

## TRANSPORTATION POOLED FUND PROGRAM QUARTERLY PROGRESS REPORT

Date: 1-25-2017

Lead Agency (FHWA or State DOT): South Dakota 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.*

<b>Transportation Pooled Fund Program Project #</b> <i>(i.e., SPR-2(XXX), SPR-3(XXX) or TPF-5(XXX))</i>  TPF-5(054)		<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 type="checkbox"/> Quarter 3 (July 1 – September 30) <input checked="" type="checkbox"/> Quarter 4 (October 1 – December 31)	
<b>Project Title:</b> Development of a Maintenance Decision Support System			
<b>Name of Project Manager(s):</b> Dave Huft		<b>Phone Number:</b> 605-773-3358	<b>E-Mail</b> Dave.Huft@state.sd.us
<b>Lead Agency Project ID:</b> SD2002-18		<b>Other Project ID (i.e., contract #)</b> 310814	<b>Project Start Date:</b> October 14, 2002
<b>Original Project End Date:</b> April 30, 2003		<b>Current Project End Date:</b> September 30, 2017	<b>Number of Extensions:</b> 35

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
\$10,340,528.00	\$9,648,580.35	93.30%

Quarterly Project Statistics:

Total Project Expenses and Percentage This Quarter	Total Amount of Funds Expended This Quarter	Total Percentage of Time Used to Date
\$265,302.08 (2.56%)	\$265,302.08	95%

**Project Description:**

- The Maintenance Decision Support System research program is responsible for research and development related to the implementation of new information technologies to support transportation maintenance decisions, including winter and summer decision support tools. The program also performs substantial research and development into parallel applications for the transportation industry that may either share data with MDSS, or benefit by leveraging technologies developed under the program (for instance, sharing of data between MDSS and other agency systems, or the development of management-oriented tools that leverage MDSS' capabilities).

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

- The MDSS Technical Panel had a meeting in Sioux Falls, SD October 24<sup>th</sup> – 26<sup>th</sup>. During this meeting progress of the research and development tasks were completed along with discussions for upcoming operational items within each agency.

- Work continued on the Web-Based MDSS interface. A document was developed during Q1 to help identify items from the MDSS GUI that need to be included into the MDSS web-based interface. An update of current development efforts were presented at the October Technical panel meeting, including the inclusion of table views and AVL/MDC data. Voting was conducted to determine the next round of development items and those included manual reporting, trucks reports, saved storms and fixing minor bugs within the interface. Also, a design meeting was held with the agencies during Q4 that allowed attendees to ask questions and provide feedback on design concepts for the manual reporting interface.

- The current version of the GUI during Q4 is v13.0. Updates include the inclusion of friction data reported by RWIS sites and improved functionality of the manually reported information via the GUI and mobile applications.

- The Assessment of Recommendation volunteer team was expanded to include participants from CO, ND, SD, NE, IN, and MD. By the end of the quarter there were 15 DOT participants in the study. A preponderance of the assessments focused on two primary winter situations: blowing snow scenarios and precipitation events with pavement temperatures near freezing. Early user Assessment of Recommendation input highlighted a cold pavement temperature bias that became apparent when bitter cold air surged south into the Midwest after the abnormally warm fall.

- Iteris made adjustments to MDSS to alleviate the cause of the aforementioned cold bias. This included implementation of a process for estimating deep-road temperatures based on actual weather conditions, as opposed to the use of climatological deep-road temperatures. This also included tracking down and resolving an issue that caused Iteris' downwelling longwave radiation estimates to be biased low in cloudy conditions.

- On site training occurred in NE, KY, CO, IN, ND, SD, MD, MI, and WI. An overview of winter weather forecasting with emphasis on road weather impacts was discussed. How to use MDSS before, during and after a storm were key points of getting new and existing users up to speed for the 2016-2017-winter season. Where to access the recently updated training materials and training videos was also discussed. User additions changes, as well as route configuration changes and additions occurred mostly in this quarter.

- Work continued with MnDOT to help develop their maintenance reports that can easily be viewed for their operations. MnDOT is funding this work through the PFS MDSS project as the information will be beneficial for all agencies. The reports infrastructure was set-up on MnDOT's network and the following reports were officially completed: "actual vs. recommended" report and "speed while applying chemical" report. Weekly meetings are held to communicate with the project team on progress.

**Anticipated work next quarter:**

- Major work will continue on the webMDSS functionality. The list of items will include manual reporting conditions, truck reports (End of Shift and Detailed Storm Report), ability to select routes, and the beginning steps of developing saved storms.
- Operations will continue for all agencies during Q1.
- Iteris will continue to work with the AoR participants to log and evaluate user assessments of recommendations.
- New training modules and opportunities are being researched and tested to improve the 2017-2018 training efforts. Other uses with this new technology as it relates to PFS will be discussed.
- Provide updated MDSS software documentation and 'images' to the PFS, based on the MDSS instance that has been spun up in Amazon Web Services' EC2 infrastructure, but with problems noted by MnDOT in their internal rollout of the MDSS software addressed. Iteris will work with the PFS member agencies thereafter to define the process for software provision and maintenance going forward (under the newly-signed IP agreement).
- Potentially release a new version if the MDSS GUI requires any necessary updates.
- An MDSS Technical Panel Meeting will be hosted in Q1

**Significant Results:**

- The deployment of the MDSS Dashboard has been met with positive feedback and constructive comments for changes. This feature allows the most basic users to get information in a quick view.
- An operational web-based MDSS solution has been developed during Q4 2015, and Q1/Q2 2016. This effort has taken years' of work within the GUI and placed it into a web application that can be used by decision makers in each agency.

**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.)**

- Q4 represents the start of Year 2 for Phase 9. Additional funds were provided by MnDOT to assist with their maintenance reports interface. Although additional funds have been added to the project the scope of work should not be impacted by the changes.

**Potential Implementation:**

- The MDSS research program is now well into its 9<sup>th</sup> phase of work. The core MDSS software / services have been operational within numerous state transportation agencies for several years or more, depending upon the agency. An initial suite of "Management Tools" has been implemented within the past several years, starting first with a WMRI tool to aid managers in quantifying winter severity across their jurisdiction from a winter maintenance perspective, followed up more recently by a complementary suite of MDC/AVL-oriented tools analyzing and visualizing maintenance being performed by the agency's MDC/AVL-equipped snowplow fleet. During Phase VII, MDSS applications for iOS and Android mobile platforms were designed, developed and made available to PFS member agencies. New features and capabilities continue to be added in the present phase of work.