Center for Advanced Multimodal Mobility Solutions and Education

UTC Project Information – CAMMSE @ UNC Charlotte	
Project Title	Impact of Connected and Autonomous Vehicles on Signalized Intersections with Transit Signal Priority
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) refer to a series of applications, services, and technologies that enable vehicles to communicate with other vehicles and infrastructures in their vicinity and be “driven” autonomously. The development of CAVs will have a profound impact in the transportation systems around the world. In the last decade, a lot of research has been conducted to investigate the impact of CAVs’ technology development in the transportation field. At the macro level, the economic, social and environmental impacts of CAVs development have been studied. At

	the micro level, research mainly focused on the impact of various specific CAVs technologies. The results showed that the development of CAVs technology can significantly improve the performance of transportation systems, thus bringing us a better city. It has been generally accepted that transit signal priority can greatly help in developing a more sustainable, equitable and efficient transportation system. Therefore, with the advanced development of the CAVs, it is very important to study the impact of CAVs on the transit priority-based transportation system. The main purpose of transit priority is to provide higher quality transit services to the public. The implementation measures include the formulation of policies to prioritize public transportation, the provision of financial subsidies for public transportation, the construction of high accessible public transportation system, and the granting of priority to public transportation on the roads, etc. The goal of this study is to investigate the impact of CAVs development on the traffic performance of signalized intersections with Transit Signal Priority (TSP). Several simulation-based experiments will be conducted to examine the impact of CAVs development. To achieve the goal, an appropriate signalized

	intersection with TSP will be selected from the real world and relevant data will be collected and used to develop the simulation model. Several scenarios will be designed in which different market penetration rates of CAVs will be explicitly accounted for. Comprehensive simulation experiments will be conducted, and the experimental data gathered will be analyzed to identify the differences of traffic performance under different scenarios. This study will help gain a deeper understanding of the impact of CAVs development on the traffic performance of signalized intersections with TSP.
Describe Implementation of Research Outcomes (or why not implemented) *Place Any Photos Here*	
Impacts/Benefits of Implementation (actual, not anticipated)	
Web Links • *Reports* • *Project website*	https://cammse.uncc.edu/sites/cammse.uncc.edu/files/media/CAMMSE-UNCC-2022-UTC-Project-Information-04-Fan.pdf https://cammse.uncc.edu/sites/cammse.uncc.edu/files/media/CAMMSE-UNCC-2022-UTC-Project-Report-04-Fan-Final.pdf