

# Aurora Program - Ongoing Project Status

March 29, 2011

## **FY 2000 through FY 2007**

- 2000-01: Benchmarking of RWIS Forecasts (\$50,000 in-kind) = 75% complete
- 2003-04: Intelligent Image-Based Sensor, Phase 3 (\$75,000 in-kind) = 95% complete
- 2006-01: Support of the Clarus Initiative (\$25,000) = 75% complete
- 2006-08: Low Cost Mobile RWIS (\$50,000 in-kind) = 95% complete
- 2007-01: RWIS Equipment Monitoring System, Phase 2 (\$135,000) = 5% complete
- 2007-02: Cold Weather Testing of the Halliday Road Grip Unit (\$40,000) = 90% complete
- 2007-04: Development of a Freezing Drizzle Algorithm (\$85,000) = 85% complete
- 2007-05: Multiple-Use ITS Data Collection Sites (\$15,000) = 10% complete

## **FY 2008**

- 2008-01: National Road Weather Testing Program (\$11,000) = 20% complete
- 2008-03: Next Generation RWIS for Canada (\$75,000 in-kind) = 55% complete

## **FY 2009**

- 2009-01: Evaluation and Inter-comparison of the Lufft R2S (\$55,000) = 5% complete
- 2009-03: Knowledge Base for RWIS (\$20,000) = 95% complete
- 2009-04: Road Weather Education Enhancements (\$20,000) = 30% complete
- 2009-05: Further Development of PPAES (\$83,000) = 25% complete
- 2009-06: Salinity Sensor Improvements and Development (\$5,000) = discontinued

## **FY 2010**

- 2010-01: Enhancements of AI/RWIS CBT (\$50,000) = 20% complete
- 2010-02: Mobile-Weather Data Collection Guidelines (\$25,000) = 10% complete
- 2010-03: Development of Models for Standards (\$120,000) = 35% complete
- 2010-04: RWIS Sensor Density Grid (\$100,000) = 5% complete
- 2010-05: Determining RPU and Sensor Failure (\$5,000) = 5% complete

## **FY 2011**

- 2011-01: Third Peer Exchange (\$30,000) = 55% complete
- 2011-02: RWIS Training Tool (200,000) = 5% complete
- 2011-03: Benefit/Costs and Instruction for Migrating to Open RWIS (\$75,000) = 5% complete
- 2011-04: Study of MDSS Costs (\$20,000) = 5% complete
- 2011-05: Funding Sources Identification (\$5,000) = 5% complete

## **Project Status Report**

March 9, 2010

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

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**Champion:** Max Perchanok, Ontario Ministry of Transportation

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### **Status:**

- The hard drive was sent on November 10.
- Agencies that provided data, that was included on the hard drive, are as follows:
  - British Columbia, Alberta, Newfoundland, Nova Scotia, New Brunswick
  - Pennsylvania, Iowa, Alaska
  - Finland
- Ontario will be provided later this month.
- A project mini-meeting is scheduled for the March 2011 in Boulder, where the team will discuss review and schedule NCAR's component.

**Approximate % Complete:** 75 %

**Barriers/Issues:** None.

**Recommendations:**  X  continue as planned  
    continue with modifications  
    discontinue

### **Additional Comments:**

- The project is expected to be complete in 2011.
- This is an in-kind project for Ontario Ministry of Transportation.
- Project Team: Max Perchanok (champion), Mike Adams, Scott Roeder, Bill Hoffman, Curt Pape, Jeff Tilley, Dave Lahn, Sheldon Drobot, Dan Huang

# **Project Status Report**

February 11, 2011

**Project:** 2003-04: Intelligent Image-Based Winter Road Condition Sensor, Phase 3

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**Champion:** Dan Eriksson, Swedish Road Administration

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## **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 involved 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.
- The team was still waiting for a report detailing the research results.
- Chris Albrecht has and Dan Eriksson will schedule a time to finish the final report summary.

**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

## **Project Status Report**

December 3, 2010

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

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**Champion:** Tina Greenfield, Iowa Department of Transportation

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**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.
- 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>.

**Approximate % Complete:** 75 %

**Barriers/Issues:** None.

**Recommendations:**  continue as planned  
 continue with modifications  
 discontinue

**Additional Comments:**

- This project was funded for \$50,000 in FY 2006.
- The project funding was reduced to \$25,000 at the September 2010 board meeting.
- Project Team: Tina Greenfield (champion), Jack Stickel, Kirk Carpenter, Dean Kernan, Mike Adams, Scott Roeder, Sheldon Drobot

## **Project Status Report**

February 11, 2011

**Project:** 2006-08: Low Cost Mobile RWIS

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**Champion:** Claude Lapointe, Quebec Ministry of Transportation

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**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:**

- Final project materials have been provided by Quebec.
- InTrans/CWIMS publications staff is editing them for a final review by the board.

