

Aurora Program

minutes

**Aurora Board Meeting
September 24-25, 2008 – Toronto, Ontario, Canada**

Individuals Participating in the Meeting:

Max Perchanok, Ontario MOT
Ralph Patterson, Utah DOT
Dawn Gustafson, Michigan DOT
Brad Darr, North Dakota DOT
Tina Greenfield, Iowa DOT
Dean Kernan, Illinois DOT
Jack Stickel, Alaska DOT&PF
Curt Pape, Minnesota DOT
Joe Doherty, New York DOT
Bill Hoffman, Nevada DOT
Dave Lahn, Environment Canada
Daniel Huang, Environment Canada
Bill Mahoney, NCAR
Jeff Tilley, University of North Dakota
Chris Albrecht, Iowa State University

I. Open and General Items

Introductions and Approval of Agenda – Max Perchanok welcomed the attendees and asked the board to review the meeting agenda. After a few minor comments, the agenda was approved as the order of business for the meeting. *A copy of the agenda is attached to these minutes.*

Review of Previous Actions and Board Minutes – Chris Albrecht then reviewed the draft board meeting minutes from the May 6-7, 2008 meeting in Reno, Nevada. After a short discussion, the minutes were approved. Chris noted that he would post the minutes on the program website.

II. Project Updates

The project champions then reviewed the status of ongoing research. Chris Albrecht provided the board with a summary of status reports for each project. *A copy of this summary is attached to these minutes as Attachment A.* Details of the status reports are as follows:

Project 2000-01 – Benchmarking the Performance of RWIS Forecasts: Max Perchanok reviewed this project, noting that administrative problems at MTO continue to delay the project.

Project 2000-05 – RWIS Leverage Opportunities: No update was provided for this effort, but Chris Albrecht noted that the balance for this project was \$31,000.

Project 2003-03 – Technology Transfer of Swedish RWIS to North America: Curt Pape reviewed the latest concerning this project. A lengthy discussion followed, wherein the board agreed that some elements of the project could be transitioned into a new project idea for FY2009. After the board discussed how to capture the necessary information about Utah’s experience with data loggers in a “wikipedia-like” website under a new project, they voted to discontinue this effort.

Project 2003-04 – Intelligent Image-Based Winter Road Condition Sensor - Phase III: No update was provided for this effort.

Project 2004-04 – Winter Weather Severity Index Enhancements: Tina Greenfield reviewed some of the delays this project had seen in recent months, noting that AccuWeather had not delivered new products based on recent comments from the project team. After a discussion, the board agreed to give AccuWeather additional time to address comments.

Project 2005-01 – Development of a RWIS Quality Assurance Monitoring System: Jack Stickel noted that the project team for this effort met prior to the board meeting. He had sent information to the team concerning work done through the COMET program so that they can develop a scope of work, he added. He also noted that he felt this project and Project 2007-001 could be advertised with one RFP.

Project 2005-02 – RWIS Telecommunications Issues and Options: No update was provided for this effort.

III. Project Updates

Project 2005-03 – Mobile Weather and Road Condition Reporting: No update was provided for this effort.

Project 2005-06 – New Road Surface Condition Sensor: No update was provided for this effort.

Project 2006-01 – Support of the *Clarus* Initiative: Tina Greenfield reviewed the project, noting that an award from the Clarus team would be announced in October 2008. Until that time, she added, there was nothing to act on.

Project 2006-02 – Pilot Test of ESS Sensor Testing Guidelines: Ralph Patterson led the discussion on this effort, noting that the project team was in the process of revising the scope of work. He also noted that the mini-meeting held prior to the board meeting was very helpful. Before moving on, he noted that Dawn Gustafson, Tina Greenfield, and Bill Hoffman had been added to the project team.

Project 2006-03 – Update of SHRP H-350 and H-351: Tina Greenfield noted that Michigan DOT was now included in the project team. She also stated that WTI made progress on the survey.

Project 2006-04 – Evaluation of Vaisala Spectro Pavement Sensor: Jeff Tilley reviewed the project progress, noting that two reports came from this effort, each in a different format. After a long discussion, the board decided that one technology transfer summary of both reports could be done as a final deliverable for the website. They also noted that the two full reports could be placed on the “members only” section of the Aurora website. Chris Albrecht noted he would have the team and his publications staff work together to develop a summary for this effort.

Project 2006-05 – Technology Transfer of Alternative Inexpensive RWIS: Jack Stickel reviewed this project, noting that the mini-meeting had resulted in some progress. He also noted that he would put together a concept of operations to develop the RFP.

Project 2006-08 – Low Cost Mobile RWIS: No update was provided for this effort.

Project 2007-01 – RWIS Equipment Monitoring System – Phase II: Jack Stickel noted that the project team for this effort met in a mini-meeting. As he noted earlier, Jack had sent information to the team concerning the COMET program.

IV. Project Updates

Project 2007-02 – Cold Weather Testing of the Halliday Road Grip Unit: No update was provided for this effort.

Project 2007-03 – Incorporation of MDSS into Winter Weather Forecasting- Phase I: Tina Greenfield noted that a lengthy discussion concerning this project had taken place earlier, wherein the team decided to reduce project funding from \$80,000 to \$30,000. This was due to the unlikely possibility of coming to an agreement between NCAR and Iowa DOT on a contract, she added.

Project 2007-04 – Development and Demonstration of a Freezing Drizzle Algorithm for ESS: Max Perchanok and Jeff Tilley discussed this project, noting that slow, but steady progress was being made.

Project 2007-05 – Multiple-Use ITS Data Collection Sites: No update was provided for this effort.

Project 2008-01 – Development of a National Road Weather Testing Facility: Tina Greenfield reviewed this project, noting that the team agreed that an RFI would likely be needed to get more information on possible testing locations. In addition, she asked that an additional \$10,000 be allotted to this project under FY2009. After a short discussion, the board tentatively approved this funding, but agreed to vote on this along with new projects.

Project 2008-02 – Evaluation of Utah DOT’s Weather Operations/RWIS Program: Ralph Patterson discussed this effort, noting that he had been working with WTI to get a contract in place.

Project 2008-03 – Next Generation RWIS for Canada: Max Perchanok reviewed the initial planned actions for the project. A short discussion followed, wherein the board asked a few questions about contracted RWIS service in Ontario.

V. Program Administration and Financial Status

Next, Chris Albrecht reviewed the financial spreadsheet he used to track member agency contributions. After a short discussion about outstanding payments, Chris noted he would follow-up with agencies that had outstanding issues.

VI. 2008-2009 Work Plan

Plan Schedule and Milestones – Chris Albrecht reviewed the process and schedule for the current work plan update, noting that the “boilerplate” materials had been completed.

Available Budget for FY2009 – Chris stated that, based on membership payments and expected expenses, approximately \$330,000 was available for FY2009 projects. He also noted that cancellation of Project 2003-03 and funding adjustments on existing projects were factored into this number.

Candidate Projects for FY2009 – Next, Chris reviewed a handout detailing the proposed projects for FY2009 and the project selection process. *This handout is attached to these minutes as Attachment B.* The board then discussed each of the proposed projects in detail.

VII. 2008-2009 Work Plan

Selection of Projects for FY2009 – After review of the candidates and a few adjustments to budgets and project details, Chris Albrecht asked that each member agency provide their rankings of the candidate projects. Chris then calculated the member votes and subsequent project rankings. As a result of the board voting, seven new projects and one existing project received funding. Specifically, the following were funded under the FY2009 research program:

- \$10,000 additional funds for Project 2008-01: Development of a National Road Weather Testing Facility
- \$55,000 for a new effort, Project 2009-01: Evaluation and Inter-comparison of the Lufft R2S Microwave Precipitation Sensor
- \$30,000 for a new effort, Project 2009-02: 2009 Peer Exchange
- \$20,000 for a new effort, Project 2009-03: RWIS Data Logger Knowledge Base
- \$20,000 for a new effort, Project 2009-04: Road Weather Education Enhancements and Technology Transfer
- \$83,000 for a new effort, Project 2009-05: Further Development of Pavement Precipitation Accumulation Estimation System
- \$50,000 for a new effort, Project 2009-06: Salinity Sensor Improvements and Development
- \$35,000 for a new effort, Project 2009-07: Review of Friction Detection Technologies

Designation of Project Teams – In addition, team members were assigned to each new FY2009 effort.

Remaining Plan Sections Under Review and Tentative Approval – Chris Albrecht then asked the board to tentatively approve the work plan pending addition of the new FY2009 projects. The board voted to tentatively approve the work plan. Chris noted that he would update the remaining sections of the work plan and provide a revised version to the board.

VIII. National Initiatives and Partnerships

Next, the board briefly reviewed RWIS-related national initiatives. Dawn Gustafson noted a few recent developments with ENTERPRISE, Curt Pape reviewed the latest with MDSS and NTCIP, Bill Mahoney reviewed AMS news, and Lee Smithson reviewed the latest with SICOP and the TRB Winter Maintenance Committee.

IX. Member Agency Updates

Next, some of the agencies in attendance gave very brief reviews of their recent winter maintenance and road weather-related activities, as described following.

Iowa Department of Transportation – Tina Greenfield reported that the Weatherview website was being updated and that Iowa was upgrading its communications system for RWIS.

Minnesota Department of Transportation – Curt Pape noted that Minnesota had been doing updates on their RWIS and expanding AVL use statewide. In the near future, they planned to have 140 routes using MDSS he added. Some minor communications issues were also discussed.

New York State Department of Transportation – Joe Doherty noted that NYSDOT had been working on an MDSS with Meridian and Lufft.

North Dakota Department of Transportation – Brad Darr noted that North Dakota had become members of Clear Roads and North West Passage recently.

Ontario Ministry of Transportation – Max Perchanok noted that MTO now had a new RWIS contract and they were looking into ways to reduce salt usage.

Utah Department of Transportation – Ralph Patterson reported UDOT had had issues with forecast consistency.

Michigan Department of Transportation – Dawn Gustafson noted that Michigan had been facing significant budget problems.

