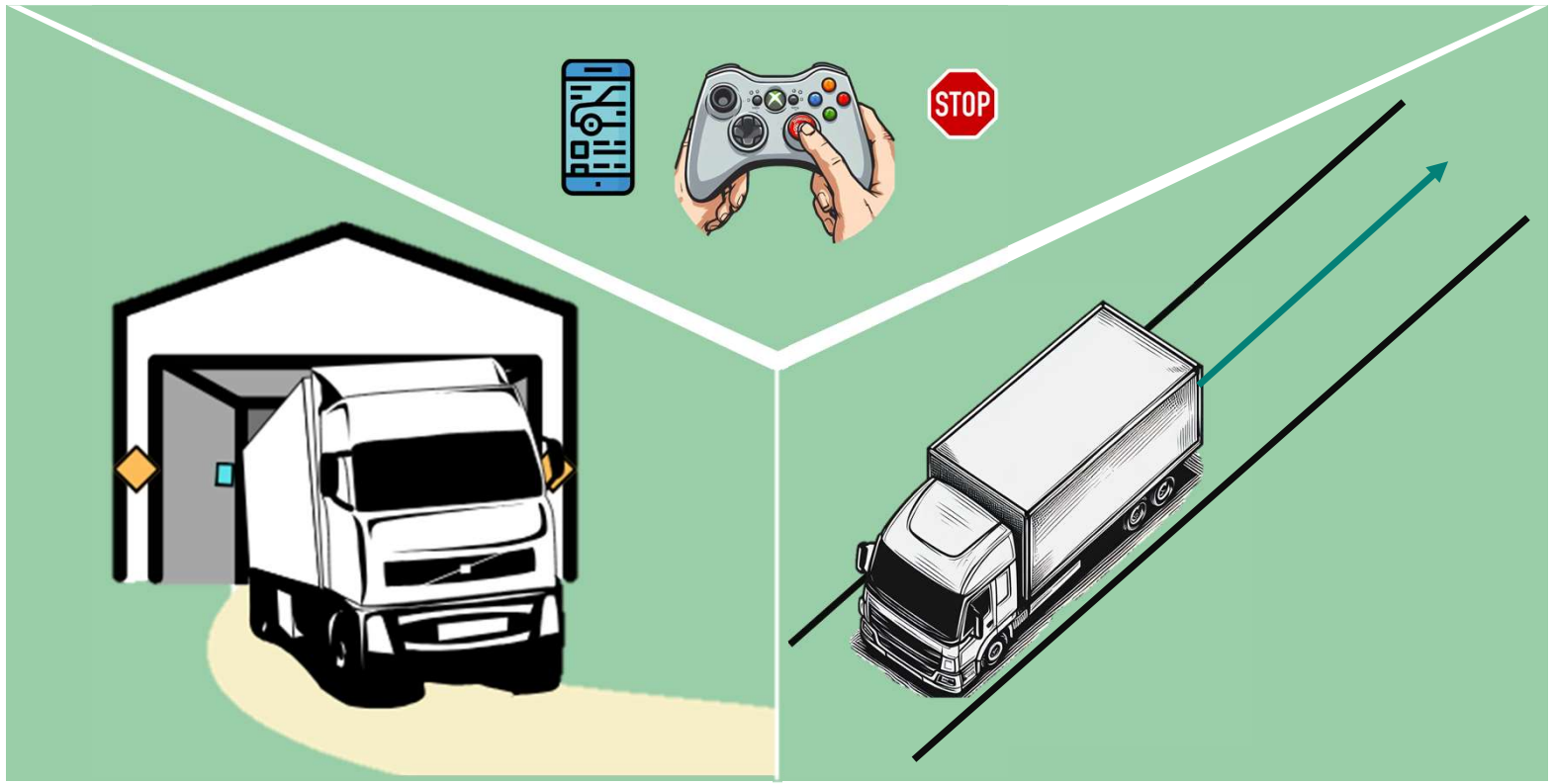
TrailerMate

Team Jason

Abdessamad Amadar
Malaurie Bernard
Sarah Bobillot
Emilie Fraumar
Killian Gonet
Réda Kharoubi
Antonin Laborde-Tastet

