BASE NEEDS

My car has to be safe!
The car needs to be able to safely stop when a collision otherwise would occur.

I need to be able to control my car
The driver should be able to have complete (remote) control of the car's functionality.

My car needs to be able to adapt to the traffic in front of it
The car needs to be able to closely follow another car.

STORIES

(T) [6] - As a developer I want the MOPED-code to be refactored because I want the code I work with to be structured

Acceptance criteria

1. Refactoring is done
2. Comments should be present to explain code to the reviewer

(R) [4] - As a developer I want to get data from the ultrasound sensor so that I can read the distance to the closest object in front of the MOPED

Acceptance criteria

1. It should be possible to print or store the data in a readable format
2. The sensor should transmit often enough to give the MOPED a reaction time that is less than one second

(Q) [10] - As a developer I want to be able to filter out sensible data from the ultrasound sensor so that I can have use for it in my software

Acceptance criteria

1. The resulting distance data should prioritise safety and minimise the risk of a collision

(G) [10] - As a car owner I want my MOPED to brake when it's about to crash into something because I don't want my MOPED to collide with something

Acceptance criteria

1. The MOPED should detect objects in front of it
2. The MOPED should automatically brake and come to a full stop at least 6 cm from any obstacle it would otherwise crash into

(I) [40] - As a car driver I want my MOPED to be able to use Adaptive Cruise Control because I want to follow the flow in traffic

Acceptance criteria

1. The Adaptive Cruise Control System should be turned on a toggle button from the app.

2. The MOPED should be able to:
2.1. Keep a fixed (within a margin of error) and safe distance to the vehicle in front of it
2.2. Adapt to the speed of the vehicle in front of it
2.3. Automatically brake to avoid collisions

Prerequisites

- We have sensible sensor data

(P) - As a car driver I want my MOPED to be able to use Platoon Control System because I want to be able to engage in a platoon

Acceptance criteria

1. The Platoon Control System should be turned on automatically when the MOPED starts
2. The MOPED should be able to:
2.1. Keep a fixed (within a margin of error) and safe distance to the vehicle in front of it
2.2. Adapt to the speed of the vehicle in front of it
2.3. Automatically brake to avoid collisions
2.4. Automatically follow the vehicle in front of it if it changes direction

(C) [20] - As a car owner I want my car to have a cruise control system so that I can lower my energy consumption

Acceptance criteria

1. The car should be able to be controlled remotely
2. A UI should be able to fixate the current speed of the car

(H) [20] - As a driver I want to be able to read the speed of my MOPED in the app because I want to keep the speed limit

Acceptance criteria

1. The MOPED should automatically transmit the driving speed to the controlling application
2. The controller app should be able to receive the driving speed and continuously update the UI

EPICS

(L) - As a car owner I want to have an app so that I can control the car

Acceptance criteria

1. There should be an application to remotely connect to the car
2. The application should be able to:
2.1. Accelerate the car forwards and backwards
2.2. Turn the wheels of the car
2.3. Start 'Cruise Control'
2.4. Start 'Adaptive Cruise Control'
2.5. Subscribe the car to a platoon and make it switch to 'Platoon Control'

(M) - Having a functional Adaptive Cruise Control system (longitudinal control)

Acceptance criteria

The car should be able to:
1. Adapt its speed to the car in front of it
2. Keep a fixed distance (within a margin of error) to the car in front of it

(N) - Having a functional Platooning system (longitudinal and lateral control)

Acceptance criteria

The car should be able to:
1. Adapt its speed to the car in front of it
2. Keep a fixed distance (within a margin of error) to the car n front of it
3. Center its lateral position to the car in front of it

COMPLETED

(B) [40] - As a car owner I want an app that can connect to the MOPED because I want to see that the developer team have the skill to create a controller app

Acceptance criteria

The app should be able to connect to the car through the TCP protocol and transmit data to it.

(A) [8] - As the product owner I want the MOPED to accelerate when it's turned on because I want to see that I can trust the developer team

Acceptance criteria

When the MOPED is turned on it accelerates until it is turned off again.

(O) [40] - As a developer I want to be able to run my own MOPED-controller software on the MOPED so that I can implement new functionality

Acceptance criteria

1. Our controller software should be able to be compiled and successively installed on the MOPED
2. Our software should be able to tell the MOPED to do something IRL

(S) [26] - As a developer I want a controller app that can communicate with my MOPED so that I know the team is making progress

Acceptance criteria

1. The MOPED should receive messages sent by the app

(E) [5] - As a car driver I want to be able to manually stop my MOPED via a UI because I feel that it's important that I am in control of the MOPED

Acceptance criteria

1. The MOPED should stop when the driver tells it to stop via a UI

(D) [20] - As a driver I want to be able to accelerate the MOPED forwards and backwards because I need to move my MOPED

Acceptance criteria

1. There should be an application to remotely connect to the MOPED
2. The driver should be able to accelerate the MOPED forwards and backwards through an UI

(F) [8] - As a driver I want to be able to easily turn the front tires of my MOPED left/right because I don't want to manually turn my wheels while they spin

Acceptance criteria

1. There should be an application to remotely control the car
2. The application should be able to turn the wheels trough a UI

(K) - As a car owner concerned about safety I want my cars to automatically stop if they lose their autonomous driving capabilities because I don't want them to accelerate infinitely

Acceptance criteria

1. The car should automatically stop in a safe manner if there are any malfunctioning behaviour in the autonomous driving software

(J) - As a car owner I want to be able to turn on/off the CC, ACC and PCS features because I want to have control of its behaviour

Acceptance criteria

1. There should be a controller application.
2. The application should be able to turn CC, ACC and PCS on and off easily.