PRODUCT DEVELOPMENT TEAM

DEVELOPMENT AND VALIDATION OF DYNAMIC SIMULATION ENVIRNOMENT FOR ELECTRICALLY POWERED BICYCLE TRAILER

Project work lead towards Master thesis.

BACKGROUND:

NÜWIEL is a Hamburg based startup developing electric mobility solutions for last mile logistics. NÜWIEL was founded in 2016 with a vision to improve air quality in cities and reduce impact of traffic emissions on environment and public health by providing an award-wining sustainable mobility solution: electric trailer (eTrailer) for bikes.

By 2030 eTrailers will be saving 64M tons of the CO2 emissions per year

We are a diverse, dynamic, and growing team. We are looking for a talented, highly motivated student to support product development team in building simulation environment for EPBT (Electrically Powered Bicycle Trailer).

eTrailer system is at TRL 9 and has been developed in close cooperation with academic institutions including Hamburg University of Technology (TUHH) and University of Kiel. So far, more than 12 master thesis and projects have been completed on various development topics.

In continuation with improving the functionality of the in-house developed 'zero load' patented control technology for trailers a master thesis position is being offered. This position is a continuation of the previous research work done in a project work and master thesis at Nüwiel and TUHH on the topic of: *Dynamic Stability Analysis and Simulation of Electrically Powered Bicycle Trailers (EPBT).*

The new work item has a focus: to continue and complete the building of a full motion simulation environment around the EPBT, including modelling of the physical sensor for 'zero load' and motor modelling.

Further tasks are outlined below:

TASKS:

- Select a suitable simulation environment e.g., Coppeliasim, Gazebosim or any other
- Review of the previous work and continue with modelling of the electric bike trailer which would include electric and mechanical components
- Modelling of 'zero load' sensor and multiple DOF connection to the bicycle
- Implement a simulator interface for the software in the loop testing for the trailer firmware
- Validation and benchmark analysis with real world data
- Documented interface on how to use in mechanical and software development
- Development and simulation of the simplified thermal model of the drive train (optional)
- Setting up simulation environment and integrate it in CI (Jenkins) (optional)