Table of content

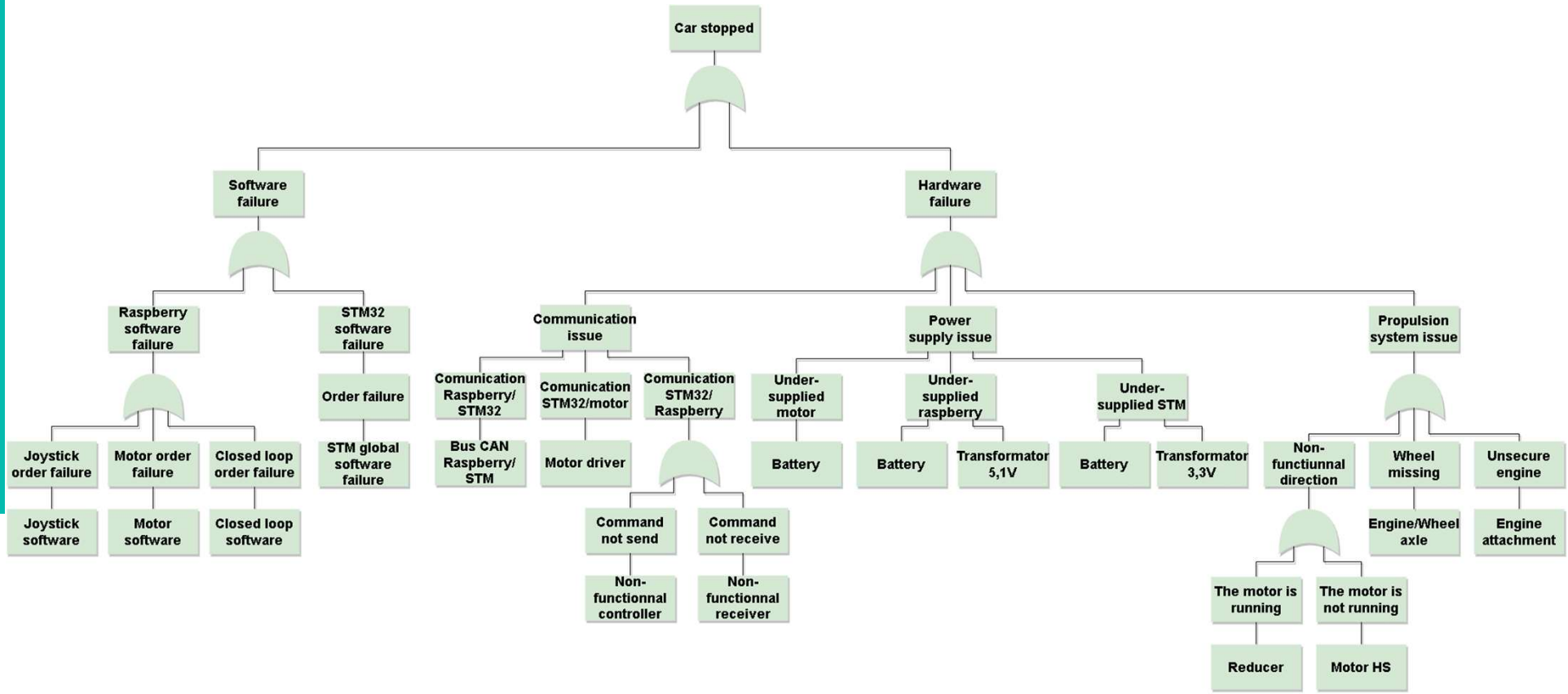
Reverse gear library

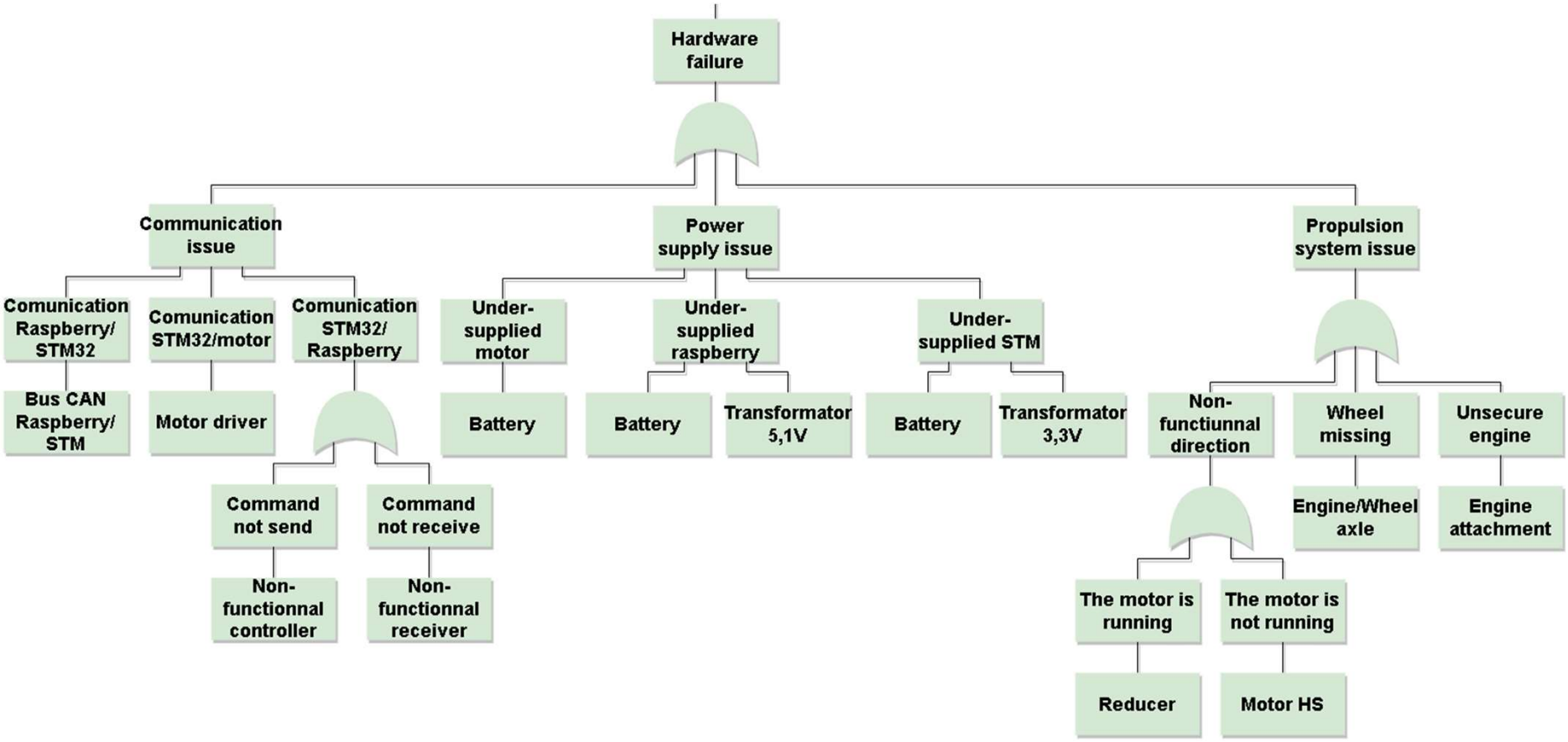


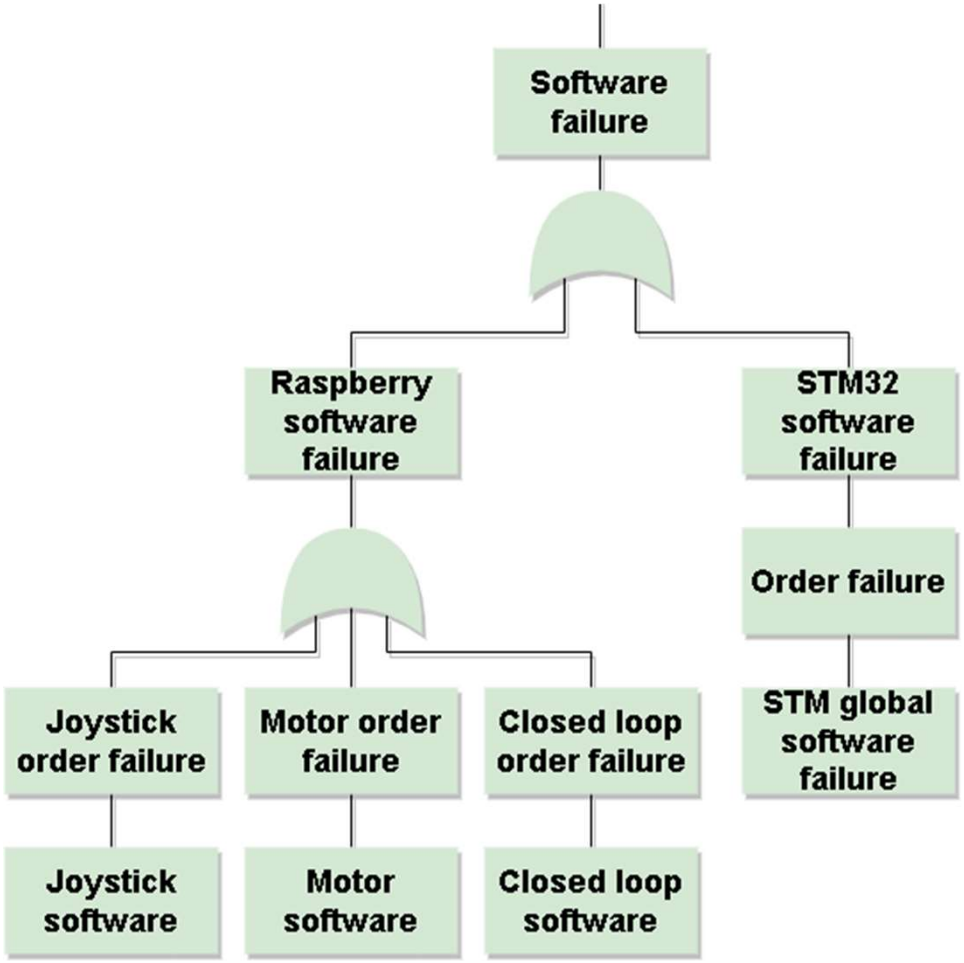
Risks identification

Battery	Network software	Ultrasonic sensor
Low	Very High	High
Very High	High	Medium
High	High	High
Recharge per use / control system of the battery level	Use an ethernet cable	Develop detection system / emergency button

Fault tree analysis



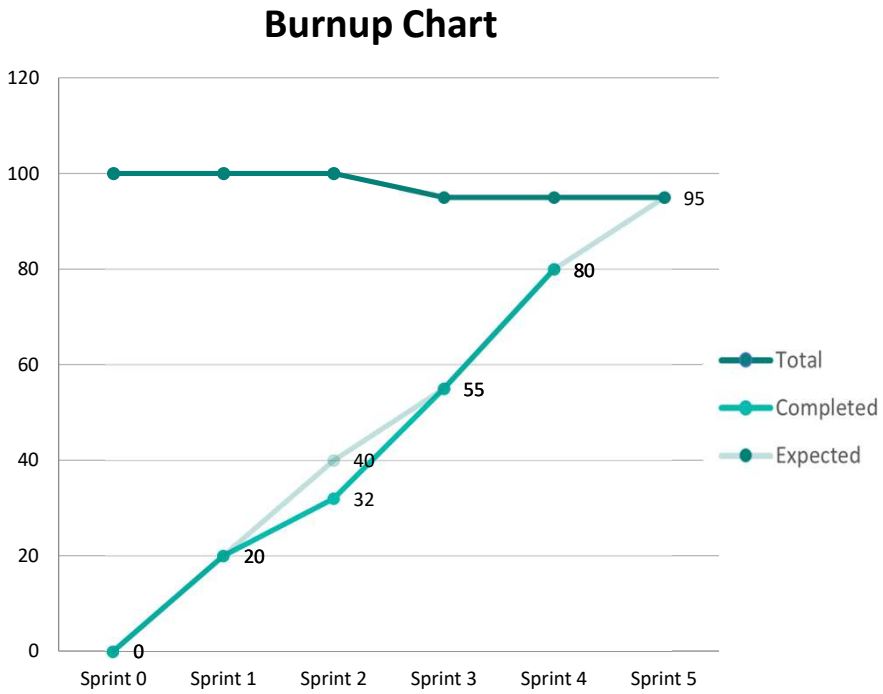

Hardware failure
Communication issue
Power supply issue
Propulsion system issue
Comunication Raspberry/ STM32
Comunication STM32/motor
Comunication STM32/ Raspberry
Under-supplied motor
