TrailerMate

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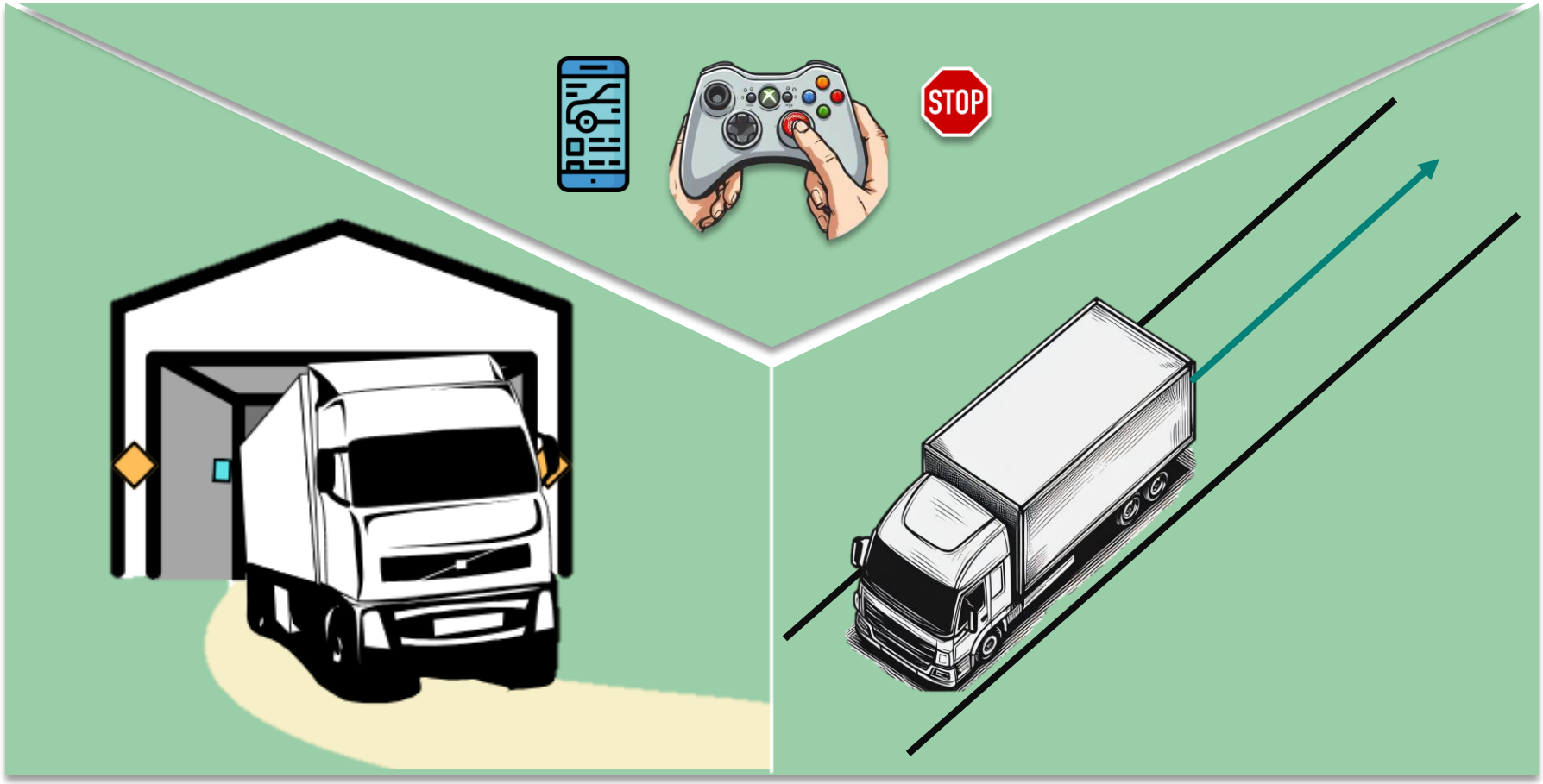
Reverse gear library



