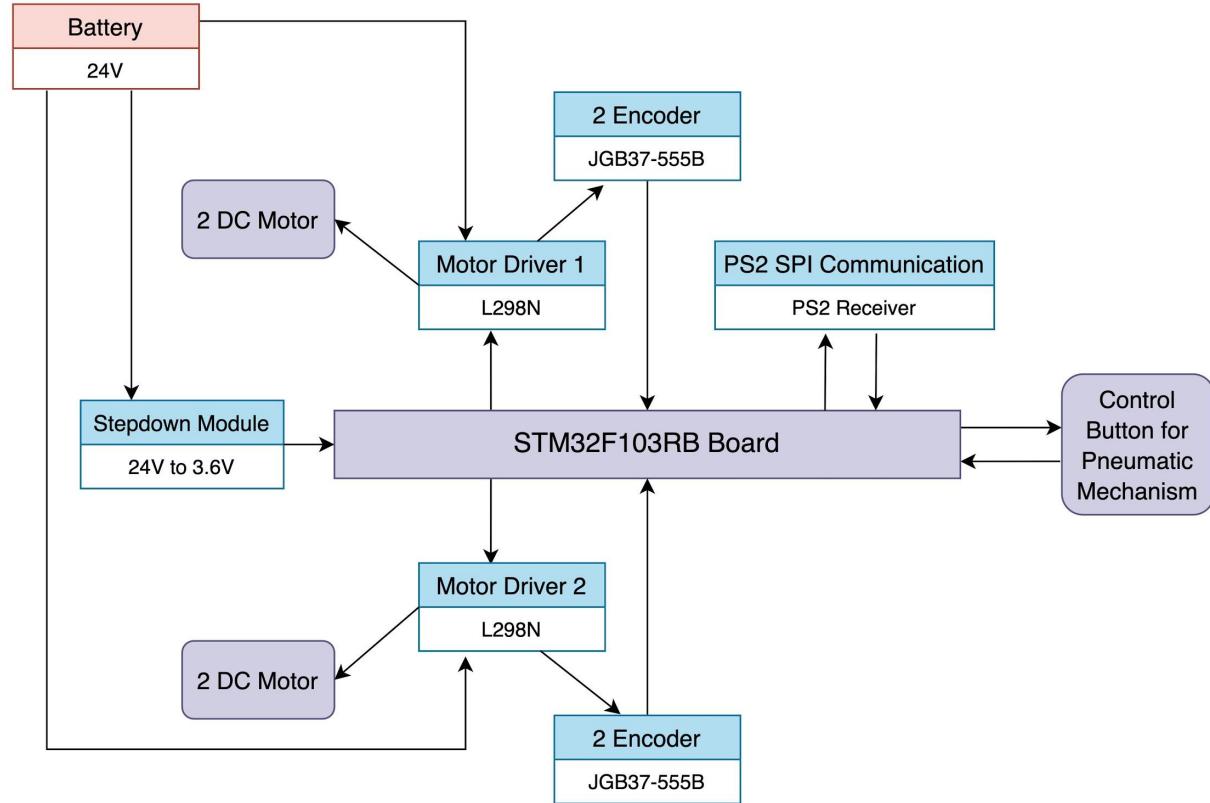


# Final Wheel Configuration

- ❑ Forward, Backward,  
Left, Right: move  
around obstacles
- ❑ Rotate: aim and kick

