Project Title: Integrated Corridor Management - Connected and Automated Vehicles (CAV)

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WHAT IS THE NEED?

In the current Integrated Corridor Management (ICM) systems, the control targets are ordinary objects such as vehicles, buses, pedestrians, etc. However, in recent years, a great amount of effort has been devoted to the field of connected and automated vehicles (CAVs), which may be implemented in the future and become one of the dominant travel modes.

Given that this important piece is missing from the current ICM systems, it will become a serious problem for public agencies like California Department of Transportation and local Traffic Management Centers to manage traffic properly and efficiently once CAVs are deployed in the field.

Unfortunately, at the current moment it is impossible to evaluate the system impact of CAVs on transportation networks in the field, and insights from existing CAV studies are very limited since they were applied to small networks. Instead, a more appropriate way is to build a well-calibrated large-scale traffic network in microsimulation and add the CAV components for testing purposes.
WHAT ARE WE DOING?

This research aims to fill this gap by developing an integrated platform in microsimulation that allows the modeling of CAVs in current ICM systems. For demonstration purposes, the Interstate 210 Connected Corridor Pilot model developed in the microsimulation software, Aimsun, will be used as a test site.

The proposed platform will incorporate the most appropriate CAV models/applications into Aimsun using the available Software Development Kits and allow public agencies to play with different scenarios in microsimulation and understand potential impacts of CAVs on their proposed ICM strategies.

WHAT IS OUR GOAL?

The primary goal of this project is to develop an integrated platform to incorporate CAVs into microsimulation and evaluate their system impacts on large-scale transportation networks.

WHAT IS THE BENEFIT?

The research results will provide public agencies useful tools to better understand the system impact of CAVs and help them perform long-term planning.

WHAT IS THE PROGRESS TO DATE?

The project was kicked off on 1/14/2020, which was an in-person meeting with the Principle Investigator and the representatives from Traffic Operations. The first deliverable for this project is a technical memo on the literature review is expected by 7/31/2020.

Review of car-following models in prevailing simulation software has been completed. The review was done comparing the models from Aimsun, Vissim, TransModeler, and Paramics. Review of car-control models for AVs/CAVs has been completed. The CAV models in Aimsun were reviewed and decided to use them for the analysis.

The research team reviewed the V2X framework in Aimsun and learned how to set up V2X communications in simulation. They found an issue that needed to be addressed in Aimsun. The two components, the CAV models and the V2X framework, are independent components in Aimsun. The CAV component focuses on the level of vehicle control/movement, while the V2X framework focuses on the level of vehicle communication. Unfortunately, the assignment of vehicles with communication capability via the V2X framework is not related to the assignment of CAV vehicles in Aimsun. Therefore, methods need to be developed to connect these two components together to have consistent vehicle assignments.