SCRUM Master : Emilie Fraumar

3 Goals

- Trailer angle
- Car automation
- Obstacles detection

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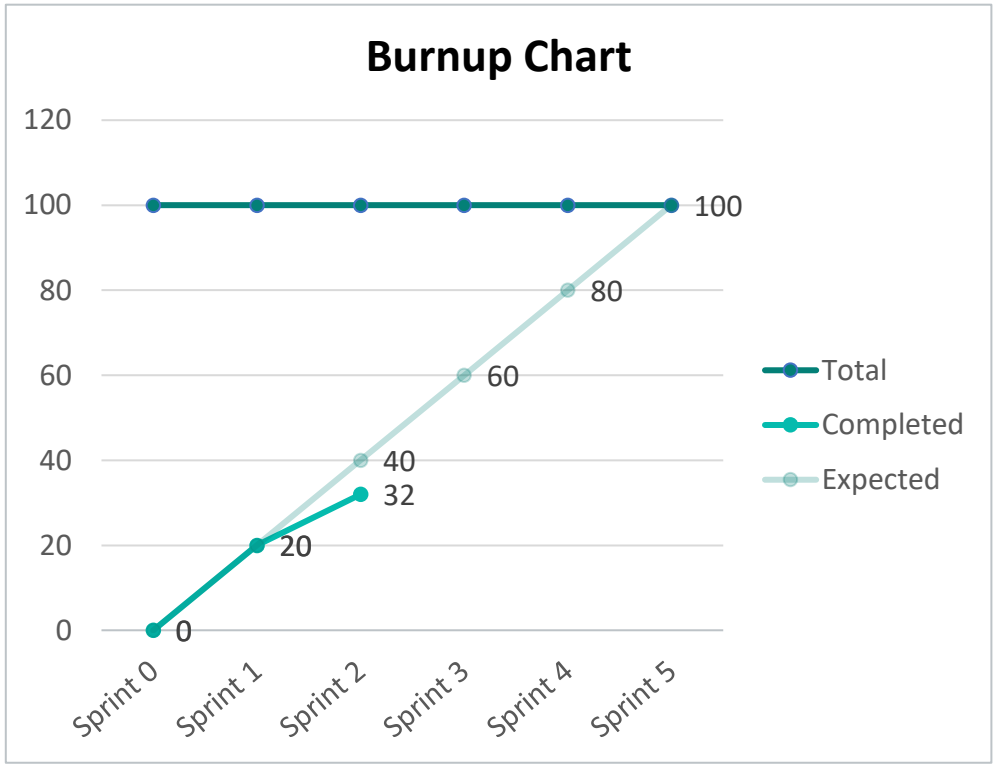
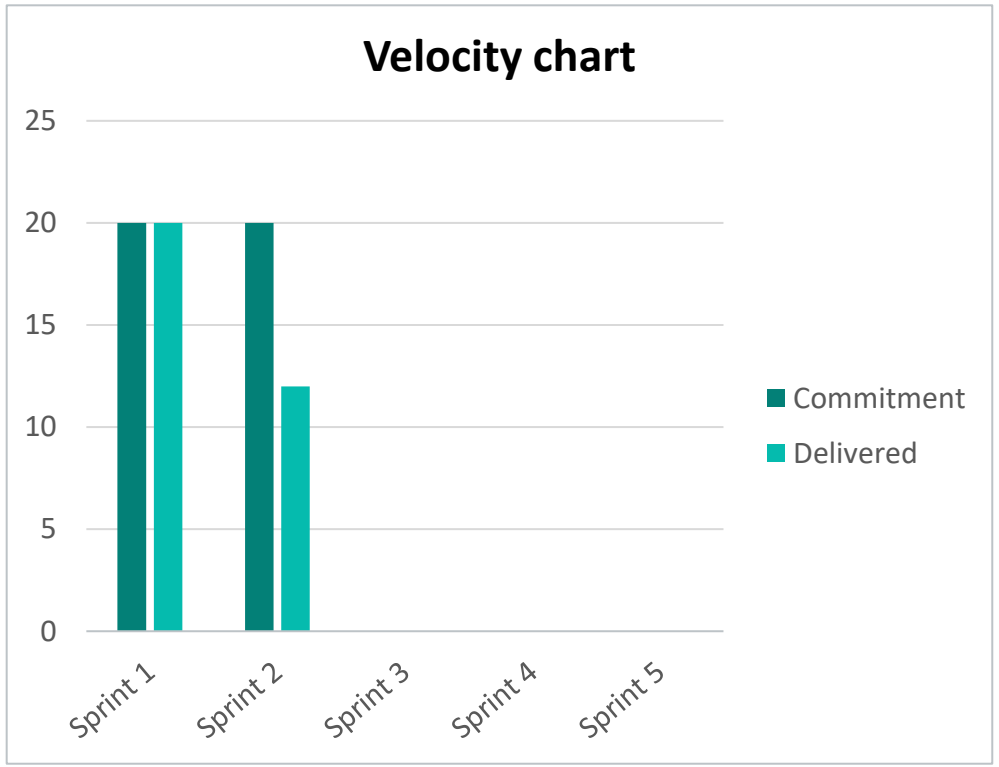
11/22
Sprint start