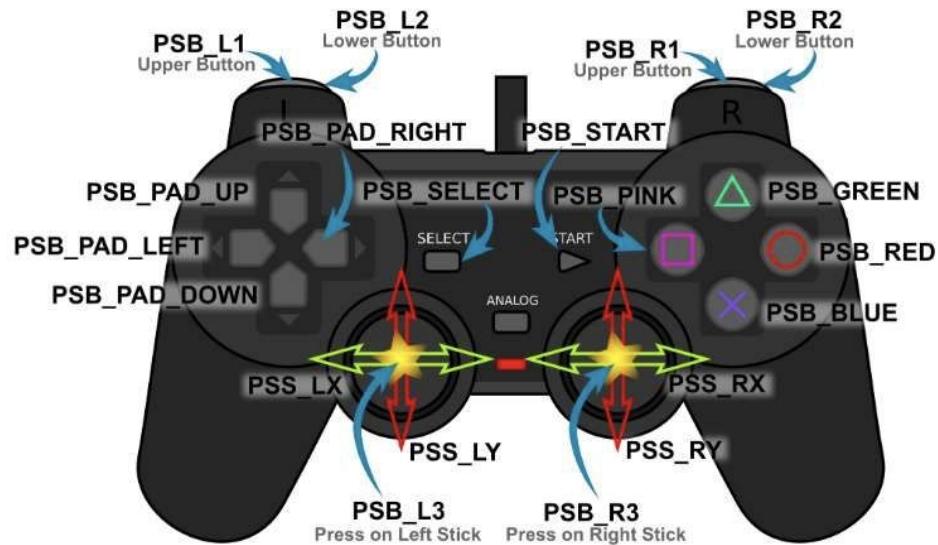


# Control System Block Diagram



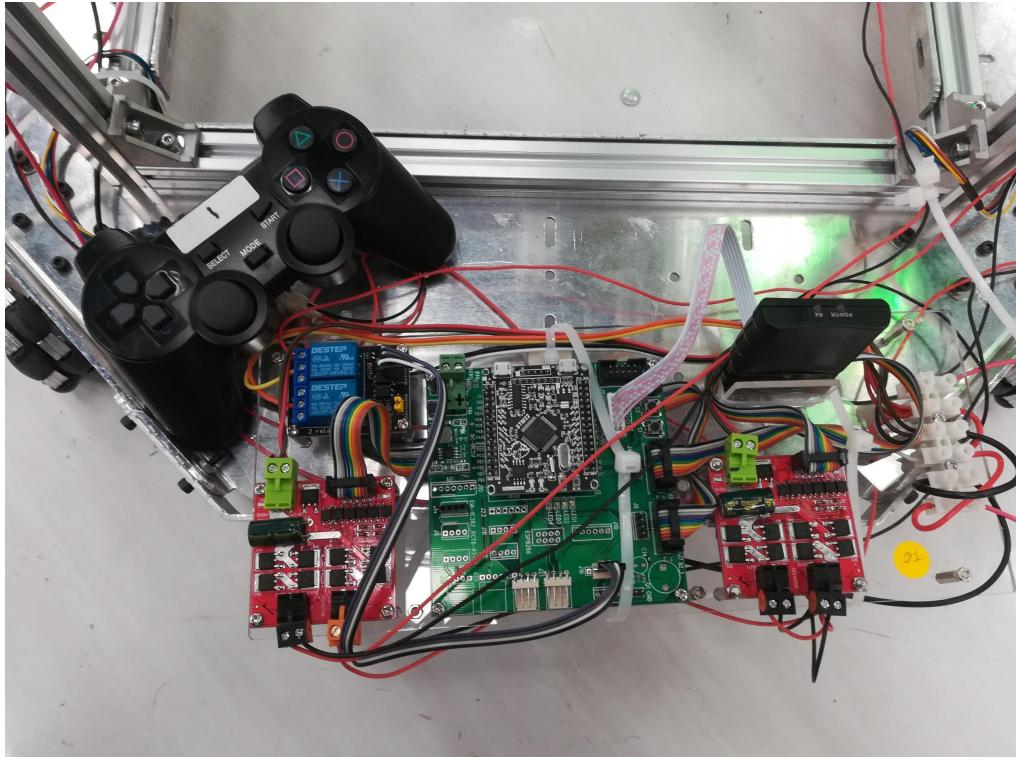
## ➤ PS2 Controller:

- Receives input from buttons and joysticks
- Transfer inputs back to the MCU controller
- Communication protocol modified with SPI



