FORMULA TECHNION DV 2019
Steering Actuation

הנדסת מכונות

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Abstract

One of the main components of the driverless car is its actuation system. The purpose of this project is to design the steering actuation of the Driverless Formula.

The main objective is to couple a motor to the existing steering system, allowing its actuation while retaining its manual mode.

Our team chose to design a **chain drive transmission** based system.

Project Objectives

- The system needs to transmit up to 30 Newton-meters.
- It has to allow an easy switch between manual and automatic mode.
- Its weight is limited to 3 kilograms.
- (Optional) It can be retrofitted into the older cars of the Formula Project that use the same steering rack.
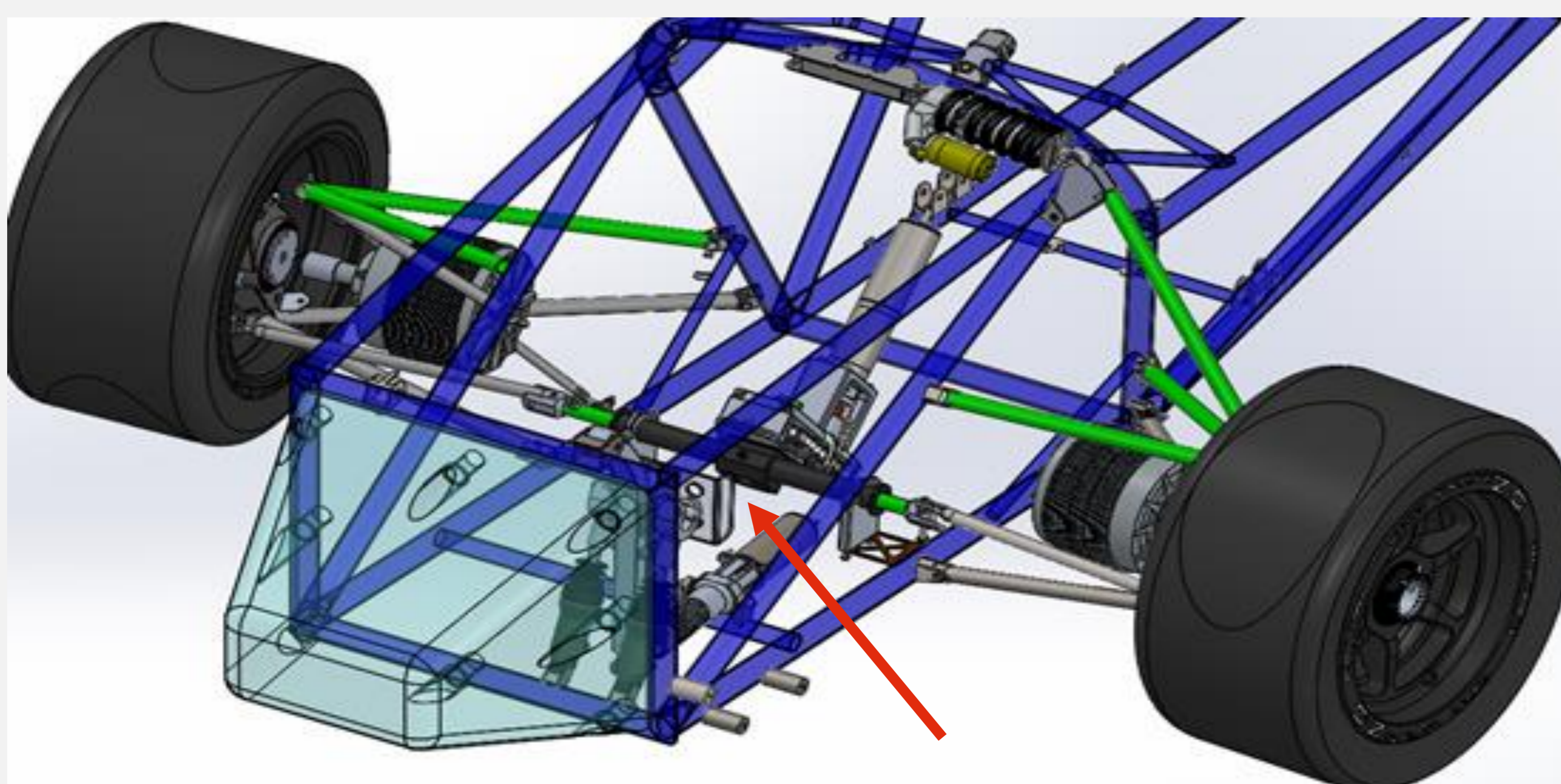
Overall Description
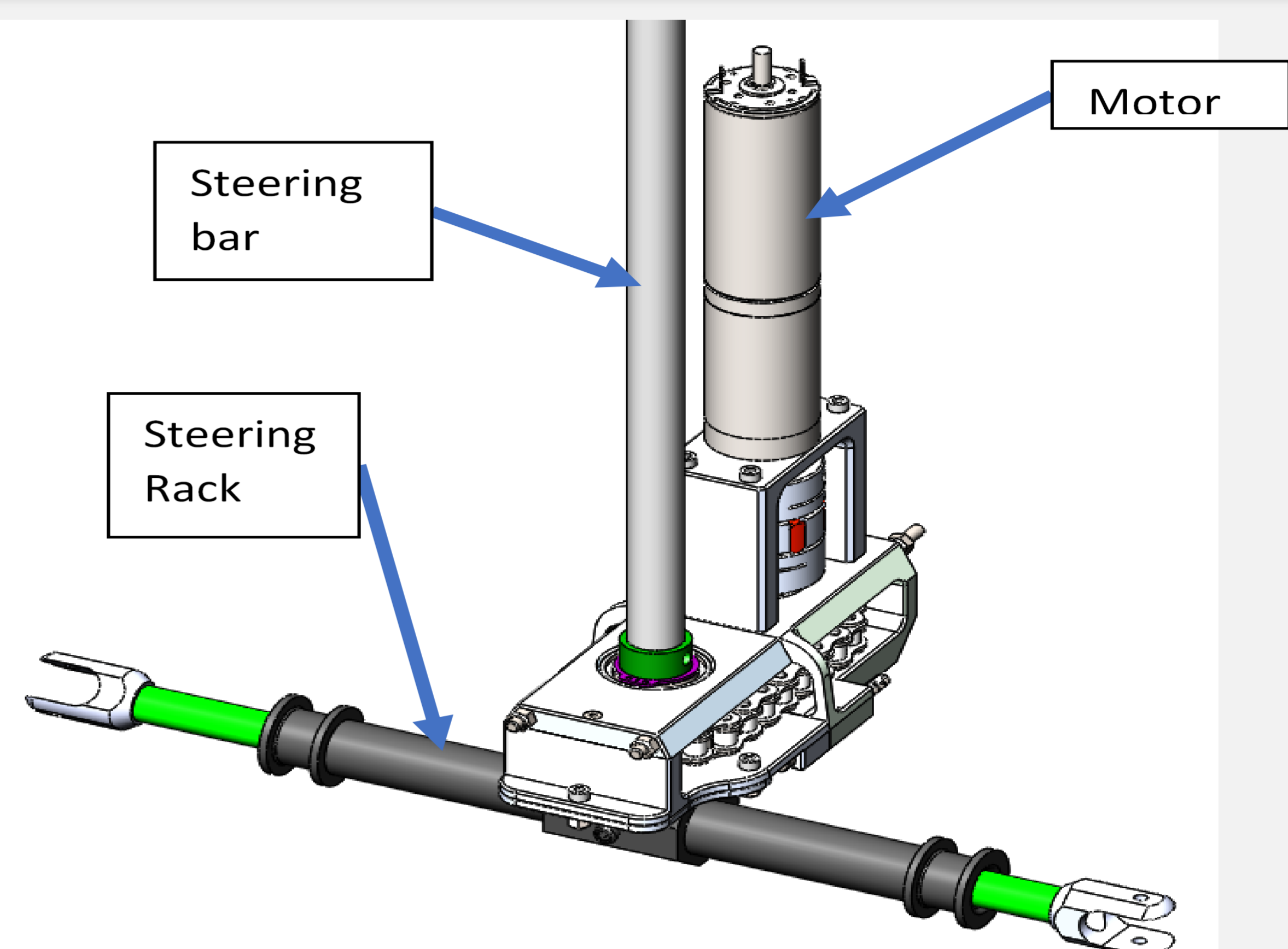
- The **steering rack** is connected to the car structure. It converts the rotary motion of the steering wheel or of the actuation motor into a linear motion that will move the car wheels.
- The **motor** is a Faulhaber 3890-024CR mounted with a gearhead.
- The **steering bar** transmits the motion of the steering wheel to the rack.