Under-supplied raspberry
Under-supplied STM
Non-functiunnal direction
Wheel missing
Unsecure engine
Bus CAN Raspberry/ STM
Motor driver
Battery
Battery
Transformator 5,1V
Battery
Transformator 3,3V
Command not send
Command not receive
Engine/Wheel axle
Engine attachment
Non-functionnal controller
Non-functionnal receiver
The motor is running
The motor is not running
Reducer
Motor HS

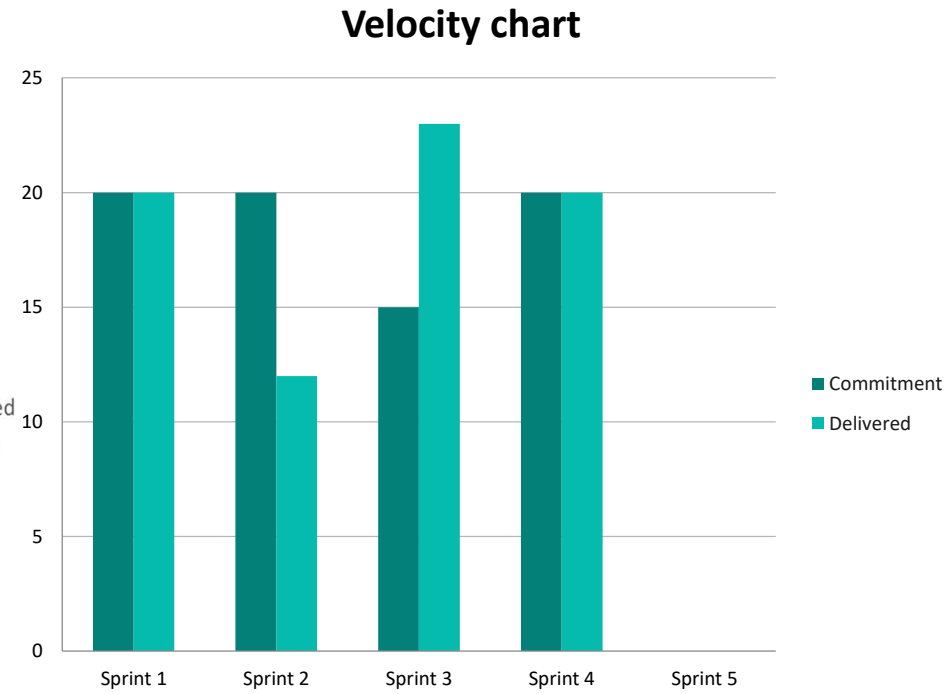

Software failure
Raspberry software failure
STM32 software failure
Order failure
Joystick order failure
Motor order failure
Closed loop order failure
STM global software failure
Joystick software
Motor software
Closed loop software

