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, 2010

Overview

Phase VI fourth quarter (Q4) 2010 was spent working directly with many of the states to begin their winter operations. Training, route configuration and changes, and overall operational support were in full gear during Q4. There were many new features developed during Q2, Q3, and the beginning of Q4 which required many changes to training materials and constant communication with users as they encountered enhanced features but did not know how to navigate the feature.

Research and development also continued during the quarter. During the technical panel meeting conducted during the early part of Q4, one of the major research tasks discussed was the assessment of recommendations. Once a direction for this research was agreed upon, a corresponding toolset to promote capture of the required data via the MDSS GUI was developed and released. Numerous other enhancements to the GUI were also developed and/or released during Q4, as detailed below. Version 7.07 of the MDSS GUI was the latest version available as of the end of Q4.

Progress by Task

Specific accomplishments on the explicit tasks of the Phase VI work plan during the third quarter of 2010 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 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. This includes the inclusion of data from over 400 new MDC/AVL units within the state of Wisconsin, among others. From the standpoint of managing and utilizing this information, the development of capabilities for generating reports that leverage the MDC/AVL information has continued to be a focus during Q4. Specifically, Meridian has completed the design process for a database intended to house the MDC/AVL and corresponding MDSS and weather data in a manner that makes it more readily accessible for report generation and MDSS/MMS/ATIS integration, and has initiated work on tools for generating reports based upon this and similar information.

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

Task 15 efforts during Q4 have largely continued to focus on enhancing the capability and performance of MDSS.   This includes refinement of Q3 enhancements related to the introduction of a domain covering the continental United States, an interface that permits access into Meridian's automated "METAlerts" alert system infrastructure, a forecast verification tool, and numerous other minor modifications to the MDSS GUI to address issues and desires brought forth by MDSS users. As is typical for a fourth quarter given the expanding winter deployments, an extensive amount of time was consumed with debugging user-reported problems, especially related to new features of the MDSS GUI and new computing environments that are encountered in expanding deployments. The server-side infrastructure of the MDSS system was improved in Q3 through the use of "SRV records" to permit load balancing between multiple MDSS servers and provision for the use of content delivery networks as a means of reducing MDSS bandwidth bottlenecks in widespread and/or particularly severe road weather events. A substantial renovation of MDSS' code for detecting and working with proxy servers was also carried out during Q4. Testing and debugging of both of these aspects of MDSS development continued during Q4.   Finally, a mechanism for promoting an assessment of the recommendations provided by MDSS was also released during Q4. The interface was developed in preparation for use in developing a method to assess MDSS road treatment recommendations and to determine reasons that recommendations were not being followed. This interface will be used in Q1 of 2011.

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.

Work toward improving the management reports toolset in the MDSS GUI has continued during the quarter (task 16.1). Efforts during Q4 have focused heavily on assessment and refinement of a new tool for wintertime precipitation analysis.   This tool, the development of which was initiated under the Clarus project, shows considerable promise for improving MDSS' ability to support management-oriented performance analysis where an accounting for variable weather conditions is required.

Work on the agency integration task (16.3) during Q4 has focused primarily upon integration of MDSS with maintenance management systems (MMS). Meridian has been directed to initially focus on the development of tools for generating reports of the nature required by MMS systems. Toward this end, Meridian has completed design of an SQL database schema appropriate for storing MDSS and MDC/AVL data in a manner that is more amenable to the generation of MMS-oriented reports. Development of software for interfacing with this database was underway as of the end of Q4. This includes the software required to populate, maintain, and query the database, and software oriented toward the development of specific reports. Some preliminary types of reports have been

made available to MDSS users during Q4, but are only available for a limited timeframe after real-time pending transition of these tools to the SQL database.

No significant progress has been made in the task of improving integration between MDSS and ATIS systems. The SDDOT was nominated as the testbed for exploring these applications, and that effort is presently on hold pending SDDOT's transition to a new road condition reporting system.

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.

The beginning of Q4 marked the beginning of winter operations across all MDSS states. After discussions during the technical panel meeting held in early Q4 final changes to the cost estimates for a few states were made and finalized. These new quotes addressed changes to their deployments and included changes to their training requirements for the upcoming winter.

During Q3 each agency received a copy of their current route configurations within MDSS. Similar to the past few years, this allowed the states to make an assessment of their MDSS route deployment and make changes if necessary. Similar to years past there were several routes in many states that needed to be updated and changed. These changes addressed issues that may negatively affect recommendations for users.

There was a major push during Q4 to conduct onsite training across all MDSS states. Table 1 shows the list of states, dates, locations and trainers that were present at the training conducted during Q4. States that are denoted with a "*" represent those agencies that are not billing their operations via the MDSS PFS contract. The meeting in Maryland at their Hampton Roads location (**) was Maryland's initial kick-off meeting that also consisted of an overview training and introduction to the MDSS software.

State	Location	Date	Trainer(s)
KS	Garden City & Hays	9/30-10/1	Ben Hershey & Tony McClellan
ND*	Bismarck (all 8 Districts)	10/4	Ben Hershey
WI*	Superior & Rhinelander	10/6-10/7	Ben Hershey & Dan Koller
IN*	Warsaw, Paoli, Indianapolis	10/12-10/14	Ben Hershey
NY	Hornell & Binghamton	10/12-10/13	Tony McClellan
PA	Erie	10/14	Tony McClellan
VA*	NoVa (Chantilly)	10/26	Ben Hershey
WI*	La Crosse, Madison, Waukesha	11/2-11/4	Ben Hershey & Tony McClellan
SD	Pierre (All 4 Regions)	11/9-11/10	Ben Hershey & Adam Chambers

MD	Hampton Roads**	11/8	Tony McClellan
PA	Hollidaysburg	11/9	Tony McClellan
*WY**	Cheyenne	11/12	Gordon Bell
KY	Salem	11/15-11/16	Tony McClellan
NE	Omaha, Lincoln, Norfolk, McCook, North Platte, Gering, Grand Island	11/15-11/19	Ben Hershey
KS	Kansas City	12/2	Ben Hershey
*CO**	Denver (All Regions invited)	12/13-12/14	Ben Hershey, Gordon Bell & Tony McClellan
*WY**	Worland, Thermopolis & Lander	12/20-12/22	Gordon Bell

Table 1: Training completed during Q3.

As mentioned above there were many changes to routes including route additions in some states. The following table (

State	# of Routes	State	# of Routes
Colorado*	134	**New Hampshire**	10
Idaho	9	**New York**	17
Indiana*	155	**North Dakota***	105
Kansas	22	**Pennsylvania**	14
Kentucky	12	**South Dakota**	105
Minnesota*	265	**Virginia***	38
Maryland	6	**Wisconsin***	385
Nebraska	140	**Wyoming***	62

Table 2) shows the number of routes configured in each state at the end of Q4. States that are denoted with a "*" represent those agencies that are not billing their operations via the MDSS PFS contract.

State	# of Routes	State	# of Routes
Colorado*	134	**New Hampshire**	10
Idaho	9	**New York**	17
Indiana*	155	**North Dakota***	105
Kansas	22	**Pennsylvania**	14
Kentucky	12	**South Dakota**	105
Minnesota*	265	**Virginia***	38
Maryland	6	**Wisconsin***	385

Nebraska	140	Wyoming*	62

Table 2: Route status per state at the end of Q4.

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.