X. Friends of Aurora

The board agreed to skip this topic until a later meeting or conference call.

XI. Aurora Communications Plan

The board agreed to skip this topic until a later meeting or conference call.

XII. Future Aurora Meetings and Calls

After some discussion, future board conference calls were scheduled for October 30, 2008 and December 4, 2008. An administrative call was set for October 23, 2008. It was also noted that the next board meeting should take place in Phoenix or Albuquerque in early 2009.

XIII. Other Aurora Items

Nothing further was discussed, and the meeting was adjourned.

Agenda

Aurora Program Board Meeting

September 24-25, 2008

Holiday Inn Midtown, Toronto, Ontario, Canada

AGENDA

Wednesday, September 24, 2008:

8:00 Project Mini-Meetings

- 8:00 Project 2006-02 Ralph Patterson and Team
Team includes: Pape and Stickel
- 8:35 Projects 2005-01 and 2007-01 Jack Stickel and Teams
Teams include: Doherty, Greenfield, Pape, and Patterson
- 9:10 Projects 2006-05 and 2007-05 Jack Stickel and Teams
Teams include: Doherty, Greenfield, Gustafson, Pape, and Patterson

9:45 Break

10:00 Project Mini-Meetings (continued)

- 10:00 Project 2007-02 Jeff Tilley and Team
Team includes: Greenfield and Perchanok
- 10:35 Project 2007-04 Max Perchanok and Team
Team includes: Mahoney, Pape, and Tilley
- 11:10 Project 2007-03 Tina Greenfield and Team
Team includes: Mahoney, Patterson, Perchanok, and Tilley

11:45 Break for Lunch

I. 1:00 Open and General Items

- 1:00 Introductions and review/approval of agenda Max Perchanok
1:05 Review of previous actions and board minutes Chris Albrecht

II. 1:15 Project Updates

- 1:15 2000-01 - Benchmarking ... RWIS Forecasts Max Perchanok
1:30 2000-05 - RWIS Leveraging Opportunities Chris Albrecht
1:35 2003-03 - Technology Transfer of Swedish RWIS ... Curt Pape
1:50 2003-04 - Intelligent Image-Based - Phase III ... Chris Albrecht
1:55 2004-04 - Weather Index Enhancements Tina Greenfield
2:10 2005-01 - RWIS Quality Assurance Monitoring System ... Jack Stickel
2:25 2005-02 - RWIS Telecommunications Issues Dean Kernan

2:40 Break

III.	2:55	Project Updates (continued)	
	2:55	2005-03 - Mobile Weather Reporting	Chris Albrecht
	3:00	2005-06 - New Road Surface Condition Sensor	Chris Albrecht
	3:05	2006-01 - Support of the Clarus Initiative	Tina Greenfield
	3:20	2006-02 - Pilot Test of ESS Guidelines	Ralph Patterson
	3:35	2006-03 - Update of SHRP H-350 and H-351	Tina Greenfield
	3:50	2006-04 - Evaluation of Vaisala Spectro Sensor	Chris Albrecht
	3:55	2006-05 - T ² of Alternative Inexpensive RWIS	Jack Stickel
	4:10	2006-08 - Low Cost Mobile RWIS	Chris Albrecht
	4:15	2007-01 - RWIS Monitoring Enhancements	Jack Stickel

4:25 *Break*

IV.	4:40	Project Updates (continued)	
	4:40	2007-02 - Cold Weather Testing of Halliday Unit	Jeff Tilley
	4:50	2007-03 - Incorporation of MDSS	Tina Greenfield
	5:00	2007-04 - Freezing Drizzle Algorithm	Max Perchanok
	5:10	2007-05 - Multiple Use ITS Sites	Jack Stickel
	5:20	2008-01 - National Testing Facility	Tina Greenfield
	5:40	2008-02 - Evaluation of Utah TOC Weather Ops	Ralph Patterson
	5:50	2008-03 - MDSS Demo in Ontario	Max Perchanok

6:00 *Adjourn*

6:45 *Group Dinner*

Thursday, September 25, 2007:

- V. 8:00 Program Administration and Financial Status** Chris Albrecht
8:00 Discussion of membership payments, contributions, and agreements
8:10 Discussion of program expenditures and contracting issues
8:25 Discussion of CTRE management contract
- VI. 8:30 2008-2009 Work Plan** Chris Albrecht
8:30 Discussion of plan schedule and milestones
8:35 Discussion of plan sections under review
9:10 Review of available budget for FY 2009
9:20 Discussion of candidate projects for FY 2009
- 10:15 Break**
- VII. 10:30 2008-2009 Work Plan (continued)** Chris Albrecht
10:30 Selection of projects for FY 2009
10:45 Designation of teams for FY 2009 projects
11:00 Tentative approval of work plan
- VIII. 11:10 National Initiatives and Partnerships (5 minutes each)**
ENTERPRISE, MDSS, NTCIP Curt Pape
TRB Task Forces and Committees, ITS America, AMS Bill Mahoney
AASHTO/SICOP, Clear Roads, PNS, SIRWEC Chris Albrecht
Other Initiatives/Groups All
- 12:00 Lunch**
- IX. 1:00 Round Robin/Member Agency RWIS Updates** All Participants
2:30 Break
- X. 2:45 Friends of Aurora** Chris Albrecht
- XI. 3:15 Aurora Communications Plan** Chris Albrecht
- XII. 3:45 Future Meetings and Calls** Max Perchanok
- XIII. 3:55 Other Items** All
4:05 Adjourn

Aurora Program Board Meeting

September 24-25, 2008

Holiday Inn Midtown, Toronto, Ontario, Canada

ATTENDING

<u>Name, Agency</u>	<u>Arrive / Depart</u>	<u>Nights (Notes)</u>
Dean Kernan, Illinois DOT	23 rd pm / 25 th pm	2 nights (n/s) *
Curt Pape, Minnesota DOT	23 rd pm / 25 th pm	2 nights (n/s) *
Bill Hoffman, Nevada DOT	23 rd pm / 25 th pm	2 nights (n/s) *
Brad Darr, North Dakota DOT	23 rd pm / 26 th am	3 nights (n/s) *
Tina Greenfield, Iowa DOT	23 rd pm / 26 th am	3 nights (n/s) *
Joe Doherty, New York DOT	23 rd pm / 26 th am	3 nights (n/s) *
Jack Stickel, Alaska DOT&PF	23 rd pm / 26 th am	3 nights (n/s) *
Ralph Patterson, Utah DOT	23 rd pm / 26 th am	3 nights (n/s) *
Dawn Gustafson, Michigan DOT	23 rd pm / 26 th am	3 nights (n/s) *
Bill Mahoney, NCAR	23 rd pm / 25 th pm	2 nights (n/s)
Jeff Tilley, University of North Dakota	23 rd pm / 25 th pm	2 nights (n/s)
Chris Albrecht, ISU/CTRE	23 rd pm / 26 th am	3 nights (n/s)
Daniel Huang, Environment Canada	23 rd pm / 26 th am	3 nights (n/s)
Dave Lahn, Environment Canada	24 th am / 26 th am	2 nights (n/s)
Max Perchanok, Ontario MOT	-	- (no overnight)

NOT ATTENDING

Kirk Carpenter, Indiana DOT
Scott Roeder, Ohio DOT
Dan Roosevelt, Virginia DOT
Jason Norville, Pennsylvania DOT
Dan Eriksson, SRA
Mike Adams, Wisconsin DOT
Claude Lapointe, Quebec MOT
Joe Holt, Tennessee DOT
Paul Pisano, FHWA
Lee Smithson, AASHTO
Tom Maze, ISU/CTRE

* indicates room paid through ISU/CTRE account

September 12, 2008

Attachment A

Aurora Program Ongoing Project Status

September 19, 2008

FY 2000

- 2000-01: Benchmarking the Performance of RWIS Forecasts = 40% complete
- 2000-05: RWIS Leverage Opportunities = \$31,000 in funding available to be designated

FY 2003

- 2003-03: Technology Transfer of Swedish RWIS to North America = 10% complete
- 2003-04: Intelligent Image-Based Winter Road Condition Sensor - Phase III = >95% complete

FY 2004

- 2004-04: Weather Index Enhancements = 60% complete

FY 2005

- 2005-01: Development of an RWIS Quality Assurance Monitoring System = 5% complete
- 2005-02: RWIS Telecommunications Issues and Options = 70% complete
- 2005-03: Mobile Weather and Road Condition Reporting = 90% complete
- 2005-06: New Road Surface Condition Sensor = >95% complete

FY 2006

- 2006-01: Support of the Clarus Initiative = 55% complete
- 2006-02: Pilot Test of ESS Sensor Testing Guidelines = 5% complete
- 2006-03: Update of SHRP H-350 and H-351 = 70% complete
- 2006-04: Evaluation of Vaisala Spectro Pavement Sensor = 95% complete
- 2006-05: Technology Transfer of Alternative Inexpensive RWIS = 5% complete
- 2006-08: Low Cost Mobile RWIS = 65% complete

FY 2007

- 2007-01: RWIS Equipment Monitoring System - Phase II = <5% complete
- 2007-02: Cold Weather Testing of the Halliday Road Grip Unit = 85% complete
- 2007-03: Incorporation of MDSS into Winter Weather Forecasting - Phase I = 15% complete
- 2007-04: Development and Demonstration of a Freezing Drizzle Algorithm = 30% complete
- 2007-05: Multiple-Use ITS Data Collection Sites = <5% complete

FY 2008

- 2008-01: Development of a National Road Weather Testing Facility = 15% complete
- 2008-02: Evaluation of Utah DOT's Weather Operations/RWIS Program = 5% complete
- 2008-03: Next Generation RWIS for Canada = <5% complete

Project Status Report

August 28, 2008

Project: 2000-01: Benchmarking the Performance of RWIS Forecasts

Champion: Max Perchanok, Ontario Ministry of Transportation

Status:

- CTRE responded to all agencies that responded to the survey, notifying them that the project is on hold until late 2007.
- AMEC has contacted CTRE about gathering sample data for use in the completion of this project.
- Proposal was submitted by AMEC and accepted by MTO.
- Discussions are underway with MTO contract administration people.
- An RFP will be developed based on the existing statement of work and advertised in June 2008.
- Funds are available for a contract this year.
- An RFP is ready.

