2017 Project Abstract

Project Title: Evaluation of Advanced Vehicle and Communication Technologies through Traffic Microsimulation (Project D)

Principal Investigator: Clark Letter, Ph.D., University of Florida, Civil and Coastal Engineering; Email: clarklet@ufl.edu

Co-PI(s): Lily Elefteriadou, Ph.D., University of Florida; Mike Hunter, Ph.D., Georgia Institute of Technology; Chelsea C. White II, Ph.D., Georgia Institute of Technology

ABSTRACT: Recent advances in autonomous and connected vehicle technology have created an opportunity to employ data and sensor-driven strategies to improve traffic operations on highways. Widespread adoption of these technologies requires the development of algorithms and procedures to fully take advantage of their potential and the data made available by them. Connectivity between vehicles and infrastructure provides a tremendous amount of data that can be used to feed real time adaptive signal control as well as long term traffic management and planning strategies.

The goal of this project is to develop and enhance traffic operational and environmental evaluation procedures considering the presence of connected and autonomous vehicles within a typical urban traffic stream. Proper evaluation of new control strategies requires accurate simulation of new technologies. This includes accurately representing vehicle autonomy and connectivity within the context of microsimulation, and their operational and environmental effects. An algorithm has been developed to jointly optimize vehicle trajectories and signal control by taking advantage of advanced technologies. This optimization algorithm will be implemented in a microsimulation environment, and its operational and environmental effects will be assessed. Also, the research will consider the effects of the utilization of combinations of mobile and infrastructure devices to support a variety of strategies. The goals of the project will be accomplished using the VISSIM microsimulator to replicate these strategies, ensure the software accurately represents their functionality and effects, and then evaluate and assess their impacts.