

Modular Mechanical Design of an Autonomous Truck



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Background

Trucks transport the most goods worldwide: In Europe, they account for around 70% of freight traffic. However, 44% of long-distance drivers would not choose their profession again and 94% of logistics companies are currently struggling with driver shortages. In addition, around 90% of truck accidents are caused by human error. Autonomous trucks are the answer to many major challenges facing the modern trucking industry: Increasing truck uptime, driver productivity, driver shortages, safety, and environmental friendliness.

Description

This thesis is about designing modular components for the mechanical design of an autonomous truck as part of a new startup. In spirit, modular design principles of our previous startup RobCo (www.robco.de) should be adapted from robots to trucks. The benefits of such a design principle are elaborated in [1]. A possible design of a modular platform from GM is shown below. More details will be provided after signing a non-disclosure agreement (NDA).



Modular concept for a truck; source: GM.

Tasks

We will provide a more detailed description of the tasks after signing the NDA.

- Integration of the steering actuator
- Integration of an available component for transporting containers
- Mechanical integration of the powertrain components
- Design and implementation of a modular system for mounting additional devices
- Optional: Concept development of a dedicated platform for lifting and moving containers

References

- [1] M. Althoff, A. Giusti, S. B. Liu, and A. Pereira. Effortless creation of safe robots from modules through self-programming and self-verification. *Science Robotics*, 4(31):1–14, 2019.

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Research project:

Startup for an Autonomous Truck

Type:

MA/BA/GR/SA

Research area:

Modular design

Programming language:

N/A

Required skills:

CAD, FEM, strong foundational knowledge in mechanical engineering

Language:

English

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