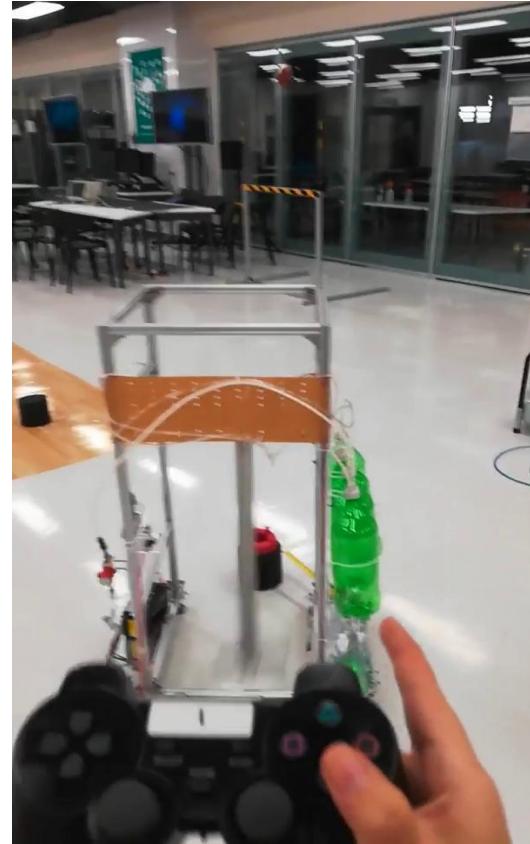
## ➤ PID Control:

- Amount of joystick movement
- Translates to motor PWM percentage  
(Proportional control)
- PID parameters to keep 4 wheels at the same speed



## ➤ **Button Release:**

- External interrupt from  
PSB\_Blue button
- Release the actuator  
when pressed



# Mechanical Part

Pneumatic design  
and installation

1

Mount the  
pneumatic  
actuator

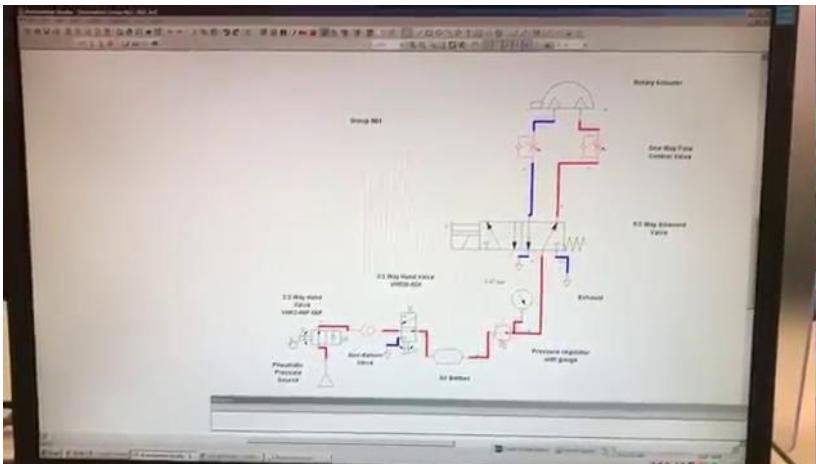
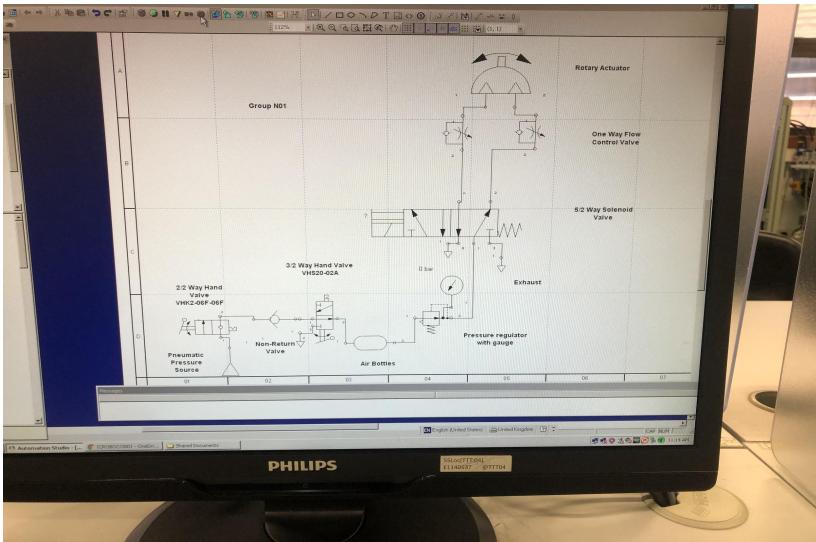
2