11/29
'Real' start

Installation of the potentiometer

Programming and testing

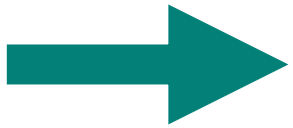


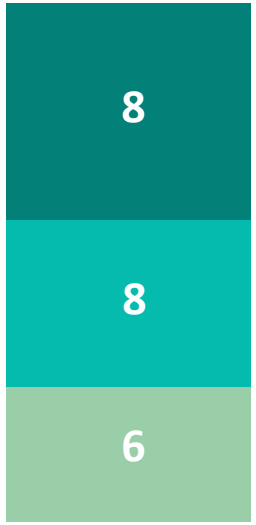


Slight delay on the overall project

Better assessment of task complexity

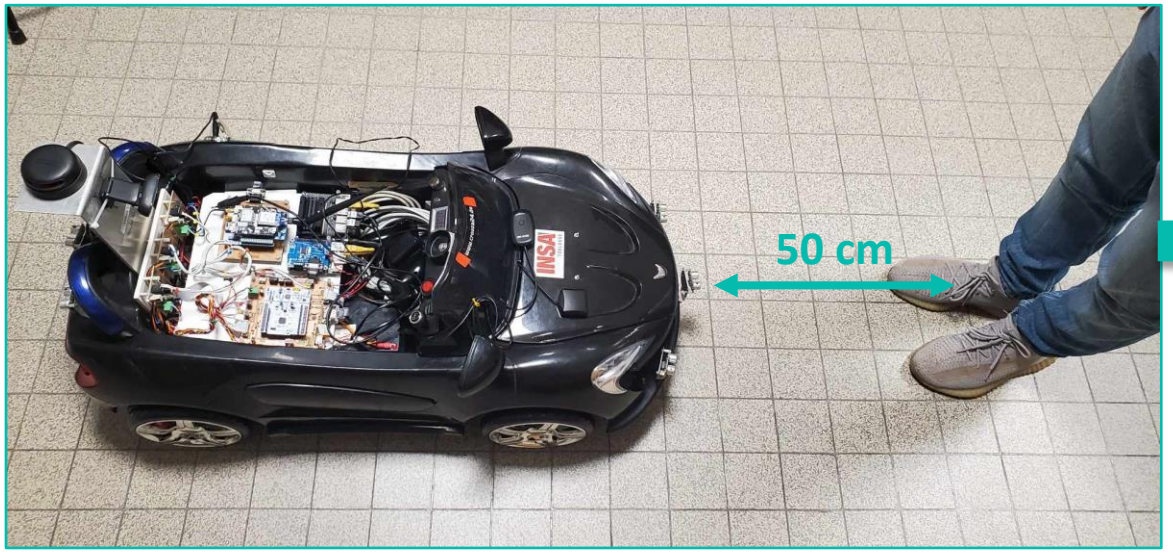
Schedule control & organization



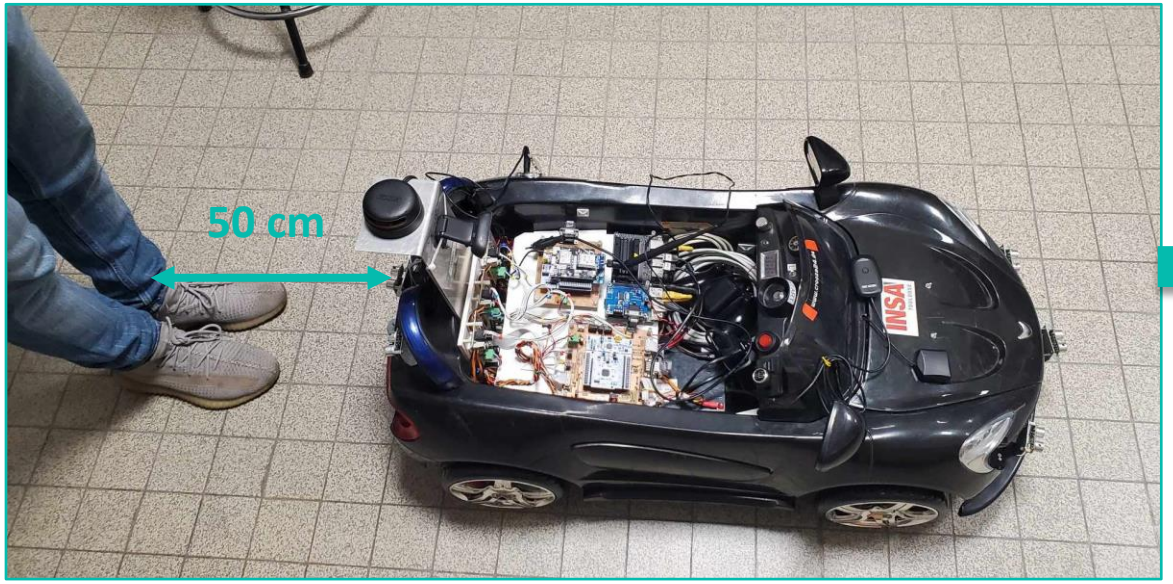


- Stopping in front of an obstacle *OK*
- Detect obstacles with the trailer *OK*
- Avoiding obstacles with the trailer *ABANDONED*
- Closed-loop reverse control *OK*
- Improve the wheel adhesion *NOT STARTED*
- Measuring the angle of the trailer *STARTED BUT NOT FINISHED*

Obstacle detection




```
---
stop_car_rear: false
stop_car_front: true
---
```




```
---
stop_car_rear: true
stop_car_front: false
---
```

3

Obstacle detection with the trailer

HOW ?

