Pooled Fund Study Project TPF-5(054)
SDDOT Project SD2002 – 18
Development of Maintenance Decision Support System
Phase IV
Fifth QUARTERLY PROGRESS REPORT
January - March, 2007

Overview

The focus of the Phase IV first quarter (2007) was the continuation of activities associated with Field Deployment Transition (FDT). This included ongoing training, software development and refinement, route expansions, and the collection of case studies.

Most FDT training was performed during the 2006 calendar year. However, additional training sessions were performed this quarter in Colorado, South Dakota, and Minnesota. Additionally, the initial 'kick-off' visit and interview process for CalTrans was conducted in mid-January.

Improvements to the MDSS Graphical User Interface (GUI) were performed and incremental new releases of the software were available for use throughout the quarter. A more substantial upgrade was released to the MDSS Technical Panel as version 3.10 on March 1st, 2007.

Route expansions continued in several PFS MDSS states during the quarter, including the addition of nearly 100 new routes in Minnesota. Case studies were also collected during the quarter. These studies were conducted in several locations in varying weather conditions. These case studies will be used to further the development of the MDSS modules.

This report will encompass the major tasks that have been accomplished during the first quarter of 2007 while following the outline of the Phase IV Work Plan.

Implement version 2.0 of the PFS MDSS in state agency offices in individual and multi-state test regions as determined by the Technical Panel and evaluate its performance during 2005-06 winter operational maintenance activities (Task 1)

Task completed. No additional activities during Q1 2007.

Identify required additional research necessary to continue the enhancement of MDSS within an operational environment (Task 2)

Per the request of the MDSS Technical Panel members, additional case studies were performed during the quarter. These case studies were conducted across the PFS-MDSS domain by both Meridian staff and DOT observers. The following table shows the list of the different case studies performed during the quarter.

Location of the Event	Date	Type of Event	Observers
Columbus, IN	2/13/07	Freezing Rain & Snow	Tony McClellan & Gary Phillips
Yankton, SD	2/24/07	Heavy Snow	Ed Rogers, SDDOT
Red River Valley	3/01/07	Compacted Snow	John Mewes & Ben Hershey
Iowa	3/03/07	Major Ice and Snow	None
Red River Valley	3/15/07	Multi-faceted Snow event	John Mewes & Ben Hershey

Table 1: Case studies performed during the first quarter of 2007.

A large volume of data was collected from these cases; including MDSS forecast data, photographic and subjective observations, camera imagery, as well as NWS and RWIS observations. The data from these cases will be used to improve aspects of the MDSS including how ice build-up is modeled, the effects of compacted snow, and recommendations during freezing rain events, etc.

Prepare for the Field Deployment Transition (FDT) to be conducted during the winter of 2006-07 (Task 3)

Incremental releases of the MDSS GUI were made throughout the quarter, primarily to fix minor bugs found in the v3.00 release made on December 20, 2006. Version 3.10 of the MDSS GUI was released to the MDSS Technical Panel on March 1, 2007. This release provided some more substantial updates from the previous major release. GUI enhancements during the quarter included a notes feature within the route view that allows users to understand what MDSS is doing in the area of maintenance, traffic, road, and weather. A multi-tab feature to the reporting tool was added to provide users the ability to make ongoing reports for more than one route in an efficient manner. A preliminary storm report tool was established within the GUI to summarize a particular snowplow's operations over the past 24 hours. Other features added to the GUI include alert layering to provide better ease of use within the map view, the addition of a compacted snow category as opposed to having it grouped with the 'ice' group, and the provision of in-vehicle truck cameras through the GUI.

The MDSS server-side software also experienced module changes that were represented within the GUI. The development of a module that imposes level of service (LOS) was implemented to aid MDSS' recommendations in the absence of maintenance reporting. The imposing of LOS on routes raised some concern within the MDSS Technical Panel, but emphasis was placed on the fact that it was a module that can be turned off or on and configured per route within the system. A document describing how this module works was in rough draft form as of the end of the quarter, with the intention being to distribute it to the Technical Panel within the following quarter. This LOS module was tested within Iowa during the first quarter of 2007. Another complementary module that was created allows MDSS to intelligently utilize RWIS road condition observations to assess the condition of the road and the presence of chemicals. This module was also tested with in Iowa during the quarter.

Maintenance reporting was a big FDT topic during the first quarter as many locations worked on establishing automated systems for reporting maintenance actions. The installation of cameras within the trucks was a new activity undertaken by CDOT. A district-wide deployment of MDSS was conducted within the northwest region of Minnesota. The district deployment coincided with the scheduled installation of approximately 35 IWAPI boxes within the district's fleet of trucks.

A lot of discussion was conducted on how to integrate data from the different pieces of equipment (i.e. spreaders) into the data streams coming from the trucks, and initial efforts to assimilate this automated data were made.

Finally, with respect to training, the initial MDSS overview and Phase I interview with CalTrans was conducted in January of 2007. This training session was similar to those conducted in other states as they joined the study. A tour of the facilities and routes that were to be added within the system was conducted by CalTrans, while Meridian provided a brief overview of what MDSS provides and a live GUI demonstration. Supplemental training sessions in other locations were requested by the individual locations to foster the growth of MDSS within their daily operations. Table 2 lists the different training sessions performed during the quarter. It was noted that the questions within these supplemental training sessions were much more informed and specific than in initial training sessions for those same locales. The attendees were also much more engaged on the topics discussed. The overall impression was that these follow-up sessions were very beneficial.

LOCATION	DATE	INSTRUCTOR
California		
Kingvale	Jan 10-11	John Mewes
		Bob Hart
Colorado		
Loveland	Jan 29	Gordon Bell
Pueblo	Jan 31	Gordon Bell
Colorado Springs	Jan 31	Gordon Bell
Sterling	Feb 6	Gordon Bell
South Forks	March 9	Gordon Bell
Trinidad	March 20	Gordon Bell
Evans	March29	Gordon Bell
Minnesota		
Crookston	Feb 14	John Mewes
		Ben Hershey
South Dakota		
Custer	Jan 16	Gordon Bell

Table 2: Training sessions conducted in the first quarter of 2007. Trainings in Colorado are supplemental trainings during the winter season.

Perform scientific validation of observed weather variables and comparison with input variables to the PFS MDSS (Task 4)

A presentation of the findings of the DFT-2 case studies was presented at the October 2006 MDSS Tech Panel meeting.

Perform an assessment of the validity, acceptance, utilization and operational requirements of MDSS within State DOT winter maintenance practices (Task 5)

No formal activities were performed on this task during the quarter. However, considerable subjective input was received from DOT participants during the fall training sessions. This input is contained in reports that were recorded after each of the training sessions.

Develop a strategy to transition the MDSS PFS to a broader state DOT audience and full deployment (Task 6)

The scale of the MDSS deployment has continued to grow during the first quarter. This growth continues to challenge the system in ways not previously seen. The first quarter marked the first region-wide deployment within the MDSS (northwest Minnesota) along with other states, such as North Dakota, incorporating more routes to the system, including a major bridge deck as an individual route.

The issues affecting the eventual cost of broader scale MDSS deployments were discussed in length at the February 2007 Technical Panel meeting. Meridian prepared a presentation that explored these issues and follow-up discussion lead to an action item for the next Technical Panel meeting to help better define the MDSS deployment alternatives available to an agency and what the cost implications associated with each of those options might be.