TRANSPORTATION POOLED FUND PROGRAM
QUARTERLY PROGRESS REPORT

Lead Agency (FHWA or State DOT): __Iowa DOT_____

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 # *TPF-5(295)*	**Transportation Pooled Fund Program - Report Period:** X Quarter 1 (January 1 – March 31, 2019) Quarter 2 (April 1 – June 30) Quarter 3 (July 1 – September 30) Quarter 4 (October 1 – December 31)
Project Title: Midwest Smart Work Zone Deployment Initiative	

Name of Project Manager(s): Dan Sprengeler	**Phone Number:** 515-239-1823	**E-Mail** Dan.Sprengeler@dot.iowa.gov
Lead Agency Project ID: Keith Knapp	**Other Project ID (i.e., contract #):** Addendum 535	**Project Start Date:** July 1, 2014
Original Project End Date: June 30, 2020	**Current Project End Date:** June 30, 2019	**Number of Extensions:** None

Project schedule status:

X 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
$1,375,000 (committed)	$928,738.36	0

Quarterly Project Statistics:

Total Project Expenses and Percentage This Quarter	Total Amount of Funds Expended This Quarter	Total Percentage of Time Used to Date
$11,396.36		25

Project Description:
The Midwest Smart Work Zone Deployment Initiative (MwSWZDI) was initiated in 1999 as a Federal Highway Administration (FHWA) Pooled Fund Study intended to coordinate and promote research among the participating states related to safety and mobility in highway work zones.

The program is an ongoing cooperative effort between State Departments of Transportation, universities, and industry. The studies completed have consisted of evaluations of various work zone related products, various innovative topics, and several synthesis studies. Completed reports and descriptions of ongoing projects can be obtained at the Iowa State University's Institute for Transportation (InTrans) website (www.intrans.iastate.edu/smartwz/) link to the Smart Work Zone Deployment Initiative. InTrans currently operates as the program manager of the pooled fund efforts and completes administrative tasks related to request for ideas and proposals, meetings, project files, quarterly reports, and recommending reimbursement.

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

Quarter Ending March 31, 2019 (Overall)
During this quarter we communicated with a number of principal investigators as needed and resolved progress issues if they occurred. Projects from Program Year 2016 to 2019 contracts progressed (see below). Worked continued with the winners of 2019 funding and all those contracts are now in place. Additional effort was made to get all the funding in the system that was committed. Iowa DOT also got the new advertisement for 2020-2024 SWZDI posted and apparently Texas and Missouri have already committed to the new number of SWZDI.

The following is a summary of accomplishments from January to March 2019 for the individual research projects underway with fund account TPF-5(295).

2019 Program Projects
The following projects were selected in September for funding during the 2019 program year.

- An Intelligent Video-Based End of Queue Warning System for Work Zones, Shauna Hallmark as PI.
  This worked was contracted. It has a start date of 1/1/2019 and an end date of 3/31/2020. The project is 5% complete.

  We identified 355 back of queue events in the SHPR 2 naturalistic driving study. All of these events occurred in a work zone. We developed an initial model for assessing BOQ. In order to reduce additional distraction data, we need IRB approval. An IRB form was filled out and submitted to the ISU IRB manager. We have contacted 2 Iowa DOT members for the TAC and will work with them to identify several others from other SWZDI states so we can identify potential work zones for Task 4.

- Field Testing of Non-Motorized Road User Accommodations for Work Zones, John Shaw as PI.
  This worked was contracted. It has a start date of 1/1/2019 and an end date of 3/31/2020. The project is 1% complete.

  Task 1: TAC, IRB, Qtr Reports: Recruited TAC members, anticipating kick-off meeting in April 2019.
  Task 2: Literature Review: No activities
  Task 3: Develop Test Plan: No activities
  Task 4: Ped Test Track (PTT): No activities
  Task 5: Field Evaluations: No activities
  Task 6: Final Report: No activities

- Investigation of Autonomous/Connected Vehicles in Works Zones, Carlos Sun as PI.
  This process to contract this project was finishing this quarter and the paperwork being process with a start date of 4/15/2019 and an end date of 7/31/2020.

2018 Program Projects

- Smart Work Zone App, University of Missouri-Columbia, Yam Adu-Gyamfi as PI.

  Draft report submitted to TAC for review.

