

Development of a motor inverter system for a Formula Student vehicle

OUR PROJECT

Formula Electric Belgium is a student-run electric race team which competes in Formula Student, the world's largest competition for engineering students. We aim to push the limits of performance, innovation and sustainability within electric racing every year, which is only possible with the help of our Thesis students. These pioneers are responsible for performance-defining innovations within the team, and we would love for you to join our team of highly ambitious and motivated engineers. As a Thesis student, you will research, design, prototype and test your innovations alongside the full-time members which make sure the team pushes itself and the car to new heights.

AIM AND OBJECTIVE

The aim of this thesis is to design, implement, and validate a complete motor inverter system for a Formula Student race car, building upon previous work on the inverter power stage and logic stage.

The inverter will be designed to drive the vehicle's electric motors efficiently and reliably under demanding operating conditions. The work will focus on the integration of power electronics and control hardware, firmware development for motor control, and safe operation within Formula Student constraints. Key aspects include control algorithm implementation, real-time embedded software development, protection mechanisms, and communication with the vehicle control system.

Objectives:

- Integrate the existing power stage and logic stage designs into a complete motor inverter system. Develop the power stage, control circuitry, and protection mechanisms for safe and reliable operation.
- Develop and implement embedded firmware for motor control, including modulation and current control strategies. Implement and test control strategies to ensure stable voltage regulation across varying load and input conditions.

PROFILE

- Willingness to learn new technologies
- Education in Electronics-ICT
- Experience with PCB design (Preferably Altium Designer)
- Experience with power electronics
- Experience with embedded software development

RETURNS

- Practical experience in a high-end engineering context
- Work with the newest technologies and innovative companies
- Developing your hard- and soft-skills in a company-like environment
- Participation in the biggest student competition in the world

INTERESTED?



Send us your contact details and field of interest to

recruitment@formulaelectric.be