



Center for Advanced Multimodal Mobility Solutions and Education

UTC Project Information – CAMMSE @ UNC Charlotte	
Project Title	Evaluating and Comparing the Impact of Connected and Autonomous Vehicles on Conventional Intersections and 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 The University of North Carolina at Charlotte: \$30,007
Total Project Cost	\$90,007
Agency ID or Contract Number	
Start and End Dates	10/01/2021 – 09/30/2022
Brief Description of Research Project	Connected and Autonomous Vehicles (CAVs) have been one of the most promising technologies that are expected to bring significant changes to the transportation infrastructures. One of the main features of CAVs is that they can travel on roads without human intervention, and by doing so, traffic crashes caused by human errors can be eliminated and significant economic benefits can be reaped. Also, with the capabilities to communicate with surrounding vehicles and infrastructures, CAVs can travel through road junctions and segments more smoothly and efficiently, which will, in turn, increase the road capacity and reduce fuel



Center for Advanced Multimodal Mobility Solutions and Education

consumption.

To become better prepared for this transition, transportation engineers and researchers have begun to evaluate how well CAVs can perform in existing transportation infrastructures, such as freeways, on/off ramps, intersections, and roundabouts.

Nevertheless, there have been few studies that have assessed the performance of CAVs in the environment of innovative intersections. The main goal of this research is to mitigate this research gap by conducting a simulation-based study to examine the operational performance of superstreets, one of the popularly implemented innovative intersection designs. This research intends to answer the following questions:

- 1) How the operational performances may vary between conventional intersections and superstreets in human-driven vehicles.
- 2) How CAVs perform in different traffic conditions.
- 3) At what market penetration rate do the CAVs start to improve the traffic efficiency.
- 4) How the performances of CAVs may differ when CAVs are enabled with different levels of capabilities.

By answering the questions above, this research can provide a better understanding of the performance of CAVs at innovative intersections since many innovative intersections share similar



Center for Advanced Multimodal Mobility Solutions and Education

	design features such as displaced left turns and channelized right of way.
<p><i>Describe Implementation of Research Outcomes (or why not implemented)</i></p> <p><i>Place Any Photos Here</i></p>	
<p><i>Impacts/Benefits of Implementation (actual, not anticipated)</i></p>	
<p>Web Links</p> <ul style="list-style-type: none"> • <i>Reports</i> • <i>Project website</i> 	<p>https://cammse.uncc.edu/sites/cammse.uncc.edu/files/media/CAMMSE-UNCC-2022-UTC-Project-Information-01-Fan.pdf</p> <p>https://cammse.uncc.edu/sites/cammse.uncc.edu/files/media/CAMMSE-UNCC-2022-UTC-Project-Report-01-Fan-Final.pdf</p>