  This project started on January 20, 2018 and is expected to finish on January 19, 2019. The end date was extended to April 19, 2019 during this quarter. It is 95% complete.

- Development of Adjustment Factors for HCM Sixth Edition Freeway Work Zone Capacity Methodology, Iowa State University, Jing Dong as PI.

  Collect data of 13 work zone sites during the 2018 construction season. Identify usable data for the analysis. A TAC meeting is scheduled in April to discuss the preliminary results and next steps.

  This project was contracted to start on April 1, 2018 and will finish on July 31, 2019. It is 30% complete.

- Guidance on Active Work Zone Data Archival, Iowa State University, Anuj Sharma is PI.

  Task 1. Develop and Convene TAC - COMPLETED.
  Task 2. Conduct Literature Review - The research team conducted an analysis of existing technical standards and protocols related to work zone traffic data interchange. These included the Traffic Management Data Dictionary (TMDD), SAE standard J2540 / International Traveler Systems Information (ITIS), the European DATEX2 standard, and the draft work zone data exchange protocols currently being proposed by FHWA. Agency work zone data use cases were also compiled and summarized based on the FHWA draft report and other sources.
  Task 3. Develop Survey - The research team developed a draft agency survey to gather information about existing and proposed work zone data collection protocols and needs. The survey is currently being updated based on TAC suggestions.
  Task 4. Conduct Survey - No progress to report.
  Task 5. Analyze Survey Results - No progress to report.
  Task 6. Meet with TAC - A TAC meeting was held March 29, 2019 to review the progress to date and confirm the project direction.
  Task 7. Develop Prototype and Report - Development of a conceptual work zone data collection and management tool is currently ongoing.
  Task 8. Finalize Prototype and Report - No progress to report.

  This project started on January 1, 2018 and was expected to finish on December 31, 2018. A no-cost extension has been provided to extend the project to December 31, 2019. The project is 25% complete.

2016 Program Projects

- Design Optimal and Effective Queue Detection and Notification: Design of a Low-Cost Work Zone Warning System, University of Wisconsin, Madhav Chitturi as PI.

  Project began June 15, 2016. Due to staff turnover, we could not make much progress.
  The TAC meeting happened in October, 2016 and we obtained their input on the proposed design. Lot of discussion in the TAC meeting about what sign should be used "Be prepared to stop" or "Slow traffic ahead" or "Watch for stopped traffic". Have been in communication with TAPCO about design of the low-cost system.

TAPCO has developed a potential design already. We have gone through multiple iterations to make the design MUTCD compatible. Design changes were required to satisfy crashworthiness requirements of roadside hardware without having to go through crash testing requirements. On February 20, 2018, we presented the design changes to TAC. We communicated with FHWA to ascertain the need for submitting a Request for Experiment to FHWA before proceeding with the field testing. Based on feedback from TAC, we redesigned the sign to avoid the Request to Experiment. Working with TAPCO (private sector partner) on the redesigned sign. Before the fabrication, we reached out to TAC to get their approval for the sign. However, we received comments about crashworthiness/need for crash testing specifically about being MASH compliant. We had to do further review and in consultation with WisDOT staff and Nebraska staff, we had to do another major revision in the design of the sign. We presented the newest version of the sign to the TAC and have not received any comments. We are moving forward with the latest design.

WisDOT/Counties could not find any sites for field testing in Fall 2018. TAPCO, the private sector partner was not able to fabricate the newest design in time. Therefore, we obtained a No cost time extension till the end of 2019.

WisDOT came back to us in mid-March that they do not have any sites where we can test the QWS. We are now talking to the Counties. If we do not get any County on-board, we may have to re-scope the project to do a simulator evaluation instead of the field evaluation.

Project started on June 15, 2016 and was expected to finish on December 15, 2017. An extension to December 31, 2018 has been requested and granted. A second extension was also granted for an end date of December 31, 2019. The project is 50% complete. This is the same percent complete as last quarter.

Anticipated work next quarter:

Work will continue to work to finalize projects advance all the contracts the next program year should be place. A problem statement request for the next year of funding should be forthcoming this next quarter.

Significant Results:

The contracts for this program year are essentially completed.

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).

Currently there are no problems to report with the administrative contract. Any issues that have come up with the individual projects that may impact schedule or budget are resolved on a case by case basis.

Potential Implementation:

The website for the SWZDI pooled fund is updated on a regular and as needed basis for finished reports.