SCRUM Master : Malaurie Bernard

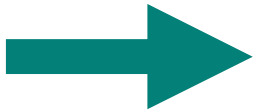
3 Goals

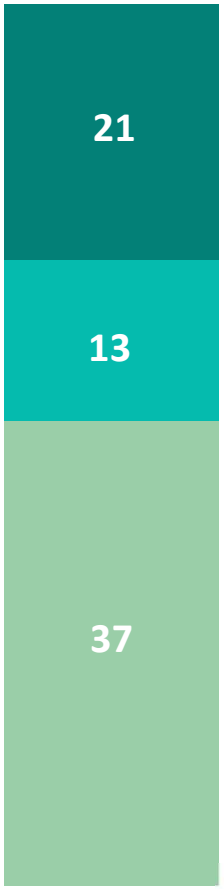
- Android application
- Reverse straight line
- Command automation


Burnup Chart
120
100
80
60
40
20
0
Sprint 0
Sprint 1
Sprint 2
Sprint 3
Sprint 4
Sprint 5
95
80
55
40
32
20
0
Total
Completed
Expected


Velocity chart
25
20
15
10
5
0
Sprint 1
Sprint 2
Sprint 3
Sprint 4
Sprint 5
Commitment
Delivered

Schedule control & organization





- **Command reception** *OK*
- **Record command** *OK*
- **Send command using joystick button** *OK*
- **Reverse control with the trailer** *Not finished*
- **The car sends the data to a server** *OK*
- **The application get the data** *OK*
- **The application display data minimastically** *OK*
- **The application display data elaborately** *(+8) OK*

5

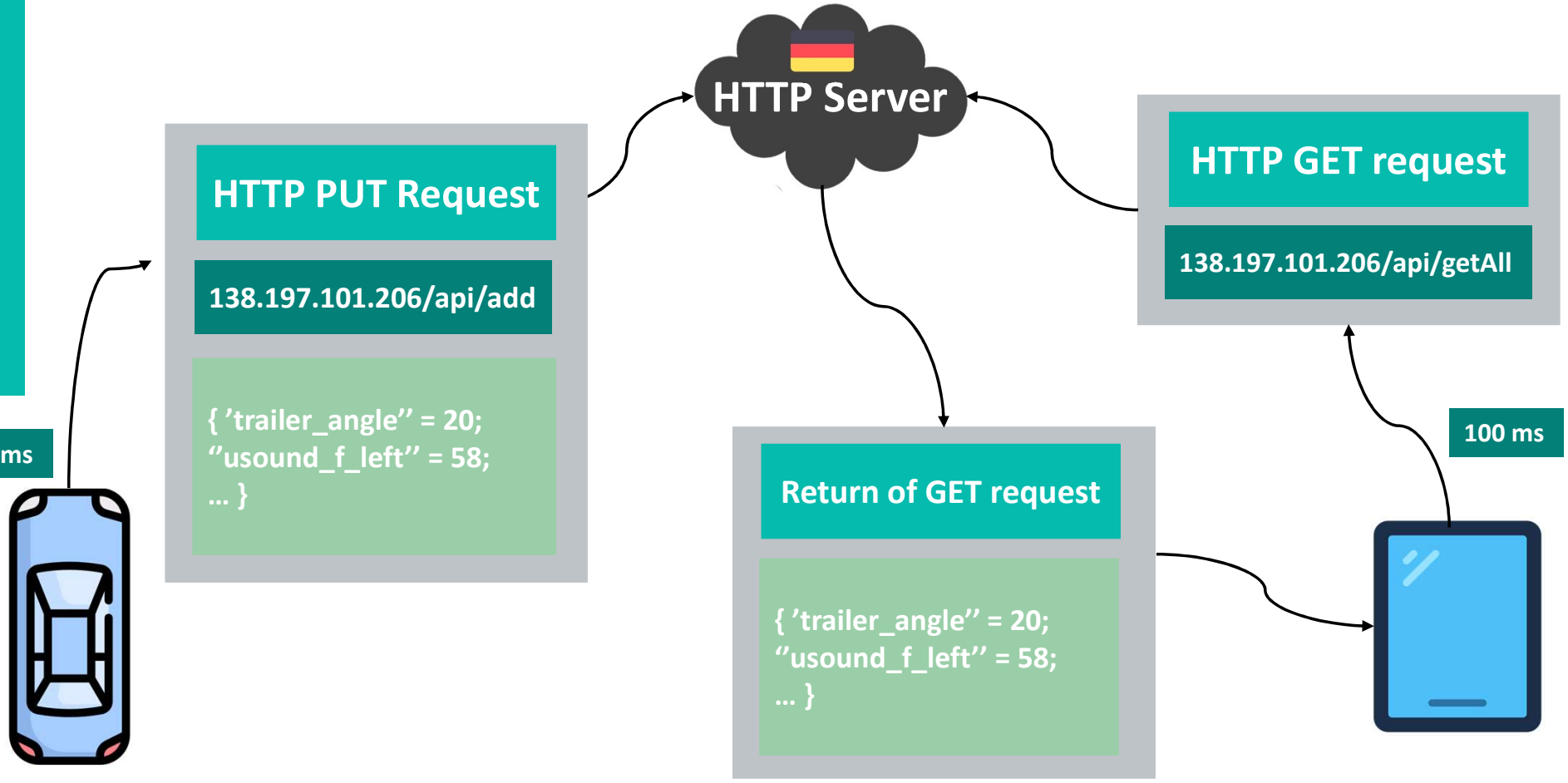
Why an Application ?

