TRANSPORTATION POOLED FUND PROGRAM
QUARTERLY PROGRESS REPORT

Date: Feb 15th, 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 ☐ Quarter 1 (January 1 – March 31) ☐ Quarter 2 (April 1 – June 30) ☐ Quarter 3 (July 1 – September 30) X 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	$5,820,909.49	87.19%

Quarterly Project Statistics:

Total Project Expenses and Percentage This Quarter	Total Amount of Funds Expended This Quarter	Total Percentage of Time Used to Date
$354,700.16 (5.31%)	$354,700.16	93.18%

TPF Program Standard Quarterly Reporting Format – 9/2011 (revised)

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. The Android app
  was made available through the Google Play Store early in Q4. This app featured a map-oriented view with
  selectable map objects, tabular, graphical and "summary" route views, RWIS and METAR current condition views,
  and a tie-in to Meridian's METAlerts automatic alerting system. Development of the iOS MDSS app also continued
  during Q4. The initial operational release of the iOS MDSS app is expected to occur during Q1 of 2013.

- Version 9.0 of the MDSS GUI was formally released. Software enhancements to address diagnosed bugs have
  continued thereafter.

- Added support for a forecast-based option for tracking winter severity and supporting the WMRI toolset.
  Implemented this new option in three states for evaluation.

- Full time forecasting support began on October 15th for those agencies requiring weather forecasting support for
  their MDSS operations.

- A draft training guide was started for the MDSS mobile application as released for review and used during training
  sessions to show App functionality. This guide was specific to Android users but an additional guide will also be
  developed for those users on the iOS platform.

- Route configuration for all agencies were performed throughout the quarter. Each agency had updates to chemical
  practices, route locations, and overall maintenance practices requiring updating. In many cases these changes
  required multiple follow-ups with the agency representatives to confirm the route information.

- Final operational budgeting was performed for each agency. This included confirming number of users, number of
  plow routes, and number of AVL/MDC units integrated into MDSS.

- Training was conducted in all locations that requested on-site training. This consisted of new users training,
  refresher training for medium knowledge users, and expert training for those agencies with very experienced users.

- Training for the Evaluation tool has been conducted through several webinar sessions. Approximately 30
  evaluators have been trained on the use of the tool from several different states within the PFS.

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

- Mobility Index - A set of relationships between mobility index values and the depths of water, snow, compacted snow,
  ice, and a mixture of the these components based upon the percentage of mass of the constituent components was

accepted for testing and was made operational in MDSS. The mobility index is computed on the fly in MDSS so it is possible to evaluate the mobility index output for saved storms as well as current events.

-Fine-resolution mesoscale model applications: Execution of the five fine-scale domains was reduced during December due to computing cluster issues. This resulted in shorter simulations for each domain included in the lake effect studies where Lake Superior was shortened to 18 hours each, and Lake Erie and Lake Michigan were shortened to 12 hours each. 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:

- Complete development of the iOS-based application and make it available through iTunes. Continue enhancing both the iOS and Android apps.

- Continue to build out and evaluate the designed suite of functionality for the combined WMRI and MDC/AVL Management Tools, specifically focusing on evaluating the usefulness of the WMRI tool in several states and and on rounding out the aspects of the MDC/AVL Management Tools that facilitate comparison of maintenance activities against both weather events and guidance provided to snowplow operators via MDSS or other more traditional mechanisms.

- Continue work to improve upon MDSS' precipitation analysis data based on issues identified during the winter season, and continue the general process of refinement to other MDSS components based on feedback received.

- Full winter operations will continue throughout the quarter including weather forecasting support for those agencies requiring support.

- 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.

- Route configuration changes and additions will likely occur due to additional on-site training feedback. Several agencies have used live storms to determine MDSS configurations and we anticipate that will continue this winter.

- Mobility Index - Monitor the performance of the mobility index for active weather and stored events. Set up a program for users to report on the performance of the mobility index values.

- Fine-scale mesoscale modeling - Upgrades to the Meridian computing cluster are expected in early 2013 and adjustments of modeling integration limits will be made accordingly to provide a longer forecast interval for lake effect events and high-wind conditions.

Significant Results:

- Significant results this quarter include the initial release of an operational MDSS smartphone app for Android
  as well as Version 9.0 of the MDSS GUI.

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.

-Blowing snow modeling – Due to the change in route naming by Minnesota DOT, the blowing snow model and its associated snow data assimilation database is not presently working for MnDOT. This will require significant code revision in order to restructure the database for the new route naming.

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.

- An operational MDSS application of Android devices was released in late fall of 2012. A similar application for iOS devices is expected in Q1 2013.