Mount the kicking  
leg to actuator

3

# Pneumatic Design

- Rotary Actuator
- One Way Flow Control Valve
- 5/2 Way Solenoid Valve
- 3/2 Way Hand Valve (VHS20-02A)
- Pressure regulator with gauge
- Non-Return Valve
- 2/2 Way Hand Valve (VHK2-06F-06F)



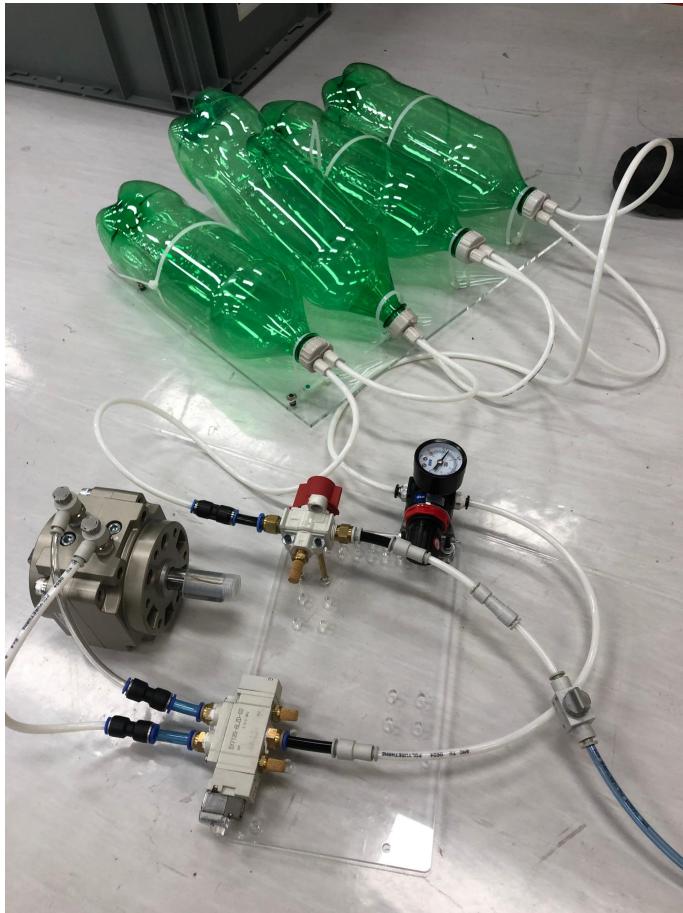
## – Installation

### Problems:

1. Tightness of nylon cables
2. Not enough space for the air bubble source
3. Lack of space for the actuator

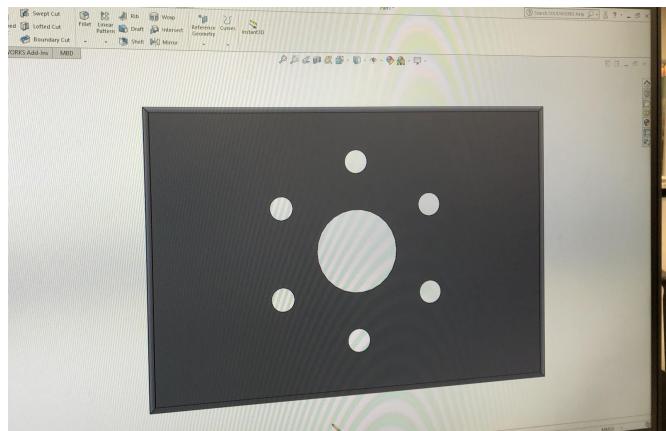
### Solutions:

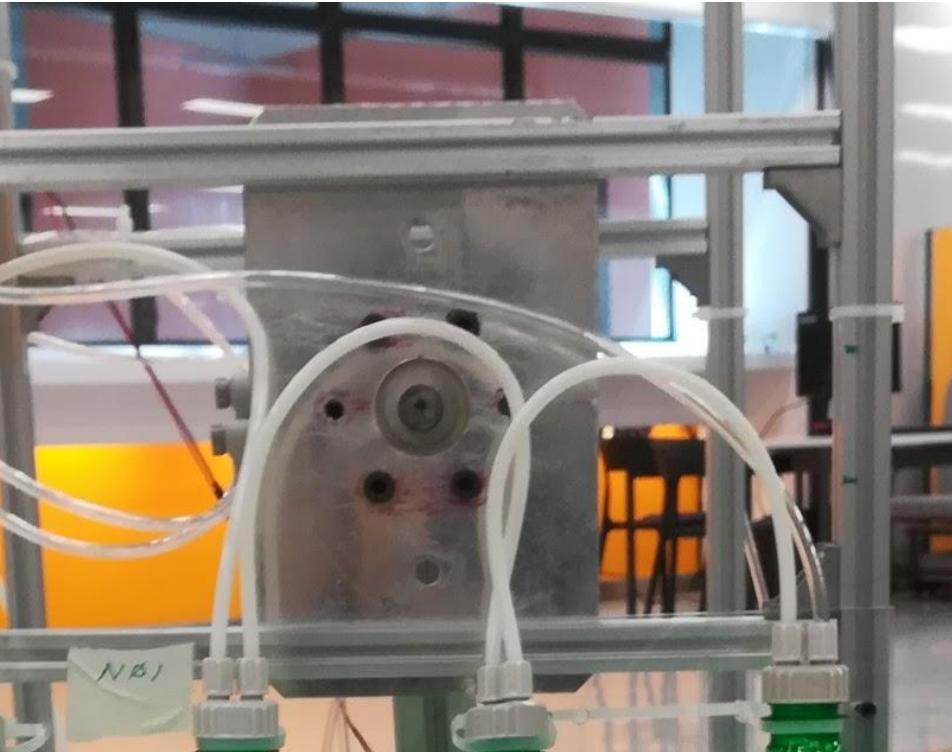
1. Use new cables to make it less tight
2. Connected all of them on the board
3. Manufacture a new platform



## — Rotary Actuator

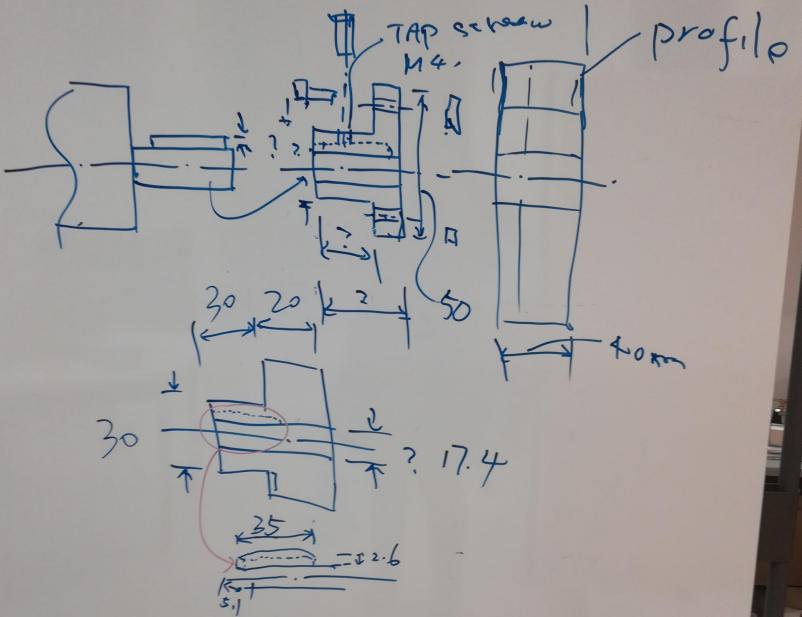
- Manufactured 2 parallel plates
- 6 designed entrances
- Enough distance to connect the pipes between pneumatic system





## Connect the actuator

- A mask is used for mounting



# Connect the leg

- From scratch, manufacturing to assembly



# Final Robot

The outcome is satisfactory :-J

## Move & Kick



85 /100



Thank you

# Q&A