5

Use case: trailer dashboard

- Lighter server
- Portable version
- Longer development time
- Only for Android

5


HTTP Server
HTTP PUT Request
138.197.101.206/api/add
{ 'trailer_angle'' = 20;
''usound_f_left'' = 58;
... }
HTTP GET request
138.197.101.206/api/getAll
100 ms
Return of GET request
{ 'trailer_angle'' = 20;
''usound_f_left'' = 58;
... }
100 ms

Demonstrations

5

Car speed percentage

Front and back ultrasound status

Animation of trailer rotation

Main numerical data of the car

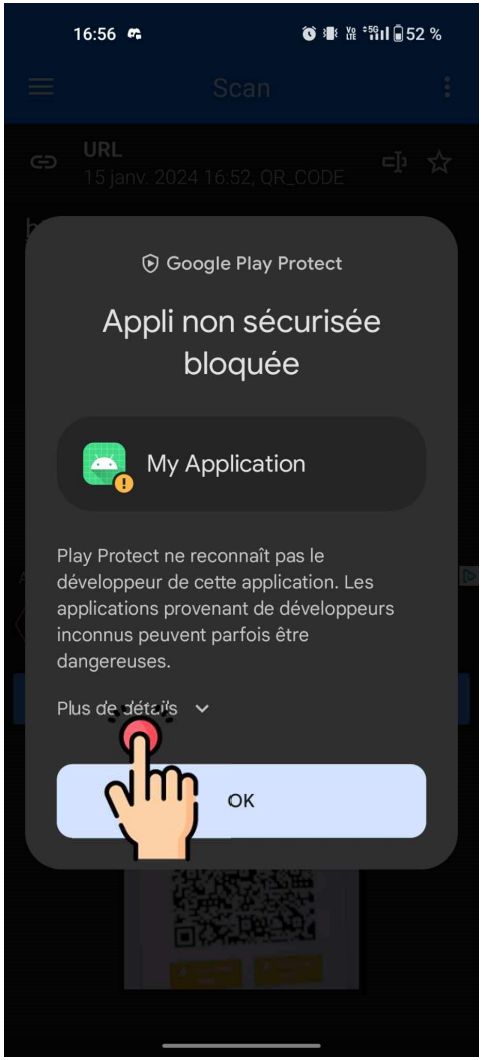
...

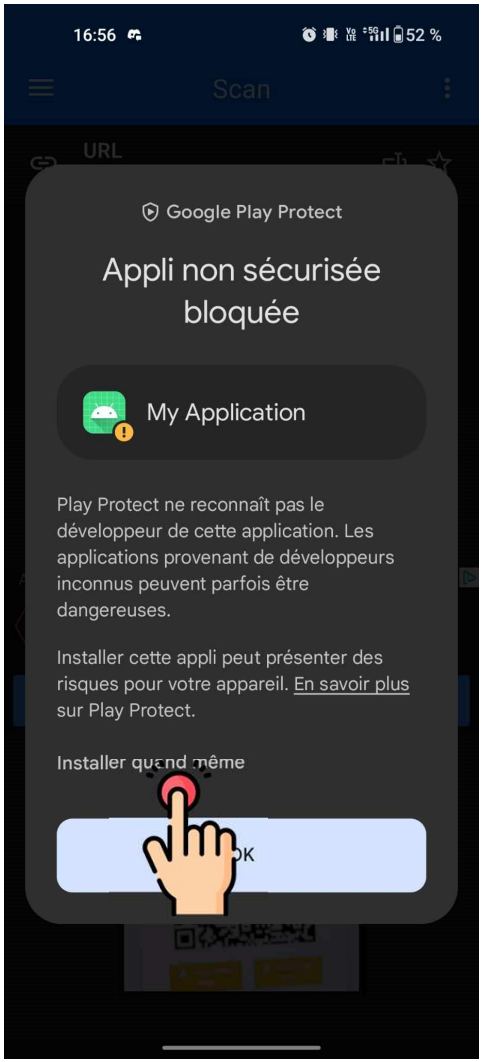
And more data and controls to come!

Demonstrations

5

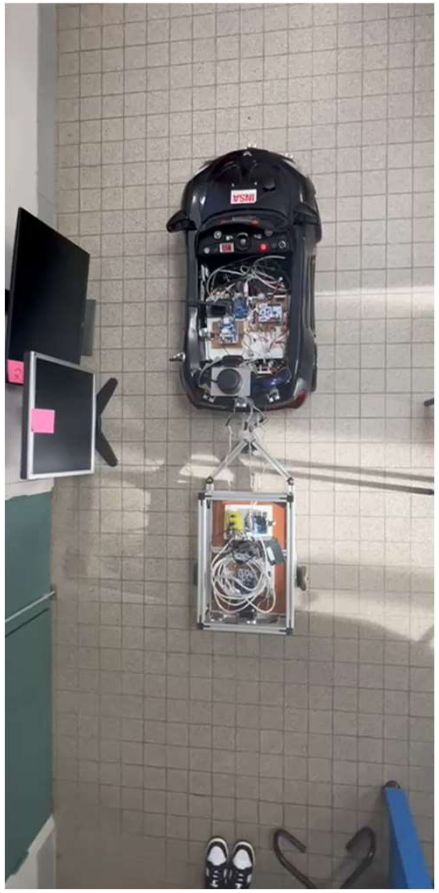
Download the app!