**Approximate % Complete:** 95 %

**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.
- Project Team: Claude Lapointe (champion), Curt Pape, Kirk Carpenter, Dan Roosevelt, Dennis Burkheimer, Rudy Persaud

## **Project Status Report**

March 10, 2011

**Project:** 2007-01: RWIS Equipment Monitoring System, Phase 2

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

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**Objective:** Expand the *RWIS Equipment Monitoring System* 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.
- This project has also discontinued Project 2005-01: Development of a RWIS Quality Assurance Monitoring System, that was intended to 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 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 was combined with Project 2005-01.
- A mini-meeting was held at the March 2011 meeting in Boulder.

**Approximate % Complete:** 5 %

**Barriers/Issues:** Final Scope of Work for RFP

**Recommendations:**  continue as planned  
 continue with modifications  
 discontinue

**Additional Comments:**

- This project was funded for \$25,000 in FY 2007.
- This project was funded for an additional \$10,000 funding under FY 2008.
- This project has been combined with Project 2005-01 and its funding of \$100,000.
- The total project budget is \$135,000 as of the September 2010 board meeting.
- Project Team: Jack Stickel (champion), Dawn Gustafson, Curt Pape, Mike Adams, Ralph Patterson, Tina Greenfield, Joe Doherty

## **Project Status Report**

February 7, 2011

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

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**Champion:** Diana Clonch, Ohio Department of Transportation

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### **Status:**

- Jeff Tilley is preparing a final report for presentation at the TRB show next June in Indianapolis.
- Ohio DOT brought the RT3 unit back from North Dakota last week.
- A presentation on results will be made at the 4<sup>th</sup> National Conference on Surface Transportation Weather in Indianapolis.
- Jeff Tilley would try to send a final report to Scott Roeder prior to the Albuquerque meeting.
- Participating states gave their comments on the draft final report, and additional technical comments were anticipated after Max Perchanok's revisions.
- Max submitted comments to Jeff Tilley early in April 2009 and a portion of these requested changes would be made by early June. Some comments were beyond the scope and would need to be addressed so the two planned a call.
- Waiting to hear back from UND.
- UND had expressed some security concerns with sharing the extra data collected on this project. It was agreed that Jeff Tilley would gather this data and forward it on to Chris Albrecht where it could be accessible upon request.
- Max noted that Quebec did a friction report and that the two devices should be compared.
- The draft report is being finished.
- A mini-meeting was held Des Moines on September 21, 2010.
- Tina Greenfield sent a note to the UND contract office a few months ago about finding a successful conclusion to this project, but has not heard a response plan from UND.

**Approximate % Complete:** 90 %

**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, Max Perchanok, Tina Greenfield, Bill Hoffman, Lee Smithson

## **Project Status Report**

November 30, 2010

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

**Champion:** Max Perchanok, Ontario Ministry of Transportation

### **Status:**

- The purpose of this project is to test/optimize the Rosemont freezing precipitation sensor for detecting freezing drizzle (freezing drizzle is defined as very light freezing rain) in roadside situations.
- The approach is to operate the sensor in conjunction with various 'ground truth' sensors (mainly Geonor heated rain gauge) and to develop statistical measures of its accuracy under different ambient conditions (temperature, storm type, season) and with or without filtering the data using other sensors.
- Phase 1 was completed in October 2008. This remaining work is Phase 2.
- Geonor quality control was completed in October, review of Geonor and NCAR data are now underway.
- The report will include analysis of the corrected data from both seasons stratified into 2 or 3 synoptic types, and will compare results from the stand-alone Rosemont with results obtained when the Rosemont data are pre-classified using Geonor precipitation rate data.
- The report will include a chapter on calibration of the Rosemont including both theoretical and practical aspects.
- A mini-meeting has been scheduled for the March 2011 meeting in Boulder.

**Approximate % Complete:** 85 % (Phase 2)

**Barriers/Issues:** **None.** Work was delayed in Sep/Oct waiting for contract extension and is now underway with delivery expected by end of 2010.

