# Center for Advanced Multimodal Mobility Solutions and Education

| UTC Project Information – CAMMSE @ UNC Charlotte | |
|---|---|
| *Project Title* | Impact of Connected and Autonomous Vehicles on Nontraditional Intersection Design: Superstreets |
| *University* | The University of North Carolina at Charlotte |
| *Principal Investigator* | Wei Fan |
| *PI Contact Information* | (704)-687-1222 / wfan7@uncc.edu |
| *Funding Sources and Amount Provided (by each agency or organization)* | U.S. Department of Transportation: $60,000<br>The University of North Carolina at Charlotte: $30,006 |
| *Total Project Cost* | $90,006 |
| *Agency ID or Contract Number* | |
| *Start and End Dates* | 10/01/2019 – 09/30/2021 |
| *Brief Description of Research Project* | Connected and autonomous vehicle (CAV) is an emerging technology that has the potential to improve operations, safety, and environment of the existing transportation system. Being able to travel on the roads with shorter headways, CAV is expected to yield a larger capacity compared with human-driven vehicles (HDVs). Accidents caused by human improper driving behaviors can also be reduced by the introduction of such technology. In addition, since CAVs can travel on the roads with fewer speed fluctuations, CAVs may as well contribute significantly to the emission reduction and improve the environmental condition of the current transportation system. |

Many studies have been conducted to explore the potential benefits of CAV technologies on the performances of conventional intersections. Improvement on the operational performances has been confirmed when the market penetration of CAVs reaches to a certain rate. Innovative intersections distinguish themselves usually by creating minor intersections that are hundreds of feet ahead of the main intersection for turning movements. Superstreets are one of the innovative intersection designs which have been implemented in numerous states. However, how CAVs would affect the performances of superstreets has not been explored, even to a minimum extent. To be specific, the following questions need to be answered: 1) at what market penetration rate would CAVs bring benefits towards operational performances; 2) at what extent would CAVs bring benefits towards operational performances of superstreets; 3) at what market penetration rate would CAVs bring benefits towards safety performances; 4) at what extent would CAVs bring benefits towards operational performances of superstreets.

This study will fill this gap by conducting several simulation-based experiments to identify the potential impact of CAVs on superstreets regarding operational and safety performances. This study will also provide a better understanding of the impacts of CAVs on innovative intersections.

| | |
|---|---|
| *Describe Implementation of Research Outcomes (or why not implemented)*<br><br>*Place Any Photos Here* | |
| *Impacts/Benefits of Implementation (actual, not anticipated)* | |
| *Web Links*<br>• *Reports*<br><br>• *Project website* | https://cammse.uncc.edu/sites/cammse.uncc.edu/files/media/CAMMSE-UNCC-2020-UTC-Project-Information-03-Fan.pdf<br><br>https://cammse.uncc.edu/sites/cammse.uncc.edu/files/media/CAMMSE-UNCC-2020-UTC-Project-Report-03-Fan-Final.pdf |