TRANSPORTATION POOLED FUND PROGRAM
QUARTERLY PROGRESS REPORT

Date: May 30, 2013

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.

Transportation Pooled Fund Program Project # *(i.e, SPR-2(XXX), SPR-3(XXX) or TPF-5(XXX)* TPF-5(054)	Transportation Pooled Fund Program - Report Period: X 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: **Development of a Maintenance Decision Support System**	

Name of Project Manager(s): **Dave Huft**	Phone Number: **605-773-3358**	E-Mail Dave.Huft@state.sd.us
Lead Agency Project ID: **SD2002-18**	Other Project ID (i.e., contract #) **310814**	Project Start Date: October 14, 2002
Original Project End Date: **April 30, 2003**	Current Project End Date: **September 30, 2013**	Number of Extensions: 29

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
$6,676,382.00	$6,189,702.90	92.71%

Quarterly Project Statistics:

Total Project Expenses and Percentage This Quarter	Total Amount of Funds Expended This Quarter	Total Percentage of Time Used to Date
$368,793.41 (5.52%)	$368,793.41	95.45%

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.):

- Continued development of MDSS applications for Android and iOS smartphone and tablet devices. Developed a summary screen concept for the route-based data that is more appropriate for the limited screen real estate of mobile devices. This screen is available in the live version of the MDSS Android app available on the Google Play. Development of the iOS version of the MDSS app continued during the quarter, with some design changes occurring relative to the Android version in order to improve tablet layouts and improve on some shortcomings noted with the Android version of the app.

- Continued support for the MDSS GUI, including various minor enhancements and debugging to resolve issues reported by the PFS MDSS member agencies. The current version is 9.04.

- Continued support of the WMRI toolset, including preliminary evaluation of a forecast-based option for tracking winter severity.

- Provided full operational support during Q1 including weather forecasting and customer support for users in the field.

- Route configuration refinements occurred throughout Q1 as agencies gained a better understand of the intended recommendations.

- Evaluations were conducted by MDSS users during snow and ice events into May. The data is being stored and will be used for future study about when MDSS is being used, and how the recommendations perform when the recommendations are followed.

- Mobility Index – A number of sites along routes in the MDSS program in 4 different states were isolated that had cameras, RWIS ESS equipment, and MDC-equipped vehicles. These sites were used to determine the correlation between the MDSS generated Mobility Index values and an "estimated" Mobility Index value associated with ob-served or ESS-reported road conditions. The evaluation indicated that camera imagery was the most reliable resource, but was limited to daytime in several locations. RWIS road conditions were not reliable and MDC proved to be an inconsistent resource, such that one had no idea whether the data from MDC was valid or not. The conclusion from these case studies was that an evaluation of the Mobility Index will require a controlled test.

-Fine-resolution mesoscale model applications: Continued execution of the five fine-scale domains during the quarter. Outreach efforts were made to each of the lake effect study areas to promote use of the survey instruments designed to support asynchronous reporting by field personnel.

Anticipated work next quarter:

- Continue enhancement of both the iOS and Android apps. Complete the process of getting the iOS approved by Apple for distribution via iTunes.

- Complete evaluation of the usefulness and performance of the WMRI tool, and report the findings to the Technical Panel.

- Full winter operations will continue throughout the first part of the next quarter with additional customer support necessary for any additional questions at winter season's end.

- Post season wrap-up meetings via face to face visits or conference calls will be conducted to determine any outstanding issues and discussions for future deployments.

- Evaluation of MDSS recommendation data will be studied and evaluated to determine if MDSS recommendations are being followed, and how the recommendations performed when they were followed. Trends will be looked at to see if there are common reasons for why the recommendations are not being used.

- Final route configuration changes and additions will be made for the last few weeks of operations in Q2.

- Mobility Index - Monitor the performance of the mobility index for stored events from the last 3 months of the winter. Research will continue on the best method to compute the mobility index. One particular area that needs assessment is the computation of mobility index for wheel tracks rather than over the entire pavement cross section. An evaluation will be done on the necessary resources available to perform a rigorous controlled evaluation of the mobility index during the next winter and a format for user input regarding user observations of mobility index and its relationship to the MDSS-generated values.

- Fine-scale mesoscale modeling – Upon completion of the winter season the data collected will be reduced and an analysis will be performed to identify benefits, challenges, and limitations of the modeling efforts to support roadway applications within MDSS.

Significant Results:

- As typical during the winter season, efforts during Q1 were largely focused on maintaining MDSS operations moreso than on engaging in substantial new areas of research and development. Results of current R&D activities will be presented in forthcoming quarters.

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).

- Project was extended 1 year to continue work on the states research priorities and conduct operational field deployment trials.

-Fine-scale mesoscale modeling – Due to hardware implementation issues associated with the Iteris computing cluster, the use of an expanded computing cluster environment will not be available for this winter season. This will limit the integration times of the individual model domains.

Potential Implementation:

- The MDSS research program is presently in its 7th 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.