Connecting sensors directly to the car

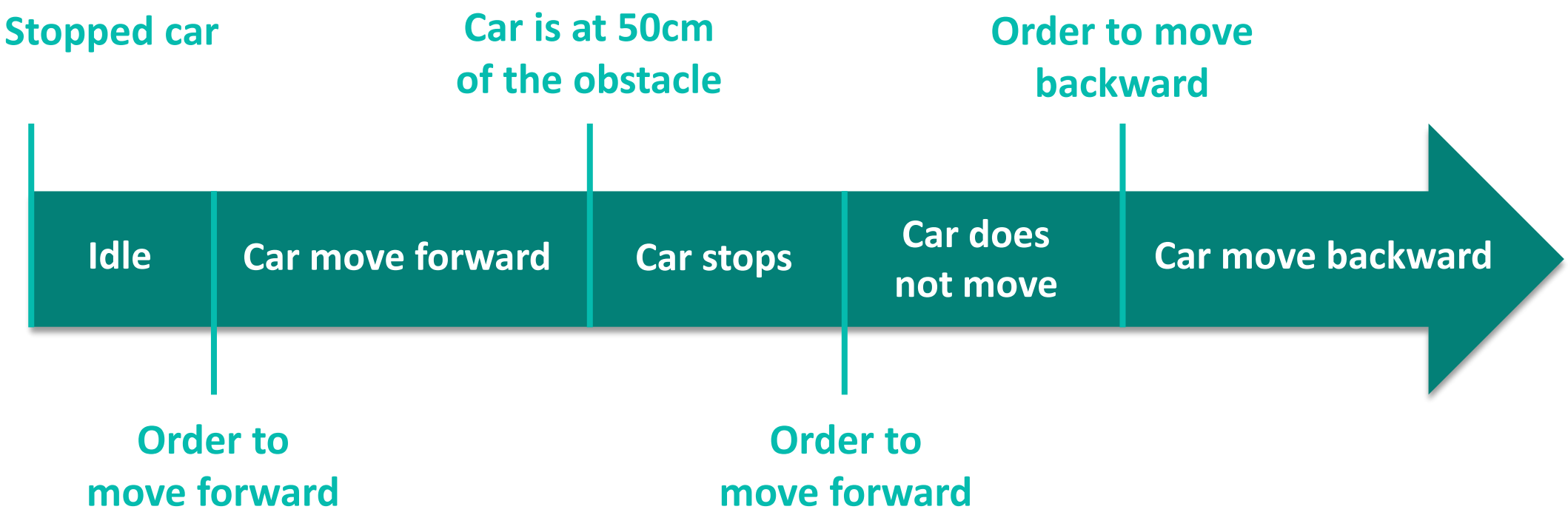
- Time
- Efficiency
- Cost

Using raspberry of the trailer

- Time
- Efficiency
- Cost

3

Demonstration sequence



