THE WILLIAM STATES LEE COLLEGE OF ENGINEERING

UNC Charlotte – Lee College of Engineering Senior Design Program
Company Information

Company Name	Mechanical Engineering.	Date Submitted	*11/22/2021*
Project Title	A Scaled Smart City for Experimental Validation of the Next-Generation of Transportation Networks **(UNCC_ME_TRANSPORT)**	**Planned Starting Semester**	Spring 2022

Personnel

Typical teams will have 4-6 students, with engineering disciplines assigned based on the anticipated Scope of the Project.

Please provide your estimate of staffing in the below table. The Senior Design Committee will adjust as appropriate based on scope and discipline skills:

Discipline	Number	Discipline	Number
Mechanical	3	Electrical	1
Computer	1	Systems	
Other ( )	-		

Project Overview and Requirements:

The landscape of mobility and transportation systems is changing dynamically at an unprecedented speed, enabled by advances in computer science and engineering, a deeper understanding of societal and environmental needs, and advances in the learning sciences. While the full deployment of autonomous vehicles may take a while, it is vital for the researchers in this field to validate the models and algorithms as realistically as possible so that they can better predict the behavior of next-generation mobility and transportation systems. To this end, the proposed project aims to develop a scaled smart city at the University of North Carolina at Charlotte. This scaled smart city will bridge the gap between simulation and full-scale implementation of mobility systems. The proposed project aims to explore the acquisition and processing of vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communication in different traffic scenarios. To this end, the students will equip the scaled smart city with various types of sensors and actuators, such as controlled traffic lights, motion-tracking cameras. The students will also develop a set of miniaturized autonomous vehicles and equip them with GPS and Lidars. Once the miniaturized autonomous vehicles are developed, the students will develop a set of codes that can track the vehicle in the scaled city using the motion tracking cameras. The students will also develop will develop a set of V2I and V2V protocols to manage and coordinate the miniaturized autonomous vehicles.

Expected Deliverables/Results:

Deliverables include:
- Design and Development of miniaturized autonomous vehicles
- Setup and test the motion-tracking cameras.
- Test the motion-tracking cameras in tracking the autonomous vehicles
- An IoT-based protocols for V2I and V2V communications between the vehicles
- All codes shall be implementable on micro-controllers
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List here any specific skills, requirements, specific courses, knowledge needed or suggested (If none please state none):
- Familiarity with Mechatronics, sensors, programming in Arduino, electronics, Matlab programming, and IoT