Research in Progress

A Pavement Marking Inventory and Retroreflectivity Condition Assessment Method Using Mobile LiDAR

Research Need

Federal Highway Administration is proposing regulations to guide minimum pavement marking retro-reflectivity levels, which poses a potential challenge to MassDOT, as the current practice of conventional visual inspection are labor-intensive, and the results can be subjective.

Goals/Objectives

To address the identified challenges and needs from MassDOT, one objective of this research is to serve as a proof of concept for the use of mobile LiDAR to locate and assess the pavement markings for a discrete sample of road segments by developing and evaluating new automated LiDAR processing algorithms. If successful, the concept in this study will facilitate a future phase of research to continue evaluating all pavement marking materials on extended road segments. This study will generate a complete pavement marking inventory with retroreflectivity conditions for the selected road segments and will also compare historical and current data to inform the deterioration trends of specific marking materials. The findings of this study are expected to guide the selection of marking materials and repair frequency. Another objective of this study is to define the benefit-to-cost ratio for each of the marking materials and help define MassDOT's pavement marking standards. In addition, with the complete pavement marking inventory and condition information, the outcome of this study will also establish an essential data layer to support MassDOT's decisions on connected and autonomous vehicles (CAV) testing, implementation, and operation.

Methodology

The proposed study will utilize mobile LiDAR data, both currently held by MassDOT and to-be collected by the study, and develop an automated method for the extraction, classification, localization, and retroreflectivity condition assessment for pavement markings. The outcome of this study will include a complete, georeferenced pavement marking inventory with retroreflectivity condition measurements for the selected road segments (i.e., the baseline inventory), and will also include the retroreflectivity deterioration trend on the selected road segments (i.e., the updated inventory with temporal changes). It is anticipated that ten segments each 5-miles long of interstate and non-interstate roadways will be analyzed within the study.