

## TRANSPORTATION POOLED FUND PROGRAM QUARTERLY PROGRESS REPORT

Date: July 31, 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.*

<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 checked="" type="checkbox"/> Quarter 2 (April 1 – June 30) <input type="checkbox"/> Quarter 3 (July 1 – September 30) <input 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, 2013	<b>Number of Extensions:</b> 29

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
\$6,676,382.00	\$6,426,672.82	96.26%

Quarterly Project Statistics:

Total Project Expenses and Percentage This Quarter	Total Amount of Funds Expended This Quarter	Total Percentage of Time Used to Date
\$236,969.92      (3.55%)	\$236,969.92	97.73%

**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 work on the MDSS applications for Android and iOS smartphone and tablet devices. Work on the iOS app focused primarily on implementation of the tabular views for the Route, METAR and RWIS Views. Access to narrative forecast products, where provided, was also added to the iOS app. In the iOS Map View, a time slider was added to permit the user to look forward or backward in time. Android work focused on a rewrite of most of the views, changing the look and feel to conform to the Android Ice Cream Sandwich look and feel. This rewrite was also expected to improve stability, and to provide better support for the range of phone and tablet devices.
- Bug fixes and minor enhancements to the MDSS GUI also continued during the quarter. This included an update to the camera viewer, including the addition of Previous / Next buttons and imaging rescaling as desired by the user.
- Continued operation and evaluation of the WMRI toolset, with particular focus on evaluation of the new forecast-based option for winter severity tracking.
- Provided full operational support during Q2 including weather forecasting and customer support for users in the field. This effort in most locations ended on April 15<sup>th</sup> as per the contractual requirements. Many locations across the project states experienced winter weather into early May. Support in these locations was provided as requested.
- Route configuration activities were minimal during Q2 as major operations across the participating states began to end on April 15<sup>th</sup>.
- The second half of the quarter, operational seasonal wrap-up conference calls were held with each agency. These meetings provided each agency to address any final issues that need to be address and look towards next winter's operational season. These meetings were successful and provided a great wrap-up to the 2012-2013 winter season.
- Input regarding the acceptance of MDSS recommendations was continued into May. User input was analyzed and generated into a set of tables and graphs indicating the degree of acceptance of recommendations when a specific set of initialization criteria used by MDSS matched the actual conditions. Particular attention was placed on the level of acceptance of recommendations when all MDSS initial conditions met actual conditions. The results were presented at the June Technical Panel meeting..
- Mobility Index – The background research on a mobility index based upon frictional forces culminated in the introduction of a continuous mobility index function for the winter of 2012 – 13. This was adjusted in March to factor in the influence of the mass (thus, the depth) of material on the road surface. The depth of the component materials creates lifting forces that impact rolling friction and thus mobility that are necessarily included in straight braking friction forces. The mobility index table values and graph section of the Route View displayed a friction index, a mass index, and a mobility index that integrated the friction and mass computations. The results were presented at the June Technical Panel meeting.

**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.
- Discussions with each agency regarding their possible 2013-2014 winter season plans will occur.
- Efforts will be placed towards updating operational budgets for each agency. This includes determining MDSS usage, route deployments, possible AVL/MDC deployments, and any other changes to operations that might require additional effort.
- The technique used in MDSS to allow users to submit evaluations will be evaluated to determine if modifications can be easily instituted to assure that all recommendations that are evaluated have MDSS initial conditions that match actual conditions. This will require a mechanism to rerun the recommendation when MDSS and actual initial conditions don't match.
- Route configuration forms will be modified to account for any changes necessary for the following winter.
- Training documentation will be edited and formatted for distribution before next winter's operational season.
- Mobility Index - The Technical Panel determined that this task was of lesser priority; therefore, the level of effort will be reduced and any work will be associated with scientific requirements within MDSS that interact with the mobility index.

**Significant Results:**

- Post season conference calls provided to be beneficial and the overall consensus from individuals is MDSS performed well and provided decision makers with a great tool for fighting snow and ice.

**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).**

**Potential Implementation:**

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