Approximate % Complete: 40 %

Barriers/Issues: Delay due to administrative problems at MTO.

Recommendations: continue as planned
 continue with modifications
 discontinue

Additional Comments:

- This is an in-kind project for Ontario Ministry of Transportation.
- Project Team: Max Perchanok (champion), Mike Adams, Dan Roosevelt, Dave Hughes, Jeff Tilley, Dave Lahn

Project Status Report

August 28, 2008

Project: 2000-05: RWIS Leverage Opportunities

Champion: Lee Smithson, AASHTO

Status:

- This is an opportunity area rather than a project.
- The overall goal of this effort is to consider funding any activities identified as priorities in other national or state RWIS research programs that are of interest to Aurora but cannot be solely funded by either program in the immediate future.
- Additional funding was provided to this effort under the 2000-2001 Work Plan.
- Funds designated for Project 2000-06 and for Project 2001-05 were also transferred into this reserve fund.
- As of the August 2003 board meeting, there was \$75,000 in funding set aside in this leverage fund. From this, \$34,000 was removed and designated to fund FY 2004 projects, and another \$10,000 was allocated to project 2006-04 during the December 2006 board meeting, leaving \$31,000 in the leverage fund.
- New opportunities for FY 2009 partnering, such as those resulting from the National Winter Maintenance Peer Exchange, are being investigated.

Barriers/Issues: None.

Recommendations: X continue as planned
 continue with modifications
 discontinue

Additional Comments:

- \$31,000 is available.
- Project Team: Lee Smithson (champion), Dean Kernan, Dan Roosevelt

Project Status Report

August 28, 2008

Project: 2003-03: Technology Transfer (T²) of Swedish RWIS to North America

Champion: Curt Pape, Minnesota Department of Transportation

Status:

- The overall goal of this project is to bring the Swedish RWIS technology to an American agency for feasibility testing.
- Curt Pape has \$38,500 committed with another \$38,500 likely coming from Mn/DOT. This money will supplement the Aurora funding for the project.
- Much of the infrastructure for this project is in place.
- A conference call was held on February 20, 2007 to discuss the future of this project.
- Re-scoping and the use of UND staff were discussed at the April on-site meeting.
- The board approved project re-scoping at the April on-site meeting.
- A project conference call was held.
- The revised scope is under review by the project team.

Approximate % Complete: 10 %

Barriers/Issues: None.

Recommendations: continue as planned
 continue with modifications
 discontinue

Additional Comments:

- This effort was funded for \$75,000 in FY 2003.
- Project Team: Curt Pape (champion), Dan Eriksson, Dan Roosevelt

Project Status Report

August 28, 2008

Project: 2003-04: Intelligent Image-Based Winter Road Condition Sensor - Phase III

Champion: Dan Eriksson, Swedish Road Administration

Status:

- This project involves a third phase of the intelligent image-based winter sensor project. The first two phases have shown to be very promising. The third phase would involve continuing research and movement of the test site to a new location to acquire more research data.
- Because of the lack of trained nets for the actual installation point, this first year has mainly had the task of retrieving pictures to be used for future training of the neural networks. Results from the two approximate nets have not been reliable.
- One could also note that the computer used for image classification has been exchanged one time during this year. The usage of industrial computers with operating systems such as Microsoft Windows 2000 has shown to be crucial for the system functionality. The field tests have shown that standard PC operating systems needs to be rebooted at least once per month in order to be kept running. For a wider future field usage, it would be better to implement the image classification analysis into the embedded system in the field stations.
- During 2004-2005, the pictures retrieved during the season 2003-2004 should be used to train new neural nets. It is not until then we know more precise what accuracy we could get from the field image classification system.
- Five classes of road conditions are possible to detect this winter 2005/2006. Dry, wet, snow ice and tracks.
- We are in the planning process of putting out a second camera to verify that the neural network is operational in any location, not only in the test site.
- The critical second camera test site to verify that the neural network is operational in any location, not only in the test site, has been tested this last winter season and the result was not what we had expected. The accuracy on road classification from the field image classification system was far too low to be acceptable.
- A report detailing the research results is pending.

Approximate % Complete: >95 %

Recommendations: continue as planned
 continue with modifications
 discontinue

Additional Comments:

- This is an in-kind project for the Swedish Road Administration.
- Project Team: Dan Eriksson (champion), Max Perchanok, Dan Roosevelt, Aerotech Telub

Project Status Report

August 28, 2008

Project: 2004-04: Winter Weather Severity Index Enhancements

Champion: Tina Greenfield, Iowa DOT

Purpose: The objective of this project is to determine the weather events that affect winter operational performance, then develop a software application that can automatically extract NWS data and calculate differences in weather across a region.

Status:

- CTRE completed the literature review.
- The RFP was released and 3 responses were received.
- A vendor (AccuWeather) has been selected.
- A prototype index system was provided last August.
- A demo site was provided to the project team in January 2008, and the team provided comments.
- AccuWeather appears to be working on our comments, but no new features or products have been delivered since.
- The contract end-date is to be extended again through summer 2008.
- Approximately 50% of the project contract has been paid to AccuWeather.
- The project team will consider ending the contract, with discussion at the September 2008 board meeting.

Approximate % Complete: 60 %

Barriers/Issues: None.

Recommendations: continue as planned
 continue with modifications
 discontinue

Additional Comments:

- This project was funded for \$50,000 in FY 2004.
- Project Team: Dennis Belter (champion), Dennis Burkheimer, Mike Adams, Curt Pape, Tina Greenfield

Project Status Report

August 28, 2008

Project: 2005-01: Development of a RWIS Quality Assurance Monitoring System

Champion: Jack Stickel, Alaska Department of Transportation and Public Facilities

Objective: Develop a system that is modular to allow installation with different host organizations and platforms, expandable for incorporating additional quality assurance modules, accessible via the web, and holds historical database of quality assurance reports for future reference.

Status:

- The project team determined there were two advantages to completing this project: 1) creating a graphical interface to provide rapid analysis for sensor performance issues, and 2) adding specific sensor parameters that Aurora members are interested in and for which the Clarus System does not support.
- The final Proof of Concept meeting (Park City UT, December 11, 2006) revealed a number of quality checks that need refining. Additionally there were stations that were mismatched to the metadata.
- Mixon-Hill has also developed a Google Map interface to display the Proof of Concept states quality checking flags for each observation. Not only is this web application very beneficial, but it provides some thought for how we might envision the Aurora project's web interface. The site offers subscription service to the output by contributor or geospatial coordinates.
- The Clarus System quality checking feedback for the proof of concept states provides quality checking on more fields than originally described at the Boulder Quality Checking Workshop. The project team is reviewing the subscription service output provided at: <http://www.clarus.mixonhill.com/observations/contributor.jsp> to tailor this project to the anticipated Clarus System output.
- The project will use an RFP through Iowa DOT. A concept of operations will be completed in May with the draft RFP scope of work to follow.
- This project will leverage the work being done as part of Project 2007-01.
- A project mini-meeting will be held in Toronto in September 2008

Approximate % Complete: 5 %

Barriers/Issues: The final scope of work for the RFP.

Recommendations: continue as planned
 continue with modifications
 discontinue

Additional Comments:

- This project was funded for \$50,000 in FY 2005 and \$50,000 in FY 2006.
- Project Team: Jack Stickel (champion), Dan Roosevelt, Curt Pape, Dan Eriksson, Mike Adams, Ralph Patterson, Tina Greenfield

Project Status Report

August 21, 2008

Project: 2005-02: RWIS Telecommunications Issues and Options

Champion: Dean Kernan, Illinois Department of Transportation

Status:

- The original goal of this effort was to investigate, and eventually implement, a plan to reduce telecommunications costs.
- This effort will look into telecommunication efficiencies of existing and new technologies for getting RWIS and other data back and forth from remote locations to the user.
- Curt Pape provided a database of communications options to Harold Dameron in 2005. Chris Albrecht worked with Harold Dameron to further develop a detailed scope.
- Harold suggested that, following a search of existing and potential data transmission methodologies, an evaluation and recommendation phase could be started. Part of the evaluation phase would include, not only B/C type evaluations, but also a qualitative determination of alternatives can be done to consider the intangible benefits of the various telecommunication options.
- Chris contacted Harold to arrange a discussion of a detailed scope and has suggested conducting a state-of-the-practice review as a first step. This effort could be conducted by CTRE for less than \$15,000.
- Further research and deeper analysis could be approved by the board.
- Work is underway at CTRE, where Dan Gieseeman has produced a revised request for information. He has also outlined a document that will summarize the responses to the request.
- The revised request for information has been sent out and several responses have been received.
- CTRE has provided a brief summary of survey responses to the project team.
- CTRE sent a summary report to the project team.
- A project conference call will be scheduled to discuss the project.

Approximate % Complete: 70 %

Recommendations: continue as planned
 continue with modifications
 discontinue

Additional Comments:

- This project was funded for \$15,000 in FY 2005.
- Project Team: Dean Kernan (champion), Curt Pape, Jack Stickel, Chris Albrecht

Project Status Report

August 28, 2008

Project: 2005-03: Mobile Weather and Road Condition Reporting

Champion: Kirk Carpenter, Indiana Department of Transportation

Status:

- The objective of this project is to develop a road and weather condition reporting system that collects data electronically from remote statewide locations and delivers real time data electronically in a format to serve multiple uses.
- This project is being done in conjunction with an AVL research project being performed by Purdue University through the Joint Transportation Research Program. This project provided good technical support and a head start for the Aurora project with the report generation functions being developed.
- A paper on this project was presented at the AASHTO/TRB conference on July 19, 2006.
- During the summer months the truck software was revised to handle spot applications and to develop an interface into MDSS.
- Researchers have also worked on doing a batch data transfer using a hotspot and are trying three different hardware devices for collecting data - a laptop and two tablet devices.
- The data collected at the maintenance vehicle (snow plow) produces maps of time chemicals placed, type of chemical, application rate, vehicle speed, road temperature, and plow position. Also, road and weather conditions can be displayed.
- The data is transferred over a statewide wireless network and displayed on the INDOT GIS maps. Another feature is transferring the appropriate data into MDSS.
- In the 2006-2007 winter, 10 snow plow vehicles were equipped with the equipment described above. The equipment was placed in vehicles at three locations.
- The data collection software was developed by Purdue University. Motorola provided the data transfer software, and Purdue and INDOT worked together to produce the GIS maps.
- One advantage of the system is no monthly data transfer fees are required. Another is it utilizes departmental (GIS maps) and state resources.
- A few comments on the draft report will be discussed with Purdue.

