TRANSPORTATION POOLED FUND PROGRAM
QUARTERLY PROGRESS REPORT

Lead Agency (FHWA or State DOT): FHWA

INSTRUCTIONS:
Project Managers and/or research project investigators should complete a quarterly progress report for each calendar quarter during which the projects are active. Please provide a project schedule status of the research activities tied to each task that is defined in the proposal; a percentage completion of each task; a concise discussion (2 or 3 sentences) of the current status, including accomplishments and problems encountered, if any. List all tasks, even if no work was done during this period.

Transportation Pooled Fund Program Project # *(i.e, SPR-2(XXX), SPR-3(XXX) or TPF-5(XXX)* TPF-5(176) --Traffic Analysis and Simulation Pooled Fund Study	**Transportation Pooled Fund Program - Report Period:** ☐ Quarter 1 (January 1 – March 31) ☐ Quarter 2 (April 1 – June 30) ☐ Quarter 3 (July 1 – September 30) ☑ Quarter 4 (October 1 – December 31)	
Project Title: Trajectory Investigation for Enhanced Microsimulation Calibration Guidance		
Name of Project Manager(s): Rachel James	**Phone Number:** 202-493-3205	**E-Mail** Rachel.James@dot.gov
Lead Agency Project ID: DTFH61-16-D-00030-T0 T0 18F-252	**Other Project ID (i.e., contract #):**	**Project Start Date:** September 12, 2018
Original Project End Date: September 12, 2020	**Current Project End Date:** September 12, 2020	**Number of Extensions:** 0

Project schedule status:

☐ On schedule ☐ On revised schedule ☐ Ahead of schedule ☑ Behind schedule

Overall Project Statistics:

Total Project Budget	Total Cost to Date for Project	Percentage of Work Completed to Date
$366,784	$168,573	60%

Quarterly Project Statistics:

Total Project Expenses and Percentage This Quarter	Total Amount of Funds Expended This Quarter	Total Percentage of Time Used to Date
$0	$0	65%

Project Description:

In recent years, the advent of more advanced traffic sensors, video processing techniques, and connected vehicle and infrastructure technologies makes possible the provision of real-time, high-fidelity and wide-coverage information on highway traffic. With these technologies, vehicle trajectories and infrastructure information can be precisely recorded along a long roadway stretch at high frequencies and negligible communication latencies. These opportunities enable us to improve the existing traffic models by developing microscopic data-driven based models that can be calibrated with such real-time high-resolution data. To fully harvest these opportunities, we need to propose appropriate techniques for massive trajectory data processing, data-driven traffic modeling, trajectory-based calibration and validation, and real-time microscopic control.

Due to the importance of robust and accurate microsimulation models to address the freeway bottleneck problem, this project aims to:

1. Collect and process multiple sources of full-set trajectory-level data.
2. Investigate and develop a method to calibrate the driver behavior components (e.g., car-following, lane changing, etc.) of traffic simulation software using the full-set trajectory-level data. Apply this methodology to fully calibrate a traffic simulation model (e.g., driver behavior, demand, route choice, etc.).
3. Validate the developed calibration procedure.
4. Compare the accuracy and level-of-effort required to calibrate models with new methodology against more traditional methods.
5. Investigate recurring congestion via corroborative full-set trajectory-level data sources through the successive stages of congestion (onset, peak, and dissipation periods) using models.
6. Develop and enhance guidance documentation for microsimulation model calibration and validation incorporating full-set trajectory-level data.

Progress this Quarter (includes meetings, work plan status, contract status, significant progress, etc.):

Task 1 - Project Management - Estimated completion date: 09/12/2020 | On schedule, 65% complete
Held bi-weekly status meetings, held bi-monthly stakeholder update, and submitted monthly progress reports.

Task 2 - Literature Synthesis and Site and Data Collection Mechanism Selection - 100% complete as of 11/12/2018
Completed.

Task 3 - Data Collection and Processing - Estimated completion date: 11/15/2019 | Behind schedule, 90% complete
All data was collected on I-270, I-95, I-15, and I-75 in May and June. Raw datasets were delivered in July. The team spent quarter 4 cleaning and post-processing the data to resolve a number issues observed with the data. All of these challenges are documented in a lessons learned document that will be delivered with the finalized data, which should be available and posted to transportation.data.gov in Q1 of 2020.

Task 4 - Modeling in Microsimulation - Estimated completion date: 02/28/2020 | Behind schedule, 80% complete
Calibrated models and a technical paper detailing the developed calibration procedure are on schedule to be delivered to FHWA on 01/12/2020. Validation results are expected in February 2020.

Task 5 - Final Report and Documentation - Estimated completion date: 09/12/2020 | On schedule, 0% complete
(No updates)

Anticipated work next quarter:

Task 1 - Project Management - Estimated completion date: 09/12/2020
* On-going bi-weekly meetings
* On-going bi-monthly meetings with special interests groups

Task 2 - Literature Synthesis and Site and Data Collection Mechanism Selection - 100% complete as of 11/12/2018.

Task 3 - Data Collection and Processing - Estimated completion date: 02/28/2020
* Finalized corrected data will be delivered to FHWA in Q1.
* Data will be posted to transportation.data.gov.

Task 4 - Modeling in Microsimulation - Estimated completion date: 02/28/2020
* Calibrated and validated models will be delivered to FHWA in Q1.
* A journal paper will be delivered to FHWA in Q1.

Task 5 - Final Report and Documentation - Estimated completion date: 09/12/2020
* A draft guidance document will be delivered to FHWA in Q1.

Significant Results:

* Post-processed data almost finalized for publication.
* Most of the calibration experiments are complete.
* Drafted a technical paper to describe the calibration procedure.

Circumstance affecting project or budget. (Please describe any challenges encountered or anticipated that might affect the completion of the project within the time, scope and fiscal constraints set forth in the agreement, along with recommended solutions to those problems).

The process of fixing errors in the post-processed trajectory data has been lengthier than expected, but the project is expected to return back on schedule in Q1.

Potential Implementation:

It is hoped that the project may produce insights and guidance that profoundly influence the way practitioners and agencies calibrate their simulation models, by incorporating vehicle trajectories into the process.