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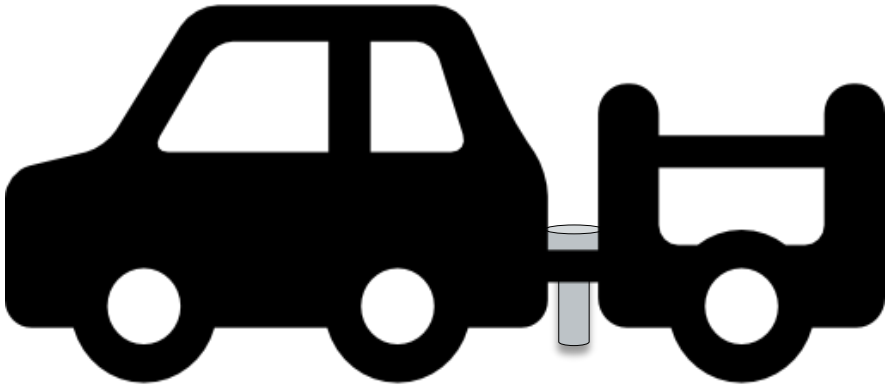
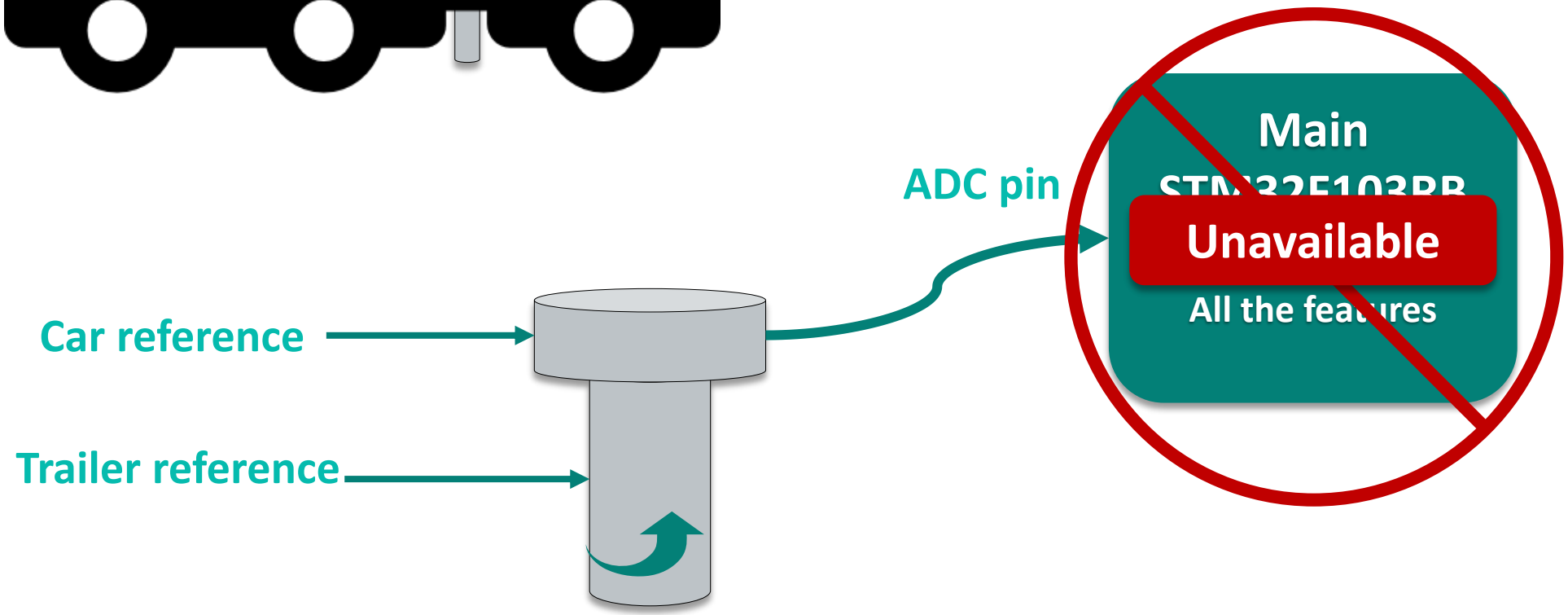
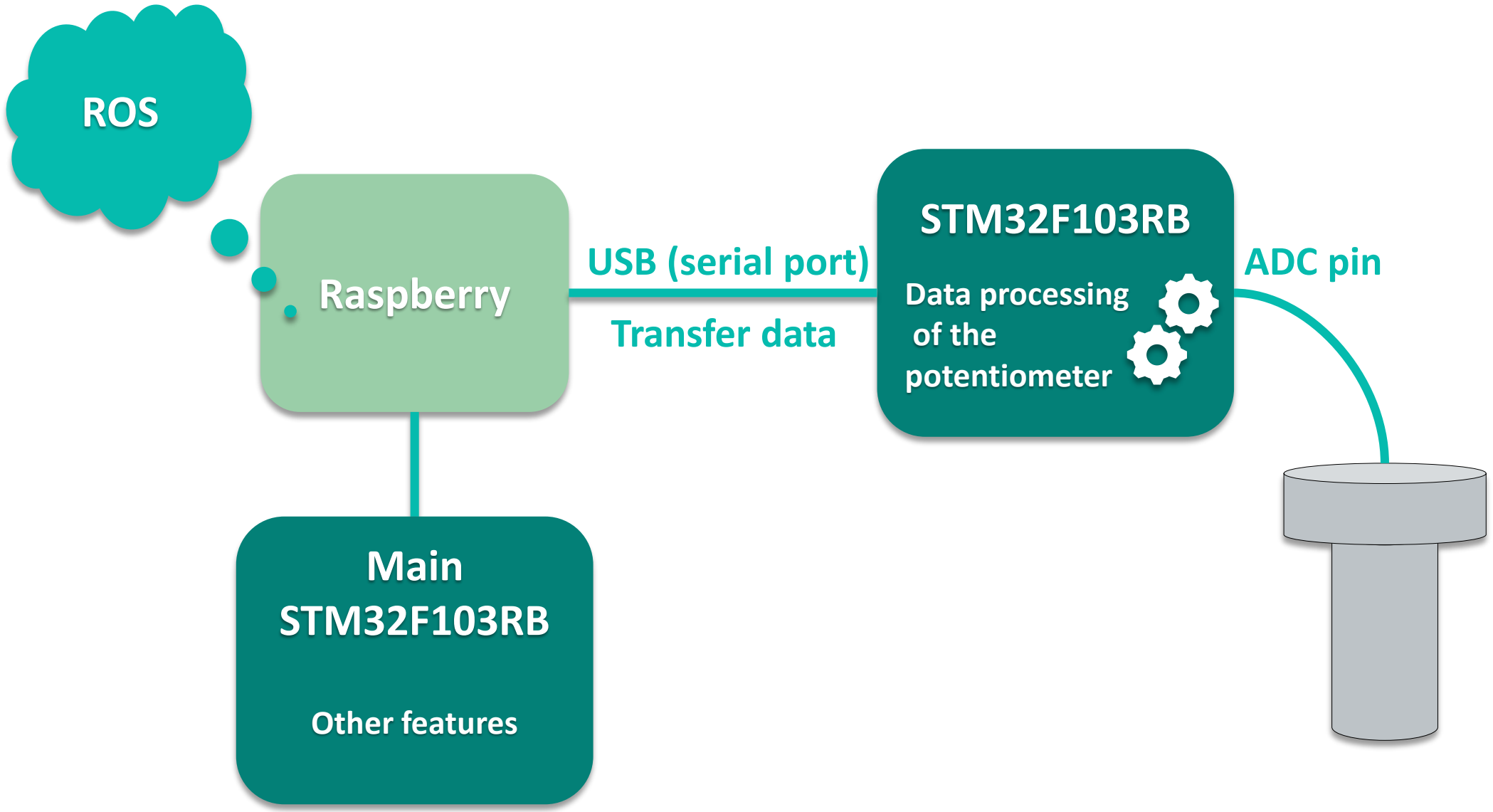
Let’s see the demonstration!