Approximate % Complete: 90 %

Barriers/Issues: None.

Recommendations: continue as planned
 continue with modifications
 discontinue

Additional Comments:

- This project was funded for \$50,000 in FY 2005 and \$25,000 in FY 2006.
- Project Team: Dennis Belter (champion), Dennis Burkheimer, Joe Holt, Mike Kisse, Bob McCullouch

Project Status Report

August 21, 2008

Project: 2005-06: New Road Surface Condition Sensor

Champion: Dan Eriksson, Swedish Road Administration

Status:

- This project aims to evaluate a prototype of a new ordinary and cheap road condition sensor to be use in combination with RWIS.
- <http://www.rwis.net/gmcgui> is the address where you could find information from the ongoing test.
- Right now the information is updated with real-time data.
- Follow the descriptions and the GMC will be installed.
- Evaluation of the results from last winter proceeds was presented in Des Moines.
- The draft report has been completed, but comments need to be addressed.

Approximate % Complete: >95 %

Barriers/Issues: None

Recommendations: continue as planned
 continue with modifications
 discontinue

Additional Comments:

- This is an in-kind project for the Swedish Road Administration.
- Project Team: Dan Eriksson (champion), Claude Lapointe, Lee Smithson, Joe Holt

Project Status Report

August 28, 2008

Project: 2006-01: Support of the *Clarus* Initiative

Champion: Dan Roosevelt, Virginia Department of Transportation

Background: *Clarus* is a FHWA initiative designed to collect, quality check, and make available via the Internet this nation's public investments in atmospheric and pavement observations which support surface transportation operations. The purpose of this project is to influence the *Clarus* initiative and assist with its early implementation through funding costs 1) for member participation in the *Clarus* project when the *Clarus* Initiative does not cover costs 2) associated with drafting and submitting a proposal to be the test location for the Multi-state Regional Demonstration.

Strategy/Approach: Once the system design is complete, it will be necessary to implement, integrate, and test *Clarus* in a Multi-state Regional Demonstration. This demonstration will be conducted at a selected location so that system components, core functions, and information management processes may be tested and improved. Aurora supports this initiative. Active participation in the design and demonstration phases will allow Aurora members to influence the product, gain knowledge of the details involved with implementation, and help promote this system.

Status:

- Proof-of-Concept test involved Aurora members UT, AK and MN.
- Iowa was awarded one of the Concept of Operations (ConOps) projects. IL, IN, and OH are Aurora members on this team. Aurora supported this application. Concerning the ConOps:
 - All four states are on the Clarus map.
 - The final ConOps was submitted on January 29, 2008.
- Aurora agreed to fund other Aurora states participation in other ConOps projects.
- The study report for all three ConOps teams are at <http://www.clarusinitiative.org/regional.htm>.
- Concerning the Multi-state Regional Demonstration, we think the RFP will be aimed at vendors, not government groups, so Aurora may have no role when the RFP is released.
- At this time there is nothing more to do but wait for the Clarus Initiative Team to act.

Approximate % Complete: 55 %

Barriers/Issues: None.

Recommendations: X continue as planned
 continue with modifications
 discontinue

Additional Comments:

- This project was funded for \$50,000 in FY 2006.
- Project Team: Dan Roosevelt (champion), Jack Stickel, Dennis Belter, Dean Kernan, Tina Greenfield, Mike Adams, Diana Clonch, Bill Mahoney

Project Status Report

August 28, 2008

Project: 2006-02: Pilot Test of ESS Sensor Testing Guidelines

Champion: Dan Roosevelt, Virginia Department of Transportation

Purpose: NCHRP 6-15, Testing and Calibration Methods for RWIS Sensors, is complete. The product is a manual, *Guidelines for Testing ESS Sensor*. Aurora will pilot test the guidelines in up to three member states and publish the results and findings.

Strategy/Approach: Aurora will:

- Contact member agencies for interest in participating
- Create and acquire six kits for testing ESS surface and atmospheric sensors for use by the states.
- Acquire field data acquisition equipment (e.g., hand held computer) for pilot states
- Contract for:
 - Training material on the guidelines
 - Presentation of training once in each state
 - Documentation of the results of the pilot states' experience with use of the guidelines
 - Development of software/forms that can be used to record test data

Status:

- The report and field test procedures have been posted on NCHRP Website.
- Virginia, Utah, and Alaska have tentatively agreed to be the participating states.
- Project team had teleconference, 3/19/08, to discuss the procedures to test. We agreed a less intrusive test procedure is needed before a lane is closed to run NCHRP test procedures. Dan called SRF (the developer of the test procedure) and determined that their research found only test 1 (of 5 procedures) has a feasible alternate test that is not traffic intrusive.
- None of the three states involved is willing to implement the test procedures as currently outlined.
- Project is currently stalled pending resolution of this dilemma.
- A project mini-meeting will be held in Toronto in September 2008

Approximate % Complete: 5 %

Barriers/Issues: None.

Recommendations: X continue as planned
 continue with modifications
 discontinue

Additional Comments:

- This project was funded for \$70,000.
- Project Team: Dan Roosevelt (champion), Jack Stickel, Curt Pape, Ralph Patterson

Project Status Report

August 21, 2008

Project: 2006-03: Update of SHRP H-350 and H-351

Champion: Tina Greenfield, Iowa Department of Transportation

Purpose: The objective is to review H-350 and H-351 to determine which portions of the original report would benefit from a fifteen year update and complete a thorough benefit/cost analysis of RWIS technology.

Status:

- Research is being performed by Western Transportation Institute at Montana State University.
- WTI has drafted, sent, and received a survey to learn more about weather usage in winter maintenance as background for the cost benefit study. They have completed their survey analysis and most of the background information necessary for the benefit/cost modeling.
- WTI has begun inputting winter operations information from Iowa and Ontario into the b/c model.
- WTI is concluding surveys for winter maintenance employees at Iowa and Ontario to support the b/c model
- Nevada has recently agreed to be another case study agency and has begun looking up some winter information. WTI has started working on their survey.
- The research is expected to go into September 2008.

Approximate % Complete: 70 %

Barriers/Issues: None.

Recommendations: continue as planned
 continue with modifications
 discontinue

Additional Comments:

- This project was funded for \$50,000 in FY 2006 and \$100,000 in FY 2007.
- Project Team: Tina Greenfield (champion), Joe Doherty, Ralph Patterson

Project Status Report

August 28, 2008

Project: 2006-04: Evaluation of Vaisala Spectro Pavement Sensor

Champion: Mike Adams, Wisconsin Department of Transportation

Purpose: The objective is to study the accuracy and usefulness of the new Vaisala Spectro pavement temperature and condition sensor.

Status:

- The North Dakota unit was installed on 2/21/06. Full testing took place in winter 2006-07.
- The Ontario unit has been installed, and friction monitoring began 12/14/06.
- Ran into funding issues with UND - project amount was not enough.
- UND visited Ontario site on 3/14/07
- UND: Collecting, archiving data since December 2006; minor software issue (flagged and deleted below zero air temperatures); two controlled experiments done, analysis underway. Most data has been collected, now doing experiments with Halladay Grip tester. Has prepared preliminary report that is being reviewed by project team. They had some issues with “spurious” data. Doing in-depth analysis to determine cause.
- Ontario: Site operational; have archived data from 6 winter storms. Analysis on hold due to Vaisala server problem. Plan to go for a second winter.
- Ontario sensor running all winter, will compare to Lufft RWIS and, hopefully, Haliday Grip Tester.
- Obtained 17 more friction data points this winter for comparison with the Vaisala traction estimate. Will also be comparing video images with the Vaisala surface conditions reports and temperatures with either Infra red thermometer data from patrol trucks or with a nearby LUFFT puck.
- Will receive final reports from UND and Ontario by August 31, 2008. Will review with team, then submit to board for approval.

Approximate % Complete: 95 %

Barriers/Issues: None.

Recommendations: continue as planned
 continue with modifications
 discontinue

Additional Comments:

- An additional \$10,000 was provided to this project under FY 2008.
- This project is funded for \$70,000 in Aurora funds.
- This project is also funded with \$25,000 in-kind from Ontario MOT.
- Project Team: Mike Adams (champion), Tina Greenfield, Curt Pape, Diana Clonch, Dan Eriksson, Ralph Patterson, Max Perchanok, Mike Adams, Bill Mahoney

Project Status Report

August 21, 2008

Project: 2006-05: Technology Transfer (T²) of Alternative Inexpensive RWIS

Champion: Jack Stickel, Alaska Department of Transportation and Public Facilities

Purpose: To research, through a proof of concept test, the ability to integrate pavement thermistors to existing highway infrastructure data collection sites. Potential sites include traffic (volume, classification, weigh-in-motion), signals (state and local government), and other environmental sites such as weather sites operated by other agencies. The project will document this new RWIS concept for pavement management and help develop urban sighting guidelines for the addition of pavement sensors to existing infrastructure.

