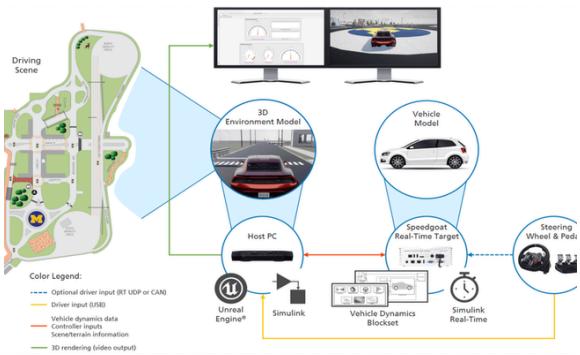


SUGGESTED TOPIC FOR SCIENTIFIC WORK

DIL Simulation





The objective is to develop and validate a Driver-in-the-Loop simulator for our electric Formula Student car. The real-time vehicle model will cover key dynamics, including suspension, tyre behaviour, aerodynamics and the powertrain, using vehicle data while balancing accuracy and computational effort. The simulator will combine a driver interface with a virtual environment featuring the car and track layouts. Using MATLAB/Simulink and a Speedgoat real-time system, the vehicle model will run with low latency, while a separate PC handles visualisation via UDP. The result will be a documented, reusable simulator for driver training, setup evaluation and control function testing, providing practical experience in vehicle dynamics and real-time simulation. The topic is merely a suggestion and must be finalised with the institute.

Tasks:

- Review existing driving simulators and define requirements
- Develop a real-time vehicle model using CAD, measurement and supplier data
- Implement the simulator, including driver hardware, virtual tracks and real-time communication
- Validate the model and evaluate the simulator with team drivers
- Document the architecture and create a user guide

Requirements:

- Enrolled in a related Master's programme
- MATLAB/Simulink knowledge; model-based development is a plus
- Basic vehicle dynamics knowledge or willingness to learn
- Good communication skills in English or German
- Motorsport enthusiasm and teamwork skills