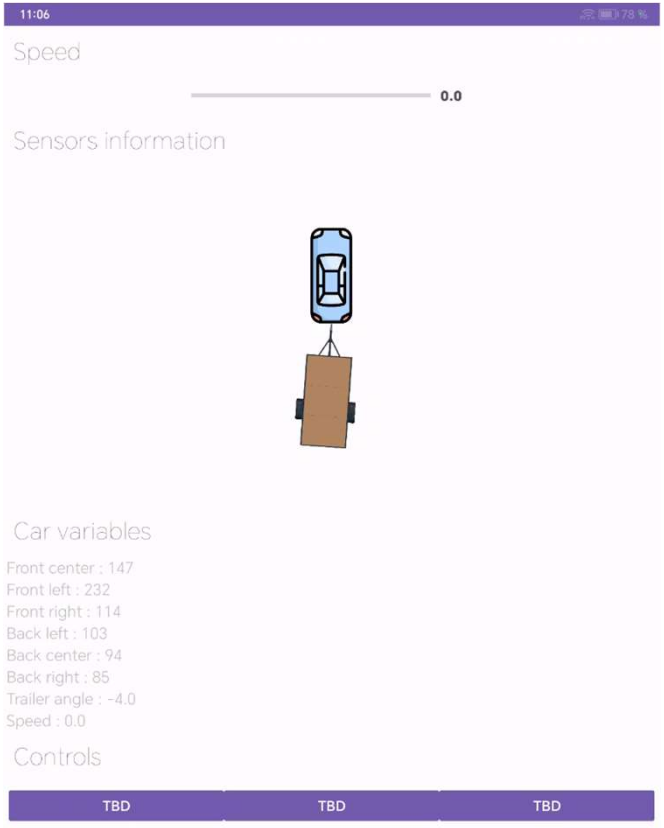




5

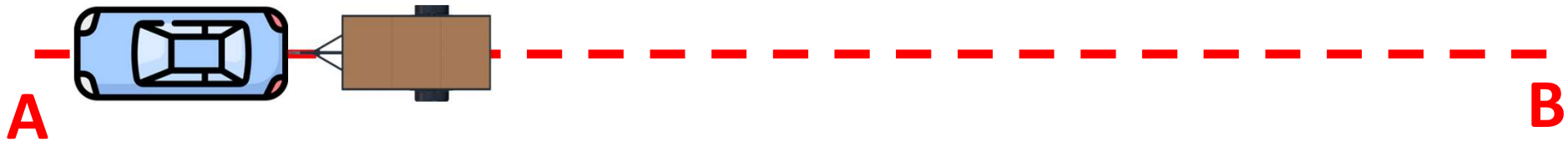
Let’s see the demonstration!