Description of the mechanism

1. **The box**. Made in 4 different parts, it holds the transmission, the steering rack and the motor together.
2. **Steering Rack**. It's the only connection between the system and the structure of the car.
3. **Steering Rack Shaft**. This part connects the pinion of the steering rack (in grey) to the chain drive and to the steering bar.
4. **Chain Drive Transmission**. It connects the two shafts, with a gear ratio of 1:1.
5. **Motor Shaft**. This shaft transmits the power of the motor to the chain drive transmission, and is connected to the motor with a coupling.
6. **Coupling**. Allows a connection between the motor and its shaft by correcting a possible offset between the two.
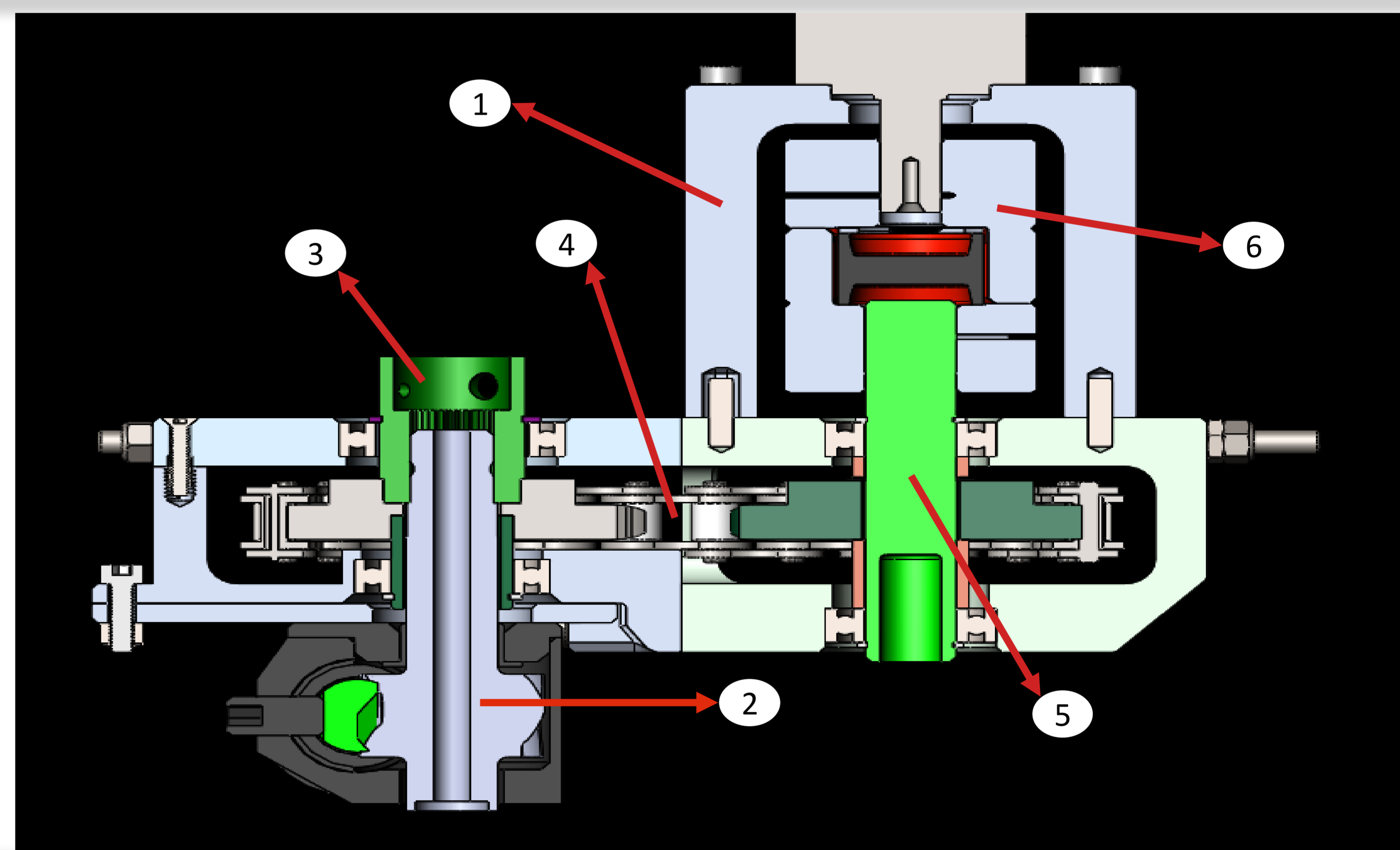
System position in the car

Acknowledgements