Realtime Electric Truck Platooning Strategies in Software-in-the-Loop Traffic Simulation

Problem description

Truck platooning has received much attention due to the pronounced benefits of fuel saving and traffic efficiency, in additional promising business models. However, there are also concerns with truck platooning systems on the potential risks in impeding other traffic, especially at highway bottlenecks. Moreover, many reported platooning algorithms rely on linear system dynamics and thus will encounter limitation when implementing in trucks with much larger delay and higher nonlinearity in dynamics compared to passenger cars. Due to the safety concern and high cost for field test, it is of great importance to validate and test they system in detailed simulation environment before it is tested with real vehicle systems.

Objectives & Assignment

The objective of the research is to analyze, implement and validate truck platooning algorithms for electric trucks in software/hardware-in-the-loop simulation environment. The simulation environment to be built will provide a practical tool to develop and verify truck platooning algorithms and the validation will lead to a candidate algorithm that will be implemented in real trucks in the next phase after the assignment. This assignment will serve as a milestone step towards real-world test of truck platooning in a proving ground.

The assignment includes:

- Review of truck platooning strategies and algorithms
- Development of electric truck simulation model
- Validation of the model with empirical data
- Implementation of electric truck platooning algorithms in simulation
- Truck platooning algorithm validation and performance evaluation
- Reporting

Research group

Transport & Planning department
Supervisor: Dr. Meng Wang
Supervisor at RWS: Mr. Marco Schreuder, Mr. Ronald Adams
Co-supervisor from TU Delft: 3mE/EWI/TPM

External support

This assignment will be facilitated by ITS Edulab. It is also part of the cooperation between the Dutch and Chinese Ministry of Transport. Data and expertise from Research Institute of Highway, under the Ministry of Transport, China will be available. A paid trip is expected to Beijing.

Further Information

Dr. Meng Wang, m.wang@tudelft.nl