

Modular Mechanical Design of an Autonomous Truck



Technical University of Munich



Department of Computer Engineering

Chair of Robotics, Artificial Intelligence and Real-time Systems

Important note: Only applications submitted via the application form will be considered!

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.

Supervisor:

Prof. Dr.-Ing. Matthias Althoff

Advisor:

Prof. Dr.-Ing. Matthias Althoff

Research project:

Startup for an Autonomous Truck

Type:

MA/BA/GR/SA

Research area:

Modular mechanical and electrical design/integration

Programming language:

N/A

Required skills:

CAD, FEM, strong foundational knowledge in mechanical engineering

Language:

English

Tasks

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

- Integration of the steering actuator
- Mechanical and electrical 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
- Optional: Concept development of a high voltage powertrain for the 2nd prototype

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.

Backup Link Application Form

<https://torch-anemone-800.notion.site/Job-board-Building-an-Autonomous-Truck-2af79cede4ca8166a413e15cdcc537c8>

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Website: [Application-Page](#) (If link fails, copy the URL on the bottom of the page.)