



# Identification of Simulation Calibration Parameters Using Urban Freeway Data

## **Problem Description**

TDOT has started using microsimulation tool, PTV VISSIM, more frequently for in-house traffic analysis. Microsimulation tools allow robustness and reliability in traffic analysis compared to generalized approach in the Highway Capacity Manual (HCM). Current TDOT PTV VISSIM user manual use calibration parameters based on best practices obtained from manuals developed by other state DOTs, however, it is critical to determine various calibration parameters to develop calibrated models for local conditions which could provide reliable simulation results. Data-driven and Tennessee specific calibration parameter development would be beneficial in enhancing TDOT's model development and reliability of microsimulation-based traffic analysis. State specific calibration parameters could provide a more accurate representation of actual traffic flow, and reliable traffic analysis results will assist traffic operational decision-making process by balancing needs and resources.

## **Research Objectives**

The overarching goal of this research project is to determine TN-specific calibration parameters for PTV VISSIM microsimulation software using urban freeway data in TN. Specific objectives of this study are to:

- Identify and determine traffic characteristics (e.g., free-flow speed, capacity) of urban freeways in TN under different weather (e.g., day/night/snowy) and traffic conditions (e.g., peak/off-peak);
- Identify and estimate TN-specific calibration parameters for PTV VISSIM microsimulation software using existing ITS data collection infrastructure and additional means (if needed);
- Identify the variation in calibration parameters/metrics across urban areas in TN;
- Develop recommendations, user guide, checklists for PTV VISSIM based microsimulation analysis for calibration and validation of VISSIM model; and
- Develop recommendations for future ITS infrastructure needs considering the existing data collection gaps and incorporate in SYNCHRO+SIMTRAFFIC based studies.

## **Potential Implementation and Expected Benefits**

Major benefits are expected from the implementation of project recommendations on the development of VISSIM simulation model. TDOT will experience efficient and consistent utilization of PTV VISSIM in freeway traffic analysis in TN with TN-specific calibration parameters assisting TDOT staff and contractors in conducting microscopic traffic analysis (e.g., surrogate traffic conflict analysis). With this, TDOT can effectively assess performances of freeway operation and control strategies. TDOT will be able to reduce time-consuming data collection and ensure the timely execution of studies along with policymakers being able to allocate limited resources effectively using reliable simulation analysis.

### **PROJECT NUMBER:**

RES2023-10

### **PRINCIPAL INVESTIGATOR:**

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### **PROJECT SCHEDULE:**

August 2022 to July 2024