Status:

- This project began in FY 2007 and will take approximately 2 years.
- Effective August 1, the project champion transferred from the Iowa Department of Transportation to the Alaska Department of Transportation and Public Facilities.
- The project examine using two dozen pavement thermistors (YSI -081-55033-NA-PF-480ST), interface board, and signal processing hardware from project 2001-04. Note (05/02/2008. These thermistors will not be used in the project and are available to other projects)
- A Concept of Operations, which will be used for putting together an RFP, will be completed in May 2008. The project will focus on these specific areas:
 - Install pavement thermistors at a State-maintained signalized intersection as part of a construction project in the Palmer/Wasilla small urban area
 - Install additional atmospheric and pavement sensors as part of automated traffic recorder sites and weigh-in-motion in Central Region
 - Establish inexpensive RWIS sites using Campbell datalogger type applications similar to the Petersburg cooperative site
- A project mini-meeting will be held in Toronto in September 2008

Approximate % Complete: 5 %

Barriers/Issues: None.

Recommendations: continue as planned
 continue with modifications
 discontinue

Additional Comments:

- This project was funded for \$50,000 in FY 2006
- Project Team: Jack Stickel (champion), Tina Greenfield, Dan Roosevelt, Dawn Gustafson, Joe Doherty

Project Status Report

October 16, 2007

Project: 2006-08: Low Cost Mobile RWIS

Champion: Claude Lapointe, Quebec Ministry of Transportation

Purpose: The objective is to build low cost mobile RWIS station with an open architecture to mix different sensors of different constructors. The project will involve the use of sensors on a vehicle and the use of an in-vehicle display and cell phone-based communications.

Status:

- Equipment was purchased, and researchers worked on the software architecture in 2006.
- Construction of the prototype system has begun:
 - Open source operating system: linux
 - Support for the two know thermometer infrared for measuring the temperature of surface: RoadWatch, CPI Product 999J
 - Support for LCD display 4 x 20 with USB interface to mount on the dash of the vehicle
 - Support for USB GPS for model with ftdi and pl2303 usb to serial converter
 - Support for 1-wire interface sensor
 - Computer with compact flash
- For developing open source software we chose database embeded SQLite on linux, software OWFS for support of 1-wire sensors, gcc compiler, software gpsd daemon for reading on a TCP/IP socket the GPS data remotely, software LCDd daemon for managing LCD display on a TCP/IP socket remotely, software ncurses for managing display for configuration
- We have begun to develop software for the daemon of data acquisition:
- We are using software gpsd daemon for reading on a TCP/IP socket the GPS data remotely and software LCDd daemon for managing LCD display on a TCP/IP socket remotely.
- All the sensors will be consulting by a connection on the TCP/IP socket and the display on the USB LCD will be display by sending data also on a TCP/IP socket.

Approximate % Complete: 65 %

Barriers/Issues: None.

Recommendations: continue as planned
 continue with modifications
 discontinue

Additional Comments:

- This is an in-kind project for the Quebec Ministry of Transportation.
- The Quebec Ministry of Transportation has spent \$100,000 on this project and is in the process of securing another \$100,000 for further development.
- Project Team: Claude Lapointe (champion), Curt Pape, Dan Roosevelt, Dennis Belter, Dennis Burkheimer, Rudy Persaud

Project Status Report

August 21, 2008

Project: 2007-01: RWIS Equipment Monitoring System - Phase II

Champion: Jack Stickel, Alaska Department of Transportation and Public Facilities

Objective: Expand the *RWIS Equipment Monitoring System* developed for Project 2002-02 in four areas:

- Include in-commission rate reports with the percent of time the site was fully operational or degraded by no data received, incomplete data, or incorrect/suspicious data.
- Implement the specific changes to the RWIS Data and Reporting System proposed by the Aurora member states.
- Evaluate how site performance by sensor can be added to the application.
- Complete a Concept of Operations, system architecture, implementation plan, and deployment (assuming sufficient funding) for ingesting Clarus System quality checking output online.

Status:

- The proposal will incorporate the Clarus System quality checking output for objective #4.
- A detailed analysis of the Clarus System quality checking output will be completed in May. A draft scope of work will follow.
- This project will leverage the work being done as part of Project 2005-01.
- A project mini-meeting will be held in Toronto in September 2008

Approximate % Complete: <5 %

Barriers/Issues: Final Scope of Work for RFP

Recommendations: X continue as planned
 continue with modifications
 discontinue

Additional Comments:

- This project was funded for \$35,000 FY 2007 and FY 2008
- This project was funded for \$25,000 in FY 2007.
- Additional \$10,000 funding under FY 2008.
- Project Team: Jack Stickel (champion), Curt Pape, Tina Greenfield, Joe Doherty, Ralph Patterson

Project Status Report

August 28, 2008

Project: 2007-02: Cold Weather Testing of the Halliday Road Grip Unit

Champion: Diana Clonch, Ohio Department of Transportation

Status:

- Jeff Tilley is preparing a final report for presentation at the TRB show next June in Indianapolis.
- Jeff Tilley will forward a copy to Aurora when it is completed.
- Ohio DOT brought the RT3 unit back from North Dakota last week.
- A presentation on results will be made at the 4th National Conference on Surface Transportation Weather in Indianapolis.
- A project mini-meeting will be held in Toronto in September 2008

Approximate % Complete: 85 %

Barriers/Issues: None.

Recommendations: continue as planned
 continue with modifications
 discontinue

Additional Comments:

- This project was funded for \$40,000 in FY 2007.
- An in-kind contribution from Ontario MOT is also a part of this effort.
- Project Team: Diana Clonch (champion), Mike Kisse, Jeff Tilley, Dan Roosevelt, Max Perchanok, Tina Greenfield, Halliday Technologies

Project Status Report

August 21, 2008

Project: 2007-03: Incorporation of MDSS into Winter Weather Forecasting - Phase I

Champion: Tina Greenfield, Iowa Department of Transportation

Purpose: To research, through a concept evaluation, the ability of the Pooled Fund MDSS to integrate weather forecast information from a separate forecast provider, and to provide guidance to states and forecast companies on the requirements of this type of MDSS procurement. Also to test and document the process for integrating the Federal MDSS.

Status:

- In April the project team switched the area of focus for this Phase 1 project to attempt to integrate the Federal Prototype instead. The Pooled Fund integration will be planned for the Phase 2 project.
- After discussing procedures and responsibilities with NCAR and Utah another change of plan was suggested to have both NCAR and a private computer/software engineering company deploy the MDSS at Utah.
- A scope of work and budget was submitted by NCAR in July 2007.
- A contract was submitted to NCAR after a long approval process, but the wording was found to be unacceptable. The contract went through several revisions and reviews by NCAR/UCAR and DOT attorneys but to date is not resolved.
- It currently appears that no agreement can be made, but Tina Greenfield will confirm this.
- A project mini-meeting will be held in Toronto in September 2008

Approximate % Complete: 15 %

Barriers/Issues: None.

Recommendations: continue as planned
 continue with modifications
 discontinue

Additional Comments:

- This project was funded for \$50,000 in FY 2007.
- This project was funded for an additional \$30,000 in FY 2008.
- Project Team: Tina Greenfield (champion), Ralph Patterson, Dennis Belter, Bill Mahoney, Jeff Tilley, Max Perchanok

Project Status Report

August 21, 2008

Project: 2007-04: Development and Demonstration of a Freezing Drizzle Algorithm for ESS

Champion: Max Perchanok, Ontario Ministry of Transportation

Status:

- The equipment has been purchased.
- Hardware and software have been transferred to UND.
- The software is installed on a computer at UND.
- The sensor is installed in a test location, along with a temperature sensor, on the roof of our building on the UND campus, in order to do some software testing.
- We have figured out a possible way to install it as a free standing sensor at our field facility (as NCAR would greatly prefer) but have been waiting for the ground to thaw enough so that we can auger a hole and secure a mounting pole. The colder than normal April we have had (with several light snowfalls) has pushed the thaw date back a bit so we are now looking at probably mid-May for this activity.
- Team needs to develop a more detailed work plan and schedule.
- A conference call will be scheduled soon.
- Delay in installation due to lightning protection.
- A project mini-meeting will be held in Toronto in September 2008

Approximate % Complete: 30 %

Barriers/Issues: None.

Recommendations: continue as planned
 continue with modifications
 discontinue

Additional Comments:

- This project was funded for \$15,000 in FY 2007 and \$70,000 in FY 2008
- Project Team: Max Perchanok (champion), Bill Mahoney, Kevin Petty, Jeff Tilley, Curt Pape, Mike Adams

Project Status Report

August 21, 2008

Project: 2007-05: Multiple-Use ITS Data Collection Sites

Champion: Jack Stickel, Alaska Department of Transportation and Public Facilities

Objective: Integrate, through a proof-of-concept, non-obtrusive traffic data collection technology at Road Weather Information System (RWIS) sites in an arctic environment.

Status:

- Completed user interviews with ADOT&PF on traffic data collection needs. The ADOT&PF Technology Transfer is also looking at non-obtrusive traffic devices to be used in portable deployments. There is an opportunity to leverage these two projects.
- Selected the three regional RWIS sites in Fairbanks, Anchorage, and Juneau. The Fairbanks site will be upgraded from a pavement sensor only site to a full RWIS site in summer 2007.
 - The Fairbanks site was not installed and is unlikely to be done this year while the Department rebid their RWIS O&M contract.
 - The Glacier Highway/Egan Drive (14) in Juneau will be the southeast Alaska site.
 - Two areas will be used in the Anchorage area: (1) the Glenn Highway ITS Corridor from Anchorage to the intersection with the Parks Highway near Palmer, and (2) the proposed State of Alaska Safety Corridor on the Knik-Goose Bay Road south of Wasilla.
- This project will leverage the following other projects:
 - Glenn Highway Corridor ITS Implementation Plan
 - State of Alaska Safety Corridor
 - The Alaska DOT RWIS program
 - The Alaska DOT research project T2-07-09 “*Demonstration of Non-Intrusive Traffic Data Collection*”
 - AURORA project 2006-05 “*Technology Transfer (T²) of Alternative Inexpensive RWIS*”
- A concept of operations will be developed in May followed by a RFP draft scope of work.
- A project mini-meeting will be held in Toronto in September 2008

Approximate % Complete: <5 %

Barriers/Issues: Final scope of work for RFP

Recommendations: X continue as planned
 continue with modifications
 discontinue

Additional Comments:

- This project was funded for \$35,000 in FY 2007
- Project Team: Jack Stickel (champion), Tina Greenfield, Joe Doherty, Ralph Patterson, Curt Pape

Project Status Report

August 28, 2008

Project: 2008-01: Development of a National Road Weather Testing Facility

Champion: Tina Greenfield, Iowa Department of Transportation

Objective: The purpose of this project is to fund Aurora to market the idea of a national testing facility to various audiences and sources of support. A national facility can help states and agencies find appropriate and well-suited providers for transportation weather research.