3



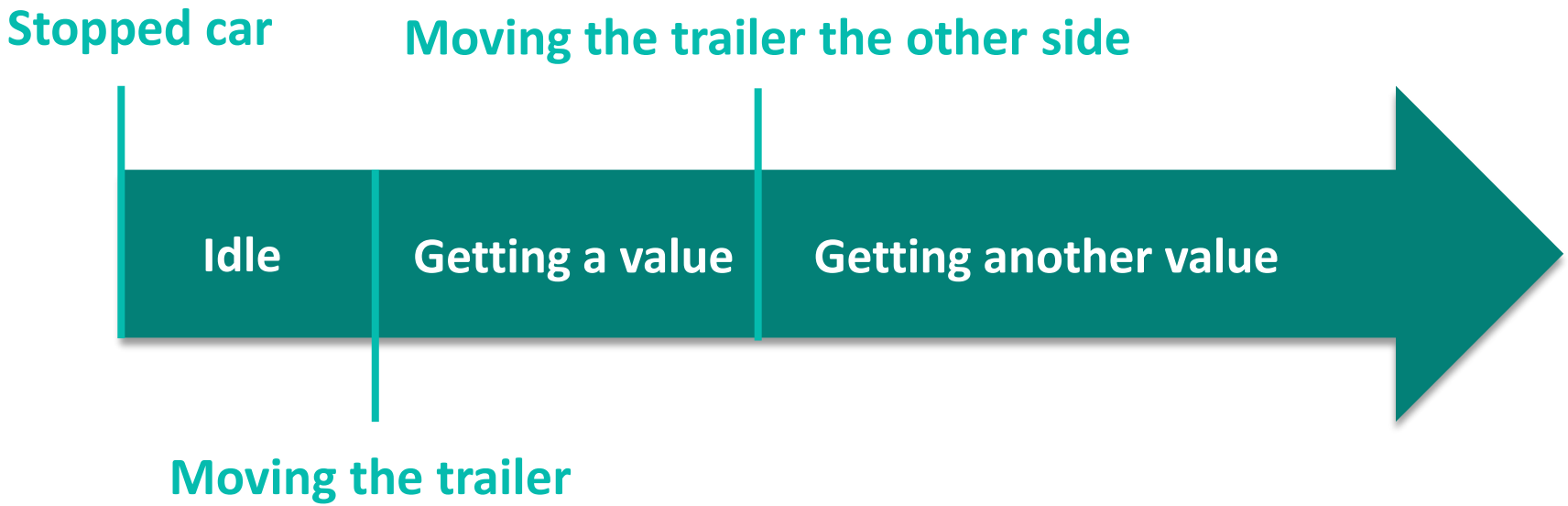

ADC pin
Main
Unavailable
All the features
Car reference
Trailer reference

3


ROS
Raspberry
USB (serial port)
Transfer data
STM32F103RB
Data processing of the potentiometer
ADC pin
Main STM32F103RB
Other features

3

Demonstration sequence



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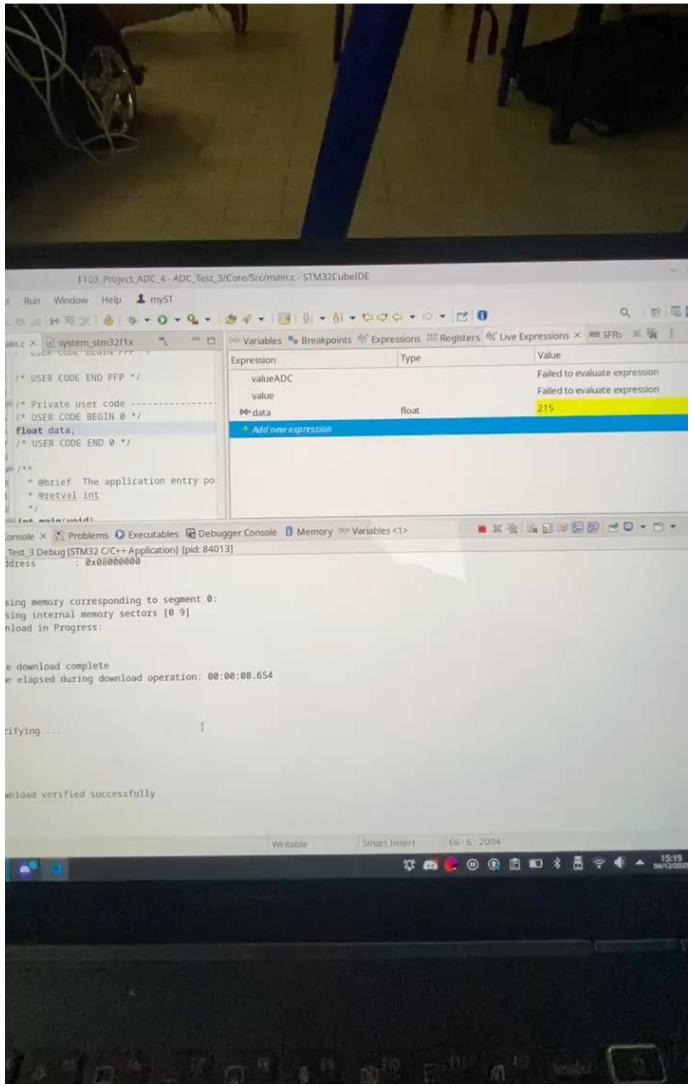
Let’s see the demonstration!



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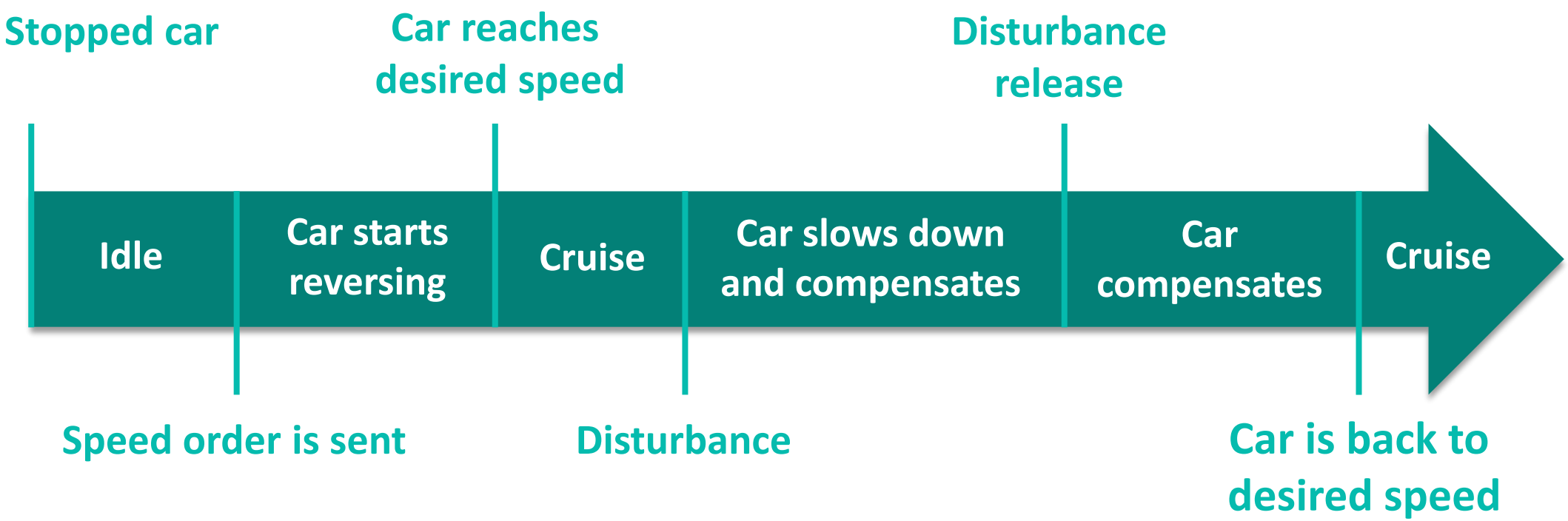
Demonstration sequence