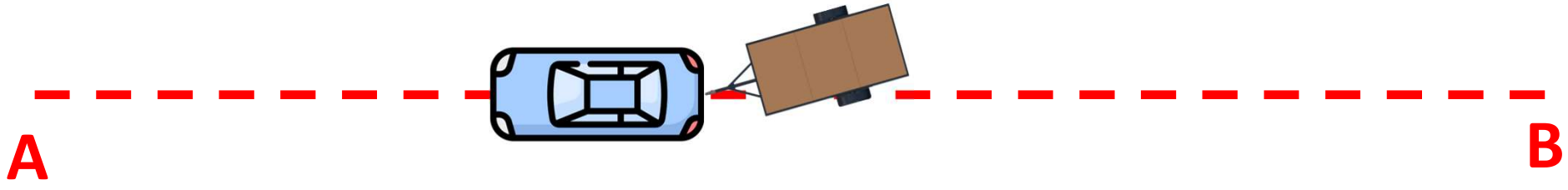
5

Reverse straight line



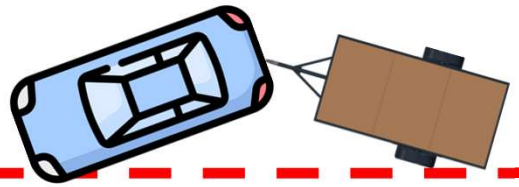
5

Reverse straight line



5

Reverse straight line

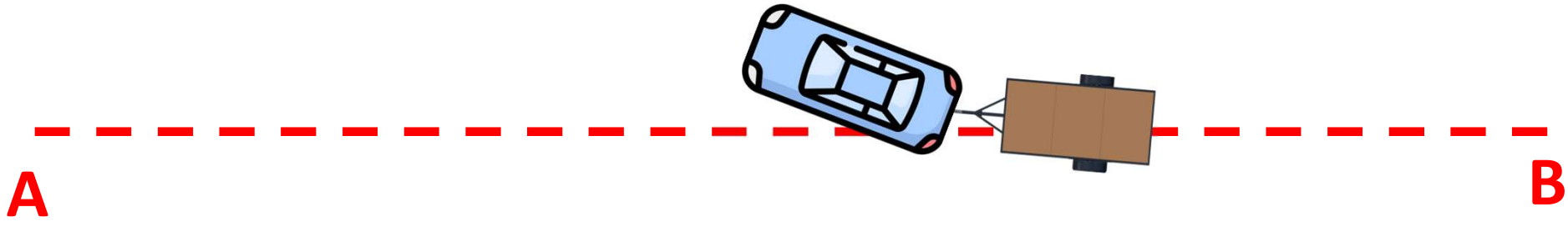


A

B

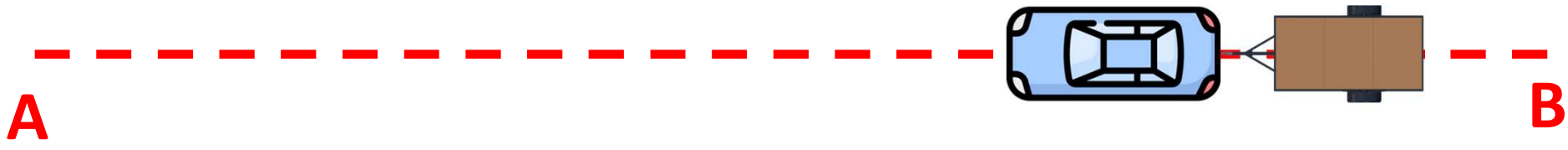
5

Reverse straight line



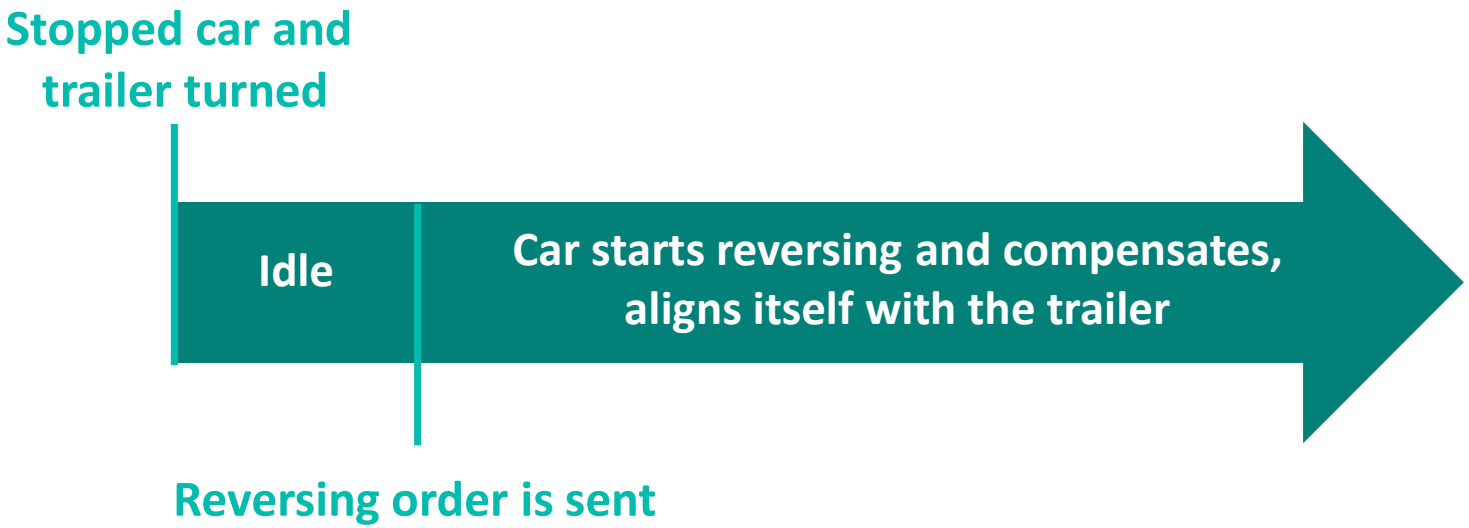
5

Reverse straight line



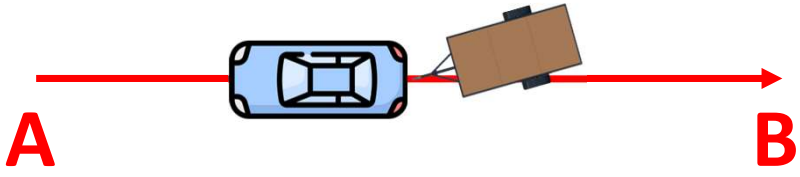
5

Demonstration sequence



5

Let’s see the demonstration!



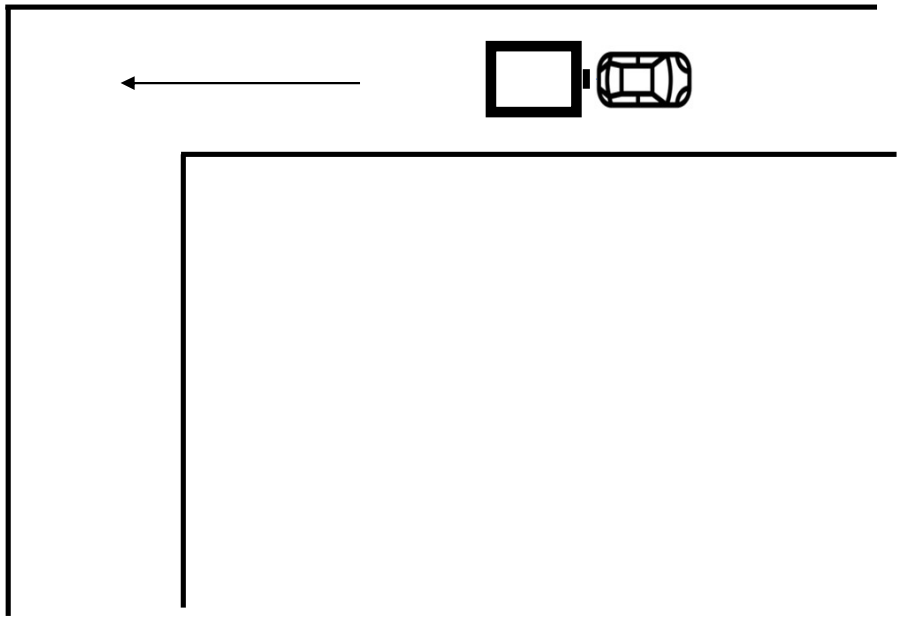
How to do the straight line ?

Path planning?

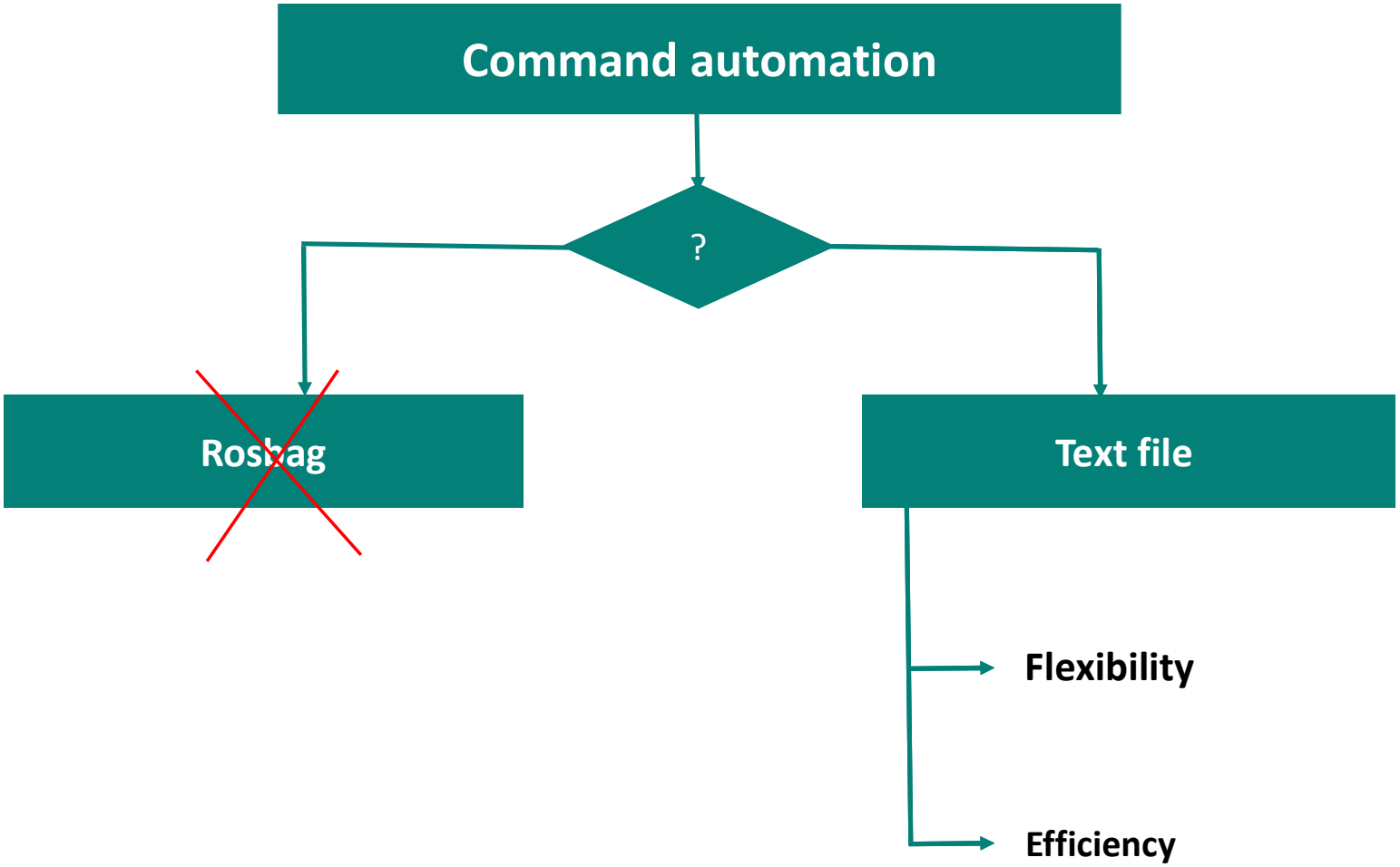
IMU?