Status:

- This project began in FY 2008.
- This project was first mentioned at the National Winter Maintenance Peer Exchange in Ohio in August of 2007. Other winter maintenance testing needs were also brought up in the Peer Exchange round-table discussions. These needs were assigned to AASHTO/SICOP at the December, 2007 meeting.
- After hearing support for a national facility from Clear Roads members, Tina helped arrange a conference call between champion members from Clear Roads, AASHTO, SICOP, PNS, and Aurora to discuss possible cooperation and coordination on our “national facility” projects. This group decided cooperation was beneficial and began working on a draft document describing the facility.
- The idea of a single facility morphed into the idea of a consortium or board of experts which can help requestors of research find appropriate facilities.

Approximate % Complete: 15 %

Barriers/Issues: None

Recommendations: continue as planned
 continue with modifications
 discontinue

Additional Comments:

- This project was funded for \$1,000 in FY 2008
- Project Team: Tina Greenfield (champion), Jack Stickel, Max Perchanok, Lee Smithson

Project Status Report

August 21, 2008

Project: 2008-02: Evaluation of Utah DOT's Weather Operations/RWIS Program

Champion: Ralph Patterson, Utah Department of Transportation

Objective: The purpose of this project is to evaluate the benefit-cost ratio of the weather operations program on winter maintenance, including the costs of labor, materials and equipment, quantify the benefits and costs of the RWIS elements of the UDOT program, quantify the benefits of the weather operations program to other UDOT users, including the TOC, and quantify the indirect benefits of the weather operations program.

Status:

- This project will begin in FY 2008.
- Ralph Patterson has solicited information from team members.
- A contract with WTI is being prepared.

Approximate % Complete: 5 %

Barriers/Issues: None

Recommendations: continue as planned
 continue with modifications
 discontinue

Additional Comments:

- This project was funded for \$25,000 in FY 2008
- Project Team: Ralph Patterson (champion), Tina Greenfield, Mike Adams, Tom Maze

Project Status Report

August 19, 2008

Project: 2008-03: Next Generation RWIS for Canada / MDSS Demonstration in Ontario

Champion: Max Perchanok, Ontario Ministry of Transportation

Objective: The purpose of this project is to evaluate environmental, safety and cost benefits of a new generation of RWIS products and services that can be implemented to improve road maintenance in Ontario.

Status:

- This project will begin in FY 2008.
- This project was accepted as 3-year in-kind contribution by MTO.
- Preliminary discussions have been held with RWIS service providers in Ontario; AMEC and Pelmorex.
- MTO resources have been planned, and a technical review is underway.

Approximate % Complete: <5 %

Barriers/Issues: None

Recommendations: continue as planned
 continue with modifications
 discontinue

Additional Comments:

- This is an in-kind project for Ontario Ministry of Transportation.
- The project funding of \$75,000 in-kind will cover Ontario's membership for FY 2008, FY 2009, and FY 2010.
- Project Team: Max Perchanok (champion), Ralph Patterson, Curt Pape, Kevin Petty

Attachment B

Aurora Program 2008-2009 Work Plan Development Project Selection Worksheet

Revised: August 19, 2008

Step 1:

The following general criteria will be considered when initially evaluating the potential projects for the 2008-2009 (FY 2009) Aurora Program Work Plan.

- **Program Balance.** This criterion should be considered when evaluating project concepts that will "round out" the Aurora Program as a whole, taking into account the projects that are already ongoing. The use of this criterion should assist in the selection of projects that complement existing Aurora initiatives.
- **RWIS Trends.** This criterion should be considered when evaluating project concepts that reflect any current "hot topics" in the RWIS arena, to ensure that the Aurora Program is seen to be at the forefront of RWIS research and practice. The use of this criterion should assist in the selection of projects that are particularly timely and relevant to the RWIS industry.
- **Leverage Opportunities.** This criterion should be considered when evaluating project concepts that can "piggyback" onto other initiatives, involving collaboration with individual states or other programs, and providing added value to both initiatives. This criterion could also apply to a project that is a continuation of a successfully completed Aurora project, in which the leveraging would occur on Aurora's previous investment. The use of this criterion should enable the selection of projects that optimize the return on the resources invested, and whose results are transferable.
- **Early Winners.** This criterion should be considered when evaluating project concepts that will produce near-term results. The use of this criterion should enable the selection of projects whose findings can be used to demonstrate the success of the Aurora Program.
- **Program Recognition.** This criterion should be considered when evaluating project concepts that will contribute particularly to the visibility and profile of the Aurora Program. The use of this criterion should assist in the selection of projects that will generate interest in the program and contribute to the program's reputation.
- **Return on Investment.** This criterion should be considered when evaluating project concepts that will offer a particularly strong return on the investment made by participants. The use of this criterion should optimize the resources of the program.
- **Feasibility of Implementation.** This criterion should be considered when evaluating project concepts whose findings or outputs are deemed to be the most easily implemented in the real world environment. The use of this criterion should assist in the selection of projects that are most likely to lead to some form of RWIS deployment.

Step 2:

The next step in the process will involve the ranking of the candidate projects. **Each member of the Aurora Board will rank the potential candidate projects in priority order, with 1 being the best potential project.**

This year’s candidate projects are:

- Candidate A: Evaluation and Inter-comparison of the Lufft R2S Microwave Precipitation Sensor
- Candidate B: Further Development of Pavement Precipitation Accumulation Estimation System
- Candidate C: Road Weather Education Enhancements and Technology Transfer
- Candidate D: Salinity Sensor Improvements and Development
- Candidate E: Review of Friction Detection Technologies
- Candidate F: High Definition Sensing of Road Conditions
- Candidate G: Peer Exchange
- Candidate H: Demonstration of a National Winter Maintenance Testing Program

Once the candidates are ranked, the average rank of each will be calculated. See Table 1 below.

Table 1: Project Priority Scoring Results

Candidates	Aurora Members (1-16)																Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
<i>Candidate A</i>																	
<i>Candidate B</i>																	
<i>Candidate C</i>																	
<i>Candidate D</i>																	
<i>Candidate E</i>																	
<i>Candidate F</i>																	
<i>Candidate G</i>																	
<i>Candidate H</i>																	

Step 3:

The candidate projects will be listed by average rank. The board will then discuss the ranked list and funding priorities for FY 2009. This discussion will determine which of the projects will be funded and included in the 2008-2009 Aurora Program Work Plan.

<p style="text-align: center;">PROPOSED AURORA PROJECT DESCRIPTION 2008–2009</p>

Candidate A: Evaluation and Inter-comparison of the Lufft R2S Microwave Precipitation Sensor

Proposal Contact: *Jeff Tilley, University of North Dakota*

Date: *September 10, 2008*

Project Champion: *TBD*

Project Area: *Equipment Evaluation*

Background: *See attached*

Research Objective: *See attached*

Research Approach: *See attached*

Products: *See attached*

Participants: *See attached*

Duration: *18 months*

Total Project Cost: *\$40,000*

Requested Funding: *\$40,000*

Evaluation and Intercomparison of the Lufft R2S microwave precipitation sensor
Aurora Proposal
Proposed champion: MnDOT
Proposed participants: UND + project team (MnDOT, Utah DOT, others?)

Background:

It is becoming increasingly recognized that precipitation observation/measurement technologies, while improved from that a decade ago, still allow for considerable errors in reported precipitation occurrence, amounts and type. As a result, work has continued by several instrument developers on new technologies for observing precipitation. One of the newer sensors is a small, low-cost microwave Doppler radar technology developed by Lufft, called the R2S. The R2S radar directly measures speed of falling precipitation particles, and provides a derived estimate of drop size. The precipitation quantity and intensity is calculated from the correlation between drop size and speed. The type of precipitation (rain/snow) is detected from the difference in drop speed. The digital outputs of the sensor (which can be tied directly to a standard datalogger such as available from various vendors), therefore include precipitation quantity/intensity (rain rate) and precipitation type.

Such a sensor, while a significant investment compared to some other RWIS sensors, has the potential, if more accurate than existing sensors, to be a very cost-effective solution compared to other types of radar technologies, which are cost prohibitive and currently have insufficient spatial coverage, leading to gaps in reporting of precipitation events.

UND has, through internal infrastructure funding, obtained an R2S sensor. We propose in this project to install this sensor at our road weather field research facility (RWFRF) and perform an evaluation (including cross-comparison with other pre-existing precipitation sensors) of the R2S's capabilities and utilities over a full annual cycle (thus providing information on its utility to distinguish between very light drizzle and fog/mist droplets, as well as various frozen precipitation types).

Project Goals: The two focus areas for the project are:

- 1) to evaluate the utility of the R2S sensors for both cold- and warm-season precipitation observation
- 2) to provide a recommendation on the cost-effectiveness of the R2S sensor for RWIS applications.

