

## Design of an X-by-wire Car for Software Defined vehicle functions

**Keywords:** Software Engineering – Automotive – Autonomous Driving

### Background

As part of the CeCaS research project, a team has been formed to develop a new system architecture for future vehicles, with a particular emphasis on autonomous driving. The development of new autonomous vehicles requires a fundamental rethinking of systems- and software engineering to manage the growing complexity and integrate the latest technologies, such as AI-based functions in automotive engineering. To achieve this, the software we develop is initially integrated on a high-performance computing (HPC) system before being tested on real vehicles in our test environment.

### Description

The proportion of software in vehicles is constantly increasing. In order to meet the demands for flexibility in software development in automotive, it is necessary for software to be independent of the hardware. We want to achieve this with our test vehicles by re-commissioning an x-by-wire research vehicle and initially using basic control functions. The project covers many problems in the field of software development, electrical engineering, robotics and automotive. These include, but are not limited to:

- Control of vehicle actuators and sensors and their hardware abstraction
- Evaluation of the developed algorithms on the vehicle in our test environment
- **Your ideas:** If you have any other ideas for research in this area you are welcome to suggest your own topic.

### Your Tasks

- Familiarization with our test vehicle
- Research the problem (study state-of-the-art test automotive prototype technology)
- Development of a novel solution approach
- Realization of the approach on Hardware and Software level
- Integrating your approach into our system

### Requirements

- You are currently studying Robotics, automotive engineering, electrical engineering ...
- High motivation and ability to work independently on your research topic as well as contributing to our teamwork.
- Interest in mechatronics and software development
- High motivation in the fields of robotics, automotive engineering and prototyping
- Basic knowledge in electrical engineering
- First experience with automotive engineering

