

## TRANSPORTATION POOLED FUND PROGRAM QUARTERLY PROGRESS REPORT

Lead Agency (FHWA or State DOT): Indiana Department of Transportation

**INSTRUCTIONS:**

Lead Agency contacts 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.

<b>Transportation Pooled Fund Program Project #</b> TPF-5(519)	<b>Transportation Pooled Fund Program - Report Period:</b> <input type="checkbox"/> Quarter 1 (January 1 – March 31) <input type="checkbox"/> Quarter 2 (April 1 – June 30) <input checked="" type="checkbox"/> Quarter 3 (July 1 – September 30) <input type="checkbox"/> Quarter 4 (October 1 – December 31)	
<b>TPF Study Number and Title: TPF-5(519) Expansion: Enhanced Traffic Signal Performance Measures</b>		
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<b>Lead Agency Project ID:</b> TPF-5(519)	<b>Other Project ID (i.e., contract #):</b>	<b>Project Start Date:</b> July 1, 2023
<b>Original Project Start Date:</b> July 1, 2023	<b>Original Project End Date:</b> 6/30/2026	<b>If Extension has been requested, updated project End Date:</b>

Project schedule status:

On schedule     
  On revised schedule     
  Ahead of schedule     
  Behind schedule

Overall Project Statistics:

Total Project Budget	Total Funds Expended This Quarter	Percentage of Work Completed to Date
\$40,000	\$959.11	2%

## **Project Description:**

### **Background & Impact**

The Indiana led pooled fund traffic signal research projects have a strong history of implementation. The first study, TPF-5(259), was recognized by EDC 4 and virtually all controllers now provide high resolution data logging. There is a strong commercial base of advanced traffic signal performance measure providers. The technical reports from TPF-5(259) listed below are widely distributed and cited.

- Performance Measures for Traffic Signal Systems: An Outcome-Oriented Approach.  
<http://dx.doi.org/10.5703/1288284315333>
- Integrating Traffic Signal Performance Measures into Agency Business Processes.  
<http://dx.doi.org/10.5703/1288284316063>

Similarly, TPF 5(377) stimulated a second generation of commercial implementation of trajectory-based traffic signal performance measures. TPF-5(377) was led by Indiana and included participation from FHWA, California, Connecticut, Georgia, Minnesota, North Carolina, Ohio, Pennsylvania, Texas, Utah, and Wisconsin. The project developed methodologies and tools for using high resolution vehicle trajectory data to compute enhanced traffic signal performance measures. The technical report for TPF-5(377) was published July 6, 2023.

- Next Generation Traffic Signal Performance Measures  
<https://doi.org/10.5703/1288284317625>

### **Research Needs**

During the April 2022 TPF-5(377) Panel Meeting in Columbus, OH, participating states supported a new PFS with the following objectives:

1. Broadening performance measures to additional modes that are impacted by traffic signal systems, particularly transit and pedestrians.
2. Identifying use cases for enhanced probe data beyond the current trajectory and hard braking/hard acceleration data.
3. Integrated Analysis of High-res Controller Data and Trajectory Probe Data

These initiatives for TPF-5(519) will complement and expand the past work the multi-state team has done in the area of enhanced traffic signal performance measures using connected vehicle data.

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

**April 1 – June 30, 2023**

The solicitation for TPF-5(519) was posted in Spring 2023.

The following states have committed a total of \$1,020,000 to TPF-5(519) as of June 30, 2023.

Connecticut  
Georgia  
Minnesota  
Mississippi  
North Carolina  
Ohio  
Pennsylvania  
Texas  
Utah

The project has a start date of July 1, 2023, and will be funded incrementally by Purdue University as funds from the participating states are transferred.

**July 1 – September 30, 2023**

The following submissions to 2024 Transportation Research Board (TRB) Annual Meeting were accepted for presentation:

- TRBAM-24-00070: A Data-driven Intersection Geometry Mapping Technique to Enhance the Scalability of Trajectory-based Traffic Signal Performance Measures
- TRBAM-24-04389 Comparison of Estimated Cycle Split Failures from Detector and Connected Vehicle Data

To date, \$40,000 in funding for TPF-5(519) has been received by Purdue University. Significant work on the PFS project is pending additional transfer of funds from the partner states.

**Anticipated work next quarter:**

- Schedule a kick-off webinar with the panel members.
- Continue to identify and/or strengthen private sector partnerships for collecting and analyzing enhanced probe data for traffic signal performance measures.
- Continue outreach activities to share findings with a broader audience and solicit participation in the PFS Expansion: Enhanced Traffic Signal Performance Measures.
- Continue development of cloud-based analysis procedures.

**Significant Results:**

Saldivar-Carranza, E. and Bullock, D. (2023) A Data-Driven Intersection Geometry Mapping Technique to Enhance the Scalability of Trajectory-Based Traffic Signal Performance Measures. Journal of Transportation Technologies, 13, 443-464  
<https://doi.org/10.4236/jtts.2023.133021>

**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).**

**None**

**Potential Implementation:** N/A