Project Participants: UND, Project Team

Project Duration: 18 months (12 months observations, 6 months analysis)

Proposed Project Budget \$40,000

PROPOSED AURORA PROJECT DESCRIPTION

2008–2009

Candidate B: Further Development of Pavement Precipitation Accumulation Estimation System

Proposal Contact: *Jeff Tilley, University of North Dakota*

Date: *September 9, 2008*

Project Champion: *TBD*

Project Area: *Decision Support Systems*

Background: *See attached*

Research Objective: *See attached*

Research Approach: *See attached*

Products: *See attached*

Participants: *See attached*

Duration: *18 months*

Total Project Cost: *\$83,000*

Requested Funding: *\$83,000*

The Pavement Precipitation Accumulation Estimation System: Further Development
Aurora Proposal and Summary Work Plan
Proposed champion: Utah DOT
Proposed participants: UND + project team

Background:

Wintertime precipitation has serious impacts on surface vehicular transportation. Despite this, identifying wintertime precipitation occurrence and accumulation is very difficult. In discussions with state Department of Transportation (DOT) personnel several years ago, the determination of wintertime precipitation occurrence and accumulation was identified as one of the top wintertime maintenance problems faced by state DOTs.

The primary reason why wintertime precipitation occurrence and accumulation are so difficult to determine is that for wintertime precipitation, each observation platform (surface, radar, satellite, etc.) has significant limitations. For surface observations, the principal limitation is scarcity; for radar, the principal limitation is that radar beams “overshoot” precipitation altogether. For satellite data, the principal limitations are precipitation algorithm inaccuracies and the lack of testing of satellite algorithms for such purposes.

To address these inadequacies at UND a prototype Pavement Precipitation Accumulation Estimation System (PPAES) was developed under separate funding during 2005-2007. PPAES utilizes multiple observation platforms and three dimensional analyses to provide a more accurate picture of precipitation occurrence and accumulation than possible by the other means discussed above. PPAES currently utilizes radar, satellite, and surface observations to estimate precipitation occurrence and precipitation rates. Analyses are used to determine precipitation type.

Given the the current *Clarus* effort directed towards enhancing the utility of Road Weather Information Systems (RWISs), this is an opportune time to significantly improve PPAES such that it might be eventually incorporated within a decision support system such as MDSS/MODSS. The aim of this project, then, is to enhance the capabilities of PPAES to allow such incorporation.

Project Goals: The two focus areas for the project are:

- 1) the utilization of RWIS data within PPAES
- 2) the blending of PPAES products produced using different observation platforms.

Rationale for these focal areas is as follows:

- 1) To date, RWIS precipitation data are not being utilized within PPAES because of concerns regarding quality control/quality assurance. However, with the ongoing *Clarus* project as well as other QA efforts (e.g., Aurora project 2005-01 and efforts by the Meso-West consortium), the time is right to ingest these data and to evaluate the impacts they have on the algorithm estimates of precipitation occurrence and accumulation accuracy.
- 2) The second area involves significant technical challenges. As one might expect, products based upon different observing platforms can be combined in numerous ways (e.g., cross-checking, statistical approaches, etc.). To better determine which approaches are optimal, significant testing and revision of the algorithm will be required.

Project Participants: UND, Utah DOT, Project Team

Work Plan:

Study Domain

The project will focus on several disparate areas in order to provide testing and evaluation of the improved algorithm within different meteorological, topographic and land use regimes. Specifically, we will test and evaluate the improved algorithm for the Aurora I-80 corridor states (Iowa, Illinois, Indiana, Ohio, Nevada), Utah and sub-Arctic Alaska.

Division of Labor

- Core development of the enhancements to the algorithm will be the responsibility of PI M. Askelson and the ½ -time graduate student. This development includes:
 - Incorporation of ESS (RWIS) data
 - Refinement of algorithms to blend the inputs from the various data types (radar, satellite, ESS, METAR and gridded analysis)
 - an ability to utilize the under-development NOAA/ESRL Rapid Refresh meteorological analysis fields (set to replace the NOAA/ESRL Rapid Update analysis in 2010) ,
 - If time permits, exploration of the use of polar orbiter data in the algorithm for sub-Arctic Alaska, with some assistance in this regard from co-PI J. Tilley
- Running tests, both in real-time and historical mode (using cases that have been previously examined for earlier algorithm development), will be the primary responsibility of the ½-time graduate student, with assistance from co-PI J. Tilley and PI M. Askelson.
- Development of validation datasets, as well as the validation of the improved algorithm, will be the primary responsibility of co-PI J. Tilley and the ½-time graduate student. Such validation will include cross-validation with other available precipitation diagnosis products (e.g., the NWS Stage IV precipitation analysis), as well as with ground truth observations.

Project Duration: 18 months

Project Timetable/Milestones

- Months 1-9 (e.g., January-September 2009):
 - develop code to handle ESS (RWIS) observations, including those associated with the *Clarus* initiative and observations from Meso-West as appropriate.
 - refine blending routines
 - initial tests of algorithm with new surface data and blending routines
 - compilation of historical validation datasets and preparation for production testing
- Months 10-18(e.g., October 2009-June 2010)
 - Production runs of improved algorithm
 - Validation activities
 - Month 10: Preliminary project report to Aurora
 - Month 13: presentation at AMS or TRB
 - Month 18: Final project report and other deliverables to Aurora

Project Deliverables:

- PPAES codes (available to be implemented by member states if desired)
- Preliminary and Final Project Reports
- Potential delivery of code to PFS MDSS infrastructure, pending results of validation activities (i.e., is it an improvement over what PFS MDSS already uses?)

Proposed Project Budget: \$83,000

- 1.55 month support for PI, M. Askelson
- 1.55 month support for Co-PI, J. Tilley
- 50% FTE support for M.S. student during the 18 months
- Travel support for the M.S. student, PI Askelson or co-PI Tilley to present work at 2010 AMS IIPS conference or suitable TRB venue
- ~\$1780 for supplies (including 500 Gb portable disk drive), communications, copying, other operational costs
- Indirect Costs at usual UND rate

PROPOSED AURORA PROJECT DESCRIPTION

2008–2009

Candidate C: Road Weather Education Enhancements and Technology Transfer

Proposal Contact: *Chris Albrecht, Iowa State University*

Date: *September 9, 2008*

Project Champion: *TBD*

Project Area: *Other (Education)*

Background: *This project idea is the result of priorities from the 2007 National Winter Maintenance Peer Exchange.*

Research Objective: *To develop methods and/or materials to disseminate existing road weather and RWIS educational materials.*

Research Approach: *TBD*

Products: *Training/educational materials, such as brochures describing existing materials*

Participants: *AASHTO, Iowa State University, Utah DOT, University of North Dakota, Ontario MOT, etc.*

Duration: *24 months*

Total Project Cost: *\$20,000*

Requested Funding: *\$20,000*

PROPOSED AURORA PROJECT DESCRIPTION

2008–2009

Candidate D: Salinity Sensor Improvements and Development

Proposal Contact: *Chris Albrecht, Iowa State University*

Date: *September 9, 2008*

Project Champion: *TBD*

Project Area: *Equipment Evaluation*

Background: *This project idea is the result of priorities from the 2007 National Winter Maintenance Peer Exchange. The final report from this event identified the desire for development of an on-vehicle salinity sensor and improvements in in-pavement chemical sensing capabilities.*

Research Objective: *To survey state transportation agencies to gauge interest in purchasing and utilizing on-vehicle chemical sensors, and if so, how many and at what price. Clear Roads would be a likely partner on such an effort.*

Research Approach: *The approach will be to:*

- 1. determine the need,*
- 2. develop the specification,*
- 3. and select a developer/vendor to produce sensors that would not be copyrighted.*

Products: *Salinity sensors for use by road agencies.*

Participants: *Ontario MOT, University of North Dakota, Clear Roads, etc.*

Duration: *24 months*

Total Project Cost: *\$50,000*

Requested Funding: *\$50,000*

Salinity sensor	79	33	17	Develop on-vehicle salinity sensor. People wanted to know how much salt was on the road so they could track dilution, re-freeze potential, and how much more chemical (if any) should be applied at that time.	A project manager has been assigned to this project. There is some research by the Swedish National Road Administration that relates to this project. The project manager will be making recommendations at the September 2008 Aurora meeting as to the scope and scheduling of this project.
		34	14	Best way to measure the chloride content on the surface and determine how long they last. The group was interested in a real-time feedback of chloride levels and expected time period the chemical could maintain the roadway. The discussion focused on roadside and vehicle mounted sensors along with work in the laboratory. The research can focus on evaluating the accuracy and reliability of devices and their relative performance when dealing with different deicers which would be beneficial for the success of MDSS.	
		12	52	Improved chemical sensor. Need a better in-pavement chemical sensor that can reliably tell how much chemical is still out on the road. Current sensors do not seem reliable enough to base decisions.	

PROPOSED AURORA PROJECT DESCRIPTION

2008–2009

Candidate E: Review of Friction Detection Technologies

Proposal Contact: *Chris Albrecht, Iowa State University*

Date: *September 9, 2008*

Project Champion: *TBD*

Project Area: *Equipment Evaluation*

Background: *This project idea is the result of priorities from the 2007 National Winter Maintenance Peer Exchange. The final report from this event identified the desire for evaluating friction devices, especially low-cost options and possible uses of ABS data.*

Research Objective: *To review the state-of-the-art in friction detection.*

Research Approach: *The approach will be to perform a review of friction detection technologies.*

Products: *A state-of-the-art review of friction detection technologies.*

Participants: *Ontario MOT, Iowa DOT, Iowa State University*

Duration: *18 months*

Total Project Cost: *\$25,000*

Requested Funding: *\$25,000*

Cheap Friction	25	25	27	<p>Pilot evaluation of virtual pavement sensors and on-board friction devices.</p> <p>Develop low-cost, simple friction measuring device or other method to determine slipperiness of roadway surface and transmit that information to users to assist in decision making.</p>	<p>Progress on Aurora Project 2007-02, "Cold Weather Testing of Halliday Unit" can be found on www.aurora-program.org. Also technical papers on the role of surface friction in winter maintenance can be found in the TRB Circular E-C126, pages 381-416, website www.trb.org/news/blurb_detail.asp?id=9165</p>
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PROPOSED AURORA PROJECT DESCRIPTION

2008–2009

Candidate F: High Definition Sensing of Road Conditions

Proposal Contact: *Chris Albrecht, Iowa State University*

Date: *September 9, 2008*

Project Champion: *TBD*

Project Area: *Road Condition Monitoring*

Background: *This project idea is the result of priorities from the 2007 National Winter Maintenance Peer Exchange. This project may be a technology review.*

