Interactive Simulation of CACC Vehicle Matching

A study focuses on developing a system to locate Cooperative Adaptive Cruise Control equipped vehicles on the road.

WHAT IS THE NEED?

Cooperative Adaptive Cruise Control (CACC) does not only allow vehicle’s cruise control system to maintain proper distance, but also allow vehicles to “cooperate” by communicating with each other via radio frequency. CACC allows vehicles that are equipped with this technology to communicate and closely follow each other, to maintain a constant distance by braking and accelerating at a fraction of a nanosecond.

With the near term deployment of the CACC-equipped vehicles, it is becoming increasingly important to develop a system that will help CACC-equipped vehicles to locate each other on the road, to fully benefit from the CACC technology.

WHAT ARE WE DOING?

The research team will study possible solutions, such as dynamic displays, to assist CACC-equipped vehicles to locate other CACC-equipped vehicles to follow, thereby helping to overcome one of the main impediments to early deployment of CACC at low market penetration.

To explore methods for facilitating the clustering of CACC-equipped vehicles, the research team will combine two types of simulation systems, the Networked Driving Simulation and the Microscopic Traffic Simulation. The Networked Driving Simulator is a relatively new, rarely used method, which enables different test subjects to interact with each other in virtual vehicles in a simulation. This new simulator is combined with the state-of-the-art Microscopic Traffic Simulation, which was developed under federally funded Exploratory Advanced Research Program (EARP) research, to produce higher fidelity modeling of Adaptive Cruise Control (ACC) and CACC vehicles’ motions.
WHAT IS OUR GOAL?

The end goal of this research is to develop requirements for CACC clustering forming systems.

WHAT IS THE BENEFIT?

CACC is an enhancement to commercially available automotive ACC systems that enables vehicles to operate at shorter headways, thus increasing traffic flow capacity on freeway and improving traffic flow dynamics. CACC systems will not only smooth out the traffic patterns, but also enhance driving experience with improved safety, reduced fuel consumption and overall carbon footprint.

WHAT IS THE PROGRESS TO DATE?

The research is expected to start in May 2018.