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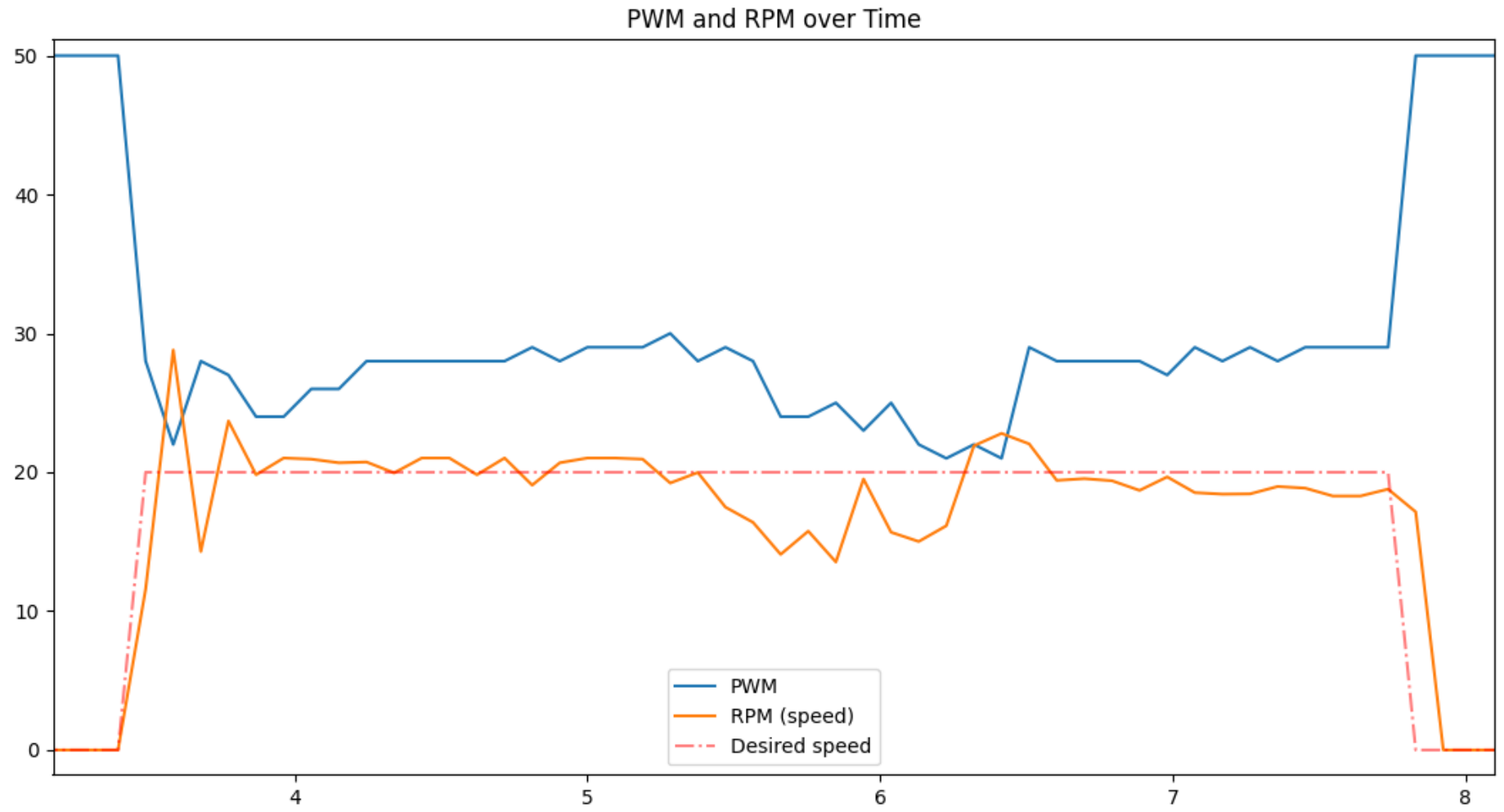

