Pooled Fund Study Project TPF-5(054)
SDDOT Project SD2002 – 18
Development of Maintenance Decision Support System
Phase VI
Fourth Quarter Progress Report
October - December, 2009

Overview

The foci of the Phase VI fourth quarter (Q4) 2009 activities included provision of operational support as winter began in most states, continued enhancement of the MDSS software, and the continued work and development related to the Winter Maintenance Response Index (WMRI). Operational support included working with states to determine the extents of their deployments for the winter season 2009-2010, developing associated budgets, route configuration, as well as ongoing operational forecast and computer support tasks. Since several states had not reassessed their route configuration for routes configured years ago, Meridian provided current configurations such that each state was aware of the opportunity to review and update the information. Meridian also assisted states with their annual fall MDSS training, where requested. This provided Meridian an opportunity to show users, new and experienced, a number of changes with the GUI completed through Q3.

Progress by Task

Specific accomplishments on the explicit tasks of the Phase VI work plan during the fourth quarter of 2009 follow.

TASK 14: Refine and evaluate techniques for acquiring, managing, using, and reporting information from mobile data collection equipment mounted in winter maintenance vehicles and for providing information to maintenance operators via the same equipment.

Meridian has continued to work with a number of PFS member agencies to incorporate new data feeds and to resolve issues reported from the field relating to the provision of MDSS information back into maintenance vehicles. Several new features for in-vehicle MDSS information provision were enabled during Q4, including the ability for users to view alternative recommendations and the ability to select other routes when the routes the system automatically selects to display to a given vehicle are not the routes the driver is intending to maintain. From the standpoint of managing and utilizing this information, the development of capabilities for generating reports geared toward management personnel in agencies using MDSS has continued to be a focus during Q4. An initial management reports toolset including these capabilities is expected to be available with the first half of Q1 2010.

TASK 15.: Refine and evaluate the capability and performance of MDSS software components, including surface condition prediction models and graphical user interface.

Efforts to improve the capability and performance of MDSS continue on an ongoing basis. Recent enhancements include numerous minor modifications to the MDSS GUI to address various issues noted by users, as well as introduction of a few new capabilities. A significant amount of time was also expended during Q4 trying to diagnose the cause of occasional lock-ups of the MDSS v6.0 GUI. All of these enhancement and adjustment activities fall under Subtask 15.10. Subtasks 15.1, 15.2, 15.4, 15.5, 15.7, and 15.8 were all completed in previous quarters, while 15.6 is presently being addressed through the inclusion of capabilities for generating management-oriented reports via the MDSS GUI.

Progress was also made on MDSS Subtasks 15.12 and 15.14 during Q4. An initial overview of the findings of the expanded literature review (Subtask 15.12) is expected to be available prior to the late February 2010 MDSS Tech Panel meeting. With regard to Subtask 15.14, a significant amount of work has been performed on the design and development of an improved precipitation estimation system. An initial functioning version of this system has been operational since late in Q4 2010. System performance is being monitored as winter progresses, with adjustments being made as issues are identified. Output from this system is expected to be made available to MDSS users before the end of the 2009/2010 winter season. Meridian was able to leverage external (non-MDSS) funding for a significant share of the work related to the initial development of this system. However, continued enhancement of the system will be necessary going forward, and funding responsibility for this enhancement is expected to return to the MDSS Pooled Fund Study (as originally envisaged).

TASK 16: Recommend, develop, and evaluate methods for enhancing highway agencies' management through interfaces between MDSS and other management systems, analysis of winter maintenance practices, and extension of MDSS techniques to non-winter applications.

Research into the potential for application of MDSS as a tool for generating reports tailored to high-level management within state transportation departments has continued during Q4. Efforts during the quarter continued to focus on building and enhancing a capability for generating management-oriented reports into the MDSS GUI. Initial reports that have been generated under this new capability focus primarily on the visualization and analysis of data coming out of the MDSS WMRI simulation system as well as out of agency MDC/AVL systems. An initial functioning version of the Management Reports interface was prepared for demonstration to the MDSS Tech Panel at the early Q4 meeting. Release of this interface to the Tech Panel has been held up by suspicions that the plug-and-play nature of these tools (which are not distributed with the GUI executable) may be responsible for the MDSS v6.0 GUI lockups some users have noted. This theory has not yet been proven or disproven, but it is expected that the Management Reports interface will be made available to a select group of MDSS users within the first half of Q1 2010 nonetheless. A substantial effort has also been underway during Q4 to improve the robustness and efficiency of the WMRI simulation process.

Much of the initial code that was written to orchestrate the simulations has since been heavily modified or completely rewritten in order to make the process less prone to failures and to make it consume fewer resources. While this work has not directly resulted in any new capability, it was a necessary step in the development of the WMRI capabilities.

TASK 17: Develop a model MDSS procurement specification suitable for use by public highway agencies.

No changes were made to the procurement specifications during Q4.

TASK 18: Provide weather forecast support, MDSS Configuration support, live MDS operations, and necessary training for continuing limited deployment field trials in the participating highway agencies.

During Q4 Meridian was heavily involved with providing operational support to all states contracting Task 18 services via the Pooled Fund Study. This included planning and logistical support for those states needing assistance in their field trials. Forecast support was also provided for all routes not covered by a current weather forecasting contract.

Major route expansion across the states did not occur during Q4, but states revisited their route configuration to ensure input was accurate. This provided states an opportunity to assess the number of routes they have within the system and how effective they have been for their agency. Meridian also provided on-site training for the states that requested training. This training included hands-on and lecture style along with new and refresher training. Table 1 is list of all training conducted by Meridian during Q4.

MDSS Training Schedule		
Kansas		
October 5th-6th	Garden City & Colby	Ben Hershey & Gordon Bell
North Dakota		
October 11th	Fargo (all Districts)	John Mewes, Adam Chambers, Matt Hartman
South Dakota		
November 10th	Pierre & Rapid City Region	Ben Hershey & Adam Chambers
November 17th-18th	Mitchell & Aberdeen Region	Ben Hershey
Wyoming		
October 19th-22nd	Entire State	Gordon Bell
Idaho		
October 28th	Shoshone (Twin Falls Region)	Gordon Bell
New Hampshire		
October 12th	Bedford	Steve Gaddy
October 13th	Franconia, Laconia	Steve Gaddy
New York		
November 9th	Binghamton	Steve Gaddy
November 10th	Hornell	Steve Gaddy
Kentucky		

November 12th	Lexington	Steve Gaddy
Virginia		
December 1st	Salem (2 sessions)	Steve Gaddy

Table 1: MDSS Training Schedule for Q4 of Phase VI.

Significant hardware upgrades were made to the computers supporting MDSS during Q4. MDSS operations load during the month of December far exceeded that of any previous month. In order to address this load the primary MDSS server was replaced with a more powerful system, while provisions are also being made to eventually move to a dual-server load sharing server environment. During the Christmas time period, bandwidth out of Meridian consumed by MDSS operations exceeded 12 Mbps.

TASK 19: Prepare a report summarizing methodology, findings in performance, conclusions and recommendations.

No activities have been performed for this task during Q4. A Major Report on the study to date was created during the Q1 2008 and will eventually serve as the basis for the Final Report.

TASK 20: Make an executive presentation to the project's technical panel and provide electronic copies of the presentation material to participating states.

No activities have been performed for this task during Q4.