Research Objective: *To review developments in high-definition road condition sensing.*

Research Approach: *The approach will be to perform a technology review.*

Products: *Review of road condition sensing technologies.*

Participants: *Ontario MOT, University of North Dakota, Iowa State University, NCAR, Iowa DOT, etc.*

Duration: *24 months*

Total Project Cost: *\$25,000*

Requested Funding: *\$25,000*

PROPOSED AURORA PROJECT DESCRIPTION

2008–2009

Candidate G: Peer Exchange

Proposal Contact: *Tina Greenfield, Iowa DOT*

Date: *September 10, 2008*

Project Champion: *TBD*

Problem Statement: *Aurora has been actively researching a number of surface transportation weather projects while Clear Roads is researching materials, equipment and practices related to winter maintenance operations. Unfortunately the information/results sometimes does not reach end users in all states or at different agency levels. The winter maintenance community needs to be more aware of the research conducted by Aurora and Clear Roads and other research organizations and take a more active role in requesting research to meet winter operational needs.*

Research Objective: *To conduct a National winter maintenance meeting for Aurora, Clear Roads, SICOP, PNS and the FHWA to share research results from the Peer Exchange held in 2007, get updates from each snow-belt state and discuss other issues related to winter snow removal operations. Each state would send two representatives to the meeting that are most actively involved with the areas covered by Aurora, Clear Roads, PNS, SICOP and FHWA efforts.*

Products: *A national, multi-day meeting to cover a wide variety of topics related to winter maintenance operations. Updates on research completed by the various winter research groups and a summary of the meeting.*

Participants: *Aurora, Clear Roads, PNS, SICOP and FHWA would be equal partners in developing the agenda for the multi-day meeting*

Total Project Cost: *\$90,000*

Requested Funding: *\$30,000*

PROPOSED AURORA PROJECT DESCRIPTION

2008–2009

Candidate H: Demonstration of a National Winter Maintenance Testing Program

Proposal Contact: *Tina Greenfield, Iowa DOT*

Date: *September 18, 2008*

Project Champion: *TBD*

Project Area: *Information Outreach/Project Assistance*

Problem Statement: *Aurora has been actively researching a number of surface transportation weather projects while Clear Roads is researching materials, equipment and practices related to winter maintenance operations. It is apparent that many agencies are interested in scientific testing and there are some research facilities already available for this purpose. However, it appears that the objectives and results of some winter maintenance research projects and the capabilities and existence of some research facilities are not well known amongst the national research groups or agency managers. Research in other classically non-winter maintenance areas, such as agriculture, work environments and ergonomics, sensor hardware/software, and human decision-making may have distinct parallels to winter maintenance problems, but may be difficult for project champions to find. Furthermore it would be beneficial to have a common constantly updating database of completed and on-going winter maintenance research projects which can be used by project managers to obtain background for future projects and refine project scopes. In March 2008, representatives from Aurora, Clear Roads, PNS, AASHTO SICOP, and FHWA met in an informal teleconference to discuss these existing and emerging testing and evaluation issues, and the possibility of creating a coordinated national plan for meeting all of the various winter maintenance testing needs. The attendees decided that cooperation may indeed be beneficial and began developing a plan to accomplish this, herein called the National Winter Maintenance Testing Program (NWMTP). The September 8, 2008 draft of the NWMTP outlines the need for a project investigating committee (consultants) whose job is to review projects on demand, and use their expertise to provide the requesting agency information regarding:*

- *Complimentary past or current projects which can be used to refine the scope of work or determine the originality of the proposed project and avoid duplication*
- *Facility components and infrastructure complimentary to the proposed research/test/evaluation*

- *Contact information for the various facility managers and researchers*
- *Facility location relative to the agency*
- *Agency affiliation (university, organization, etc)*

This information will help an agency select the best possible facility for the work and help agencies learn about other research projects, especially as they pertain to their proposed research. Additionally, the investigating committee would be responsible for maintaining a website of past and current winter maintenance projects which would be available online. Unfortunately some winter maintenance research goes unpublished and undistributed. This web catalog would serve as a place for states and local agencies to post information on some of their local projects without the need for formal publication.

Research Objective: *To conduct a demonstration of the NWMTP investigating committee in conjunction with Aurora, Clear Roads, SICOP, and PNS. The role of the NWMTP is being defined but significant uncertainty exists in its makeup, requirements, and budget on a national scale. A smaller-scale demonstration of the capabilities and challenges of an investigating committee will help define these issues, discover potential pitfalls, and illuminate potential benefits so that the nationally-deployed NWMTP can be developed on tested foundations. It is proposed that the demonstration include development of a research list and project background and facility-finding assistance for one Aurora Project, one Clear Roads project, one PNS project, and one SICOP project to get a full spectrum of potential research needs.*

Products: *Deliverables are:*

- 1. Functional project investigating committee to assist on four demonstration projects and develop a catalog of facilities and research*
- 2. A document describing the things that worked and those that did not and provide a clear understanding of what the scope, capabilities, and budget should be on a national scale.*
- 3. A modified scope of work and budget which can be used to request funding for establishing the investigating committee which would be available as needed nationally.*

Duration: *2 years*

Participants: *Aurora, Clear Roads, PNS, and SICOP would be equal partners*

Total Project Cost: *\$40,000*

Requested Funding: *\$10,000*

Winter Maintenance Testing Program Draft as of September 8, 2008

Introduction

Over the years, governmental winter maintenance agencies have expressed the desire to have test facilities which would be well-equipped and well-staffed to undertake their various winter maintenance experiments. Several testing facilities have been developed or are in construction to accommodate some of these testing needs. Several national research groups have either begun developing a facility or suggested the development of a national facility. For example, the Pacific Northwest Snowfighters (PNS) is sponsoring a Pooled Fund research project with Western Transportation Institute (WTI) which will help develop infrastructure and testing capabilities for the Lewistown, MT research facility (Transcend). In August 2007, Aurora approved a project to investigate options for a national testing facility. In the same month a similar project was designated at the National Winter Maintenance Peer Exchange and responsibility for this unmet research need was assigned to AASHTO's SICOP in December 2007. In January 2008 Clear Roads approved a project to investigate a winter maintenance test facility. State agencies, including North Dakota, Minnesota, Michigan, and Virginia, are also involved with various research facilities or universities.

It is apparent that many agencies are interested in scientific testing and there are some resources already available for this purpose. However, it appears that the capabilities of these resources, and in some cases even the existence of them, are not well known amongst the national research groups or agency managers. Furthermore it may be possible that the development of additional facilities or the augmentation of existing facilities may be needed to meet all maintenance research needs. Thus, the effort to obtain testing programs and facilities may be enhanced by cooperation and coordination amongst the research groups and the existing research facilities. In March 2008, representatives from Aurora, Clear Roads, PNS, AASHTO, SICOP, and FHWA met in an informal teleconference to discuss these existing and emerging testing facilities, and the possibility of creating a coordinated national plan for meeting all of the various winter maintenance testing needs. The attendees decided that cooperation may indeed be beneficial and began developing a plan to accomplish this. This document describes the recommendations of this initial group for a coordinated National Winter Maintenance Testing Program

The National Winter Maintenance Testing Program

The proposed National Winter Maintenance Testing Program (hereafter NWMTP) is an organization dedicated to assisting agencies in their selection of appropriate research agencies/facilities for their project needs. This NWMTP is comprised of an investigating committee who are experts on the capabilities of the various winter maintenance testing agencies, including insight into each agency's:

- Capabilities and infrastructure
- Expertise of the staff
- Workload
- Past and current projects

The investigating committee would review the proposed research and use their expertise to provide the requesting agency information regarding:

- Complimentary past or current projects which can be used to refine the scope of work or determine the originality of the proposed project
- Facility components and infrastructure complimentary to the proposed research
- Contact information for the various facility managers and researchers
- Facility location relative to the agency
- Agency affiliation (university, organization, etc)

This information will help an agency select the best possible facility for the work and help agencies learn about other research projects, especially as they pertain to their proposed research.

Clearly, the investigating committee must maintain current knowledge of the facilities, projects, and staff. They must maintain communication with fellow committee members and the different facilities through regular conference calls and on-site meetings. The committee members must be able to evaluate and respond to research queries in a timely manner. The investigating committee will be comprised of private or university contractors who will be overseen by a small group of public-sector winter maintenance experts. Members of the investigating committee must not have any affiliation with potential winter maintenance research facilities. Due to the level of effort required by the investigating committee, it is not likely that it will be staffed by volunteers or winter maintenance experts with other full-time commitments.

The investigating committee will not select a facility for the proposed research, nor will they recommend facilities over any other. Although the investigating committee can provide information to research requestors and research providers, the committee must not be involved in any of their business or research-related decisions.

Recommended Capabilities of the Program

Ideally the investigating committee can find appropriate facilities that are capable of performing research on all types of winter maintenance categories, including but not limited to:

- Deicing chemical evaluations & comparisons
- Maintenance equipment performance
- Cab-environment studies
- Weather and road sensing equipment evaluations
- Road environment modeling/forecasting
- Mitigation of blowing and drifting snow
- Maintenance technique and strategy
- Guidelines for appropriate material applications for any given weather event

The investigating committee must search for facilities staffed by qualified researchers who are knowledgeable in the fields of winter maintenance, sensor data collection, experiment design, and scientific evaluation, and those which can perform evaluations in controlled, real, or simulated winter weather/pavement conditions and traffic loads appropriate to the research and testing needs of the proposed project.

The investigating committee will maintain a summary of research areas which are in demand or relatively under-developed so that the various facilities can coordinate their own expansion and development. Where appropriate research facilities may use information from the investigating committee in their funding requests.

Necessary Actions

- Develop a draft Scope of Work and budget for a demonstration investigating committee
- Propose project funding for a demonstration from Aurora, Clear Roads, PNS, and SICOP.
- Procure a demonstration consultant through RFP or equally appropriate means