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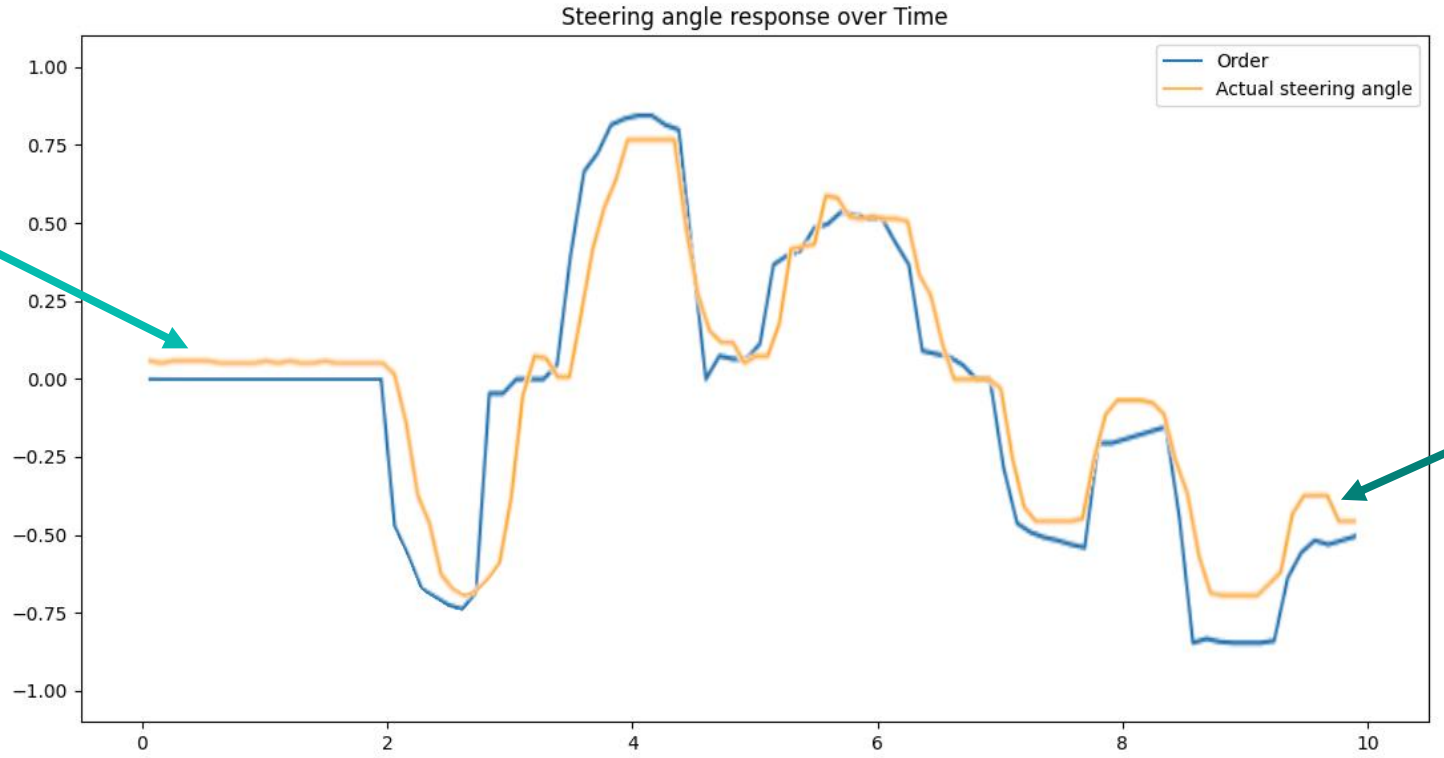
Car's steering control loop

The current control loop is operational ! But … not very precise

Tolerance error



Overshoot

Next sprint goals

SCRUM Master : Sarah BOBILLOT

3 Goals

- **Trailer angle**
- **Car automation**
- **Obstacles avoidance**

Next sprint organisation

Measure of the trailer angle 17

Improve the wheel's adhesion 3

Implement control loop on the car's steering 8

Improve control loop response 13

Avoid an obstacle forward in automatic mode 17

Next sprint acceptance test

Trailer angle

Initial state: The car is stopped.

Action: Turn the trailer manually.

Result: The sensor post the right angle of the trailer (at more or less 2 degrees)

Car automation

Initial state: The car is stopped.

Action: Ask the car to turn at a given angle.

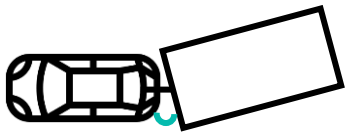
Result: The car turns at the given angle.

Obstacles avoidance

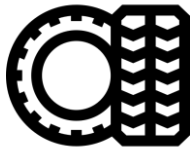
Initial state: The car is moving forward.

Action: Put an obstacle in its path and run automatic mode.

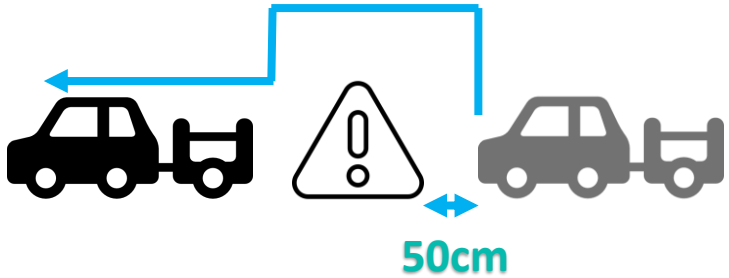
Result: The car detects the obstacle, avoids it and continues.



Angle of the trailer



Angle of the wheels



Suggestions & Questions ?