MarTREC
Maritime Transportation Research & Education Center

MarTREC UTC Project Information Form
USDOT Tier 1 University Transportation Center
Agency ID or Contract Number 69A3551747130

Project Title: Vehicle to Infrastructure (V2I) and Vehicle to Vehicle (V2V) passenger and freight vehicle applications to enhance safety and efficiency in coastal evacuations.
Project Abstract (Brief Description): Cooperative Forward Collision Warning alerts drivers of risk of frontal collisions, including head-on and rear-end collisions with vehicles ahead [1]. This system, which uses cameras and radars to detect collision threats, is a valuable V2I and V2V technology that can enhance both system efficiency and safety. It has been theorized that such technologies could be particularly valuable to enhance transportation system resilience in coastal regions, both for evacuations and for response and recovery. During evacuations transportation network efficiency is vital to reduce the evacuation time and minimize potential loss of life. Prior research has quantified the benefits of Connected and Automated Vehicle (CAV) technology supported by V2I and V2V communications ([4]; [5]). Unfortunately, this prior work was limited in that it used microsimulation analysis and associated assumptions, ignoring driver behavioral factors. The research proposed in this study seeks to address this limitation by using a driving simulator to assess and understanding how drivers interact with V2V and V2I advisories during emergency evacuation scenarios. The study will employ a full-scale driving simulation to create environments within which drivers' acceptance/responses to V2V warnings and V2I warnings will be observed. Multiple scenarios that include a range of adverse weather (e.g., heavy rain, wind etc.) and warning types (e.g., V2V and V2I) will be examined. As there are also many factors (such as gender, age, warning types, etc.) which also influence driver behavior, a factorial design will be employed to create test scenarios with interaction between multiple stimulus conditions. Driver performance indicators will include acceleration and deceleration, average speed, braking behavior, lane change maneuver, time-to-collision etc. in routine and emergency conditions.
Describe Implementation of Research Outcomes (or why not implemented) - Place any photos here *To be determined upon conclusion of the project*: Mathematical model that can be developed to identify and quantify the factors affecting drivers' acceptance/compliance with warning advisories received through V2V and V2I communications.
Impacts/Benefits of Implementation (actual, not anticipated) *To be determined upon conclusion of the project:* Providing more insights regarding how drivers will interact with warning advisories received through V2V and V2I communications. This can help transportation authorities to tolerate their plans / guidelines to maximize the benefits from V2V and V2I implementation during disaster response. Such understanding will be helpful as well for developing guidelines related to CAVs as well as enhance disaster planning in coastal regions.
Web Links: martrec.uark.edu
Budget (Funding) Amounts & Source(s) (US DOT +Match(s) =Total Costs): $92,500 (USDOT)+$46,248(Match)= $138,778 (total)
Project Start and End Dates: 8/1/2022-09/30/23 complete
Principal Investigator(s) and Contact Information: **P.I.** Hany Hassan, Ph.D., Assistant Professor, Department of Civil & Environmental Engineering, Louisiana State University, 3240R Patrick F. Taylor Hall, Baton Rouge, LA 70803, Tel: (225) 578-6588, Email:hassan1@lsu.edu, OCRID: https://orcid.org/0000-0002-3255-7474
Principal Investigator Institution (University): Louisiana State University