5

Automatic manoeuvres



HOW?


Command automation
?
Rosbag
Text file
Flexibility
Efficiency

5

Let’s see the demonstration!

```
[car_parking_node-10] [INFO] [1677762958.115140564] [filerecorder]: Recording started.
[car_parking_node-10] [INFO] [1677762970.073895927] [filerecorder]: Recording stopped.
[car_control_node-5] [INFO] [1677762976.926858682] [car_control_node]: Switching to PARKING Mode
[car_control_node-5] [INFO] [1677762976.930648201] [car_control_node]: Left: 43 | Right: 43 | Steering: 53
[car_control_node-5] [INFO] [1677762976.933592849] [car_control_node]: Left: 43 | Right: 43 | Steering: 53
[car_control_node-5] [INFO] [1677762976.935826497] [car_control_node]: Left: 43 | Right: 43 | Steering: 53
[car_control_node-5] [INFO] [1677762976.939557182] [car_control_node]: Left: 43 | Right: 43 | Steering: 53
[car_control_node-5] [INFO] [1677762976.941573127] [car_control_node]: Left: 43 | Right: 43 | Steering: 53
[car_control_node-5] [INFO] [1677762976.943379608] [car_control_node]: Left: 43 | Right: 43 | Steering: 53
[car_control_node-5] [INFO] [1677762976.945197590] [car_control_node]: Left: 43 | Right: 43 | Steering: 53
[car_control_node-5] [INFO] [1677762976.947769997] [car_control_node]: Left: 43 | Right: 43 | Steering: 53
[car_control_node-5] [INFO] [1677762976.950403367] [car_control_node]: Left: 43 | Right: 43 | Steering: 50
[car_control_node-5] [INFO] [1677762976.953735312] [car_control_node]: Left: 43 | Right: 43 | Steering: 50
[car_control_node-5] [INFO] [1677762976.955802830] [car_control_node]: Left: 43 | Right: 43 | Steering: 50
[car_control_node-5] [INFO] [1677762976.957550293] [car_control_node]: Left: 43 | Right: 43 | Steering: 50
[car_control_node-5] [INFO] [1677762976.959114127] [car_control_node]: Left: 43 | Right: 43 | Steering: 50
[car_control_node-5] [INFO] [1677762976.960731553] [car_control_node]: Left: 43 | Right: 43 | Steering: 50
[car_control_node-5] [INFO] [1677762976.963087515] [car_control_node]: Left: 43 | Right: 43 | Steering: 50
[car_control_node-5] [INFO] [1677762976.966743590] [car_control_node]: Left: 43 | Right: 43 | Steering: 50
[car_control_node-5] [INFO] [1677762976.970228923] [car_control_node]: Left: 43 | Right: 43 | Steering: 50
[car_control_node-5] [INFO] [1677762976.974007238] [car_control_node]: Left: 43 | Right: 43 | Steering: 50
[car_control_node-5] [INFO] [1677762976.975855441] [car_control_node]: Left: 43 | Right: 43 | Steering: 50
[car_control_node-5] [INFO] [1677762976.978290590] [car_control_node]: Left: 43 | Right: 43 | Steering: 50
```

Next sprint goals

SCRUM Master : Antonin Laborde-Tastet

3 Goals

- **Application improvement**
- **Correct reverse trajectory**
- **Command automation**

Next sprint organisation







- Sends orders to the car — 8
- Implement control mode buttons — 8
- Add GPS feature in the application — 13
- Keep correct trajectory — 21
- Improving replay command — 3
- Recorded maneuvers in closed loop — 13

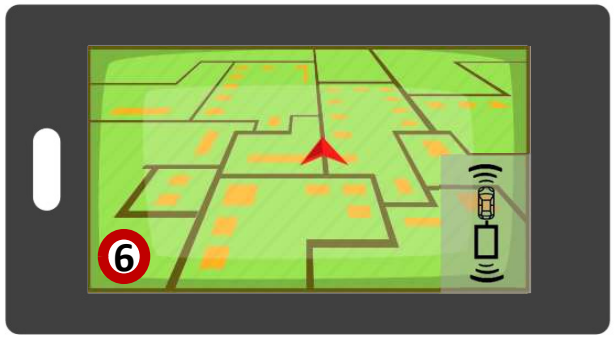
Next sprint acceptance tests

Android application

Initial state: Stopped car

Action: Send orders to the car, switch between modes, and locate the car with GPS

Result: The car behaves accordingly

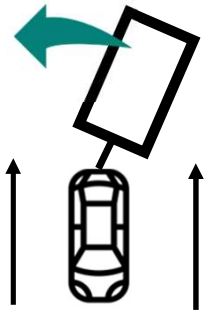


Car automation

Initial state: Stopped car

Action: Automatic reversing

Result: When the trailer deviates, it returns to the trajectory on its own.

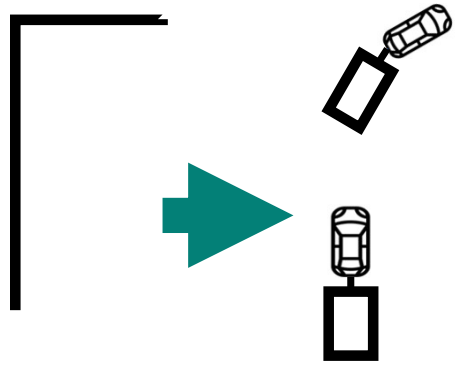


Command automation

Initial state: Stopped car

Action: Properly perform a recorded sequence

Result: The car do the sequence



Suggestions & Questions ?