**Recommendations:**      X   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), Curt Pape, Mike Adams

## **Project Status Report**

March 10, 2011

**Project:** 2007-05: Multiple-Use ITS Data Collection Practices

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

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### **Status:**

- The overall objective of this project remains the same – use RWIS sites for different types of data collection. The goals, however, have been slowly evolving over the past two years. The current project goal is to integrate non-intrusive traffic data collection devices into a RWIS site. There is a realization that each DOT has unique IT infrastructure, power, communication, traffic data needs, and contractual relationships. There needs to be different, specific solutions to meet these challenges. Therefore, the two goals for project are:
  - Document existing DOT programs for non-intrusive traffic data collection among AURORA states. This would include Utah, New York, and Iowa.
  - Develop a software solution for full Wavetronix integration for the SSI Linux RPU (LX-RPU). A prototype would be deployed for an AURORA state (Alaska); other AURORA states would be eligible to follow on at a reduced cost. Alaska DOT has a quote for the LX-RPU integration and is ready to go to work.
- The non-intrusive RWIS traffic integration from other states could be documented as part of Aurora Project 2009-03 “*Knowledge Base for RWIS*”.
- Other options for this project would include air quality monitoring for: Ozone O3, Nitrogen Dioxide O2, Carbon Monoxide CO, Volatile Organic Compounds VOC, Carbon Dioxide CO2, Sulphur Dioxide SO2, Hydrogen Sulphide H2S, Particulate PM10, PM2.5
- A concept of operations is pending.
- A mini-meeting has been scheduled for March 9, 2001 in Boulder.

**Approximate % Complete:** 10 %

**Barriers/Issues:** Final scope of work for RFP

**Recommendations:**  continue as planned  
 continue with modifications  
 discontinue

### **Additional Comments:**

- This project was funded for \$35,000 in FY 2007. This amount was reduced to \$15,000 at the September 2010 board meeting, with the other \$20,000 being rolled into the general fund.
- Project Team: Jack Stickel (champion), Tina Greenfield, Joe Doherty, Ralph Patterson, Curt Pape, Dawn Gustafson

## **Project Status Report**

March 2, 2011

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

**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 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.
- Clear Roads has committed funding. The group was waiting to hear back about additional funding from PNS.
- Chris Albrecht forwarded materials concerning a testing facility database to the project team.

**Approximate % Complete:** 20 %

**Barriers/Issues:** None

**Recommendations:**  continue as planned  
 continue with modifications  
 discontinue

**Additional Comments:**

- This project was funded for \$1,000 in FY 2008.
- This project was funded for an additional \$10,000 in FY 2009.
- Project Team: Tina Greenfield (champion), Jack Stickel, Max Perchanok, Lee Smithson

## **Project Status Report**

November 30, 2010

**Project:** 2008-03: MDSS Demonstration in Ontario

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**Champion:** Max Perchanok, Ontario Ministry of Transportation

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**Objective:** The purpose of this project is to review available MDSS systems in comparison with conventional RWIS, to identify those that best support winter operations planning, performance monitoring and contract administration, and to implement them on a limited basis.

### **Status:**

- An MDSS demonstration and evaluation is planned for 2 sites in partnership with contractor.
  - Installation of AVL on contractor trucks to obtain detailed road temperature and spreader data.
  - Implementation of a treatment advisory function in hindcast mode using AVL and RWIS archival data from storms in winter 2010-11, to compare service level and salt use from actual treatments with those from recommended treatments. Work to be completed and reported in spring 2011 as a benefit/cost study.
- Seasonal Load Advisory
  - Comparison of forecast with actual restriction dates showed benefits of Lakehead/MnDoT approach over UWaterloo index approach.
  - Web site will be revised in December 2010, replacing Waterloo prediction approach with Lakehead prediction approach..
  - Relationship of frost depth to pavement modulus (strength) is progressing as new measurements come in.
  - TempW finite-element heat-flow models was prepared and borehole data were obtained from most sites to help calibrate prediction models to geotech conditions at each load restriction site.
- Highway Frost Potential mapping
  - Not currently planned aside from MDSS
- Highway Planning and Design applications.(Weather Data Interface)
  - Precip sensors installed at most sites
  - Year-round data polling is in place
  - Planning is underway to define data and statistical summary needs for Construction, and Planning & Design

**Approximate % Complete:** 55 %

**Recommendations:**  X  continue as planned  
    continue with modifications  
    discontinue

### **Additional Comments:**

- Funding of \$75,000 in-kind will cover Ontario's membership for FY 2008 through FY 2010.
- Project Team: Max Perchanok (champion), Ralph Patterson, Curt Pape, Dawn Gustafson, Jack Stickel, Sheldon Drobot

## **Project Status Report**

March 9, 2011

**Project:** 2009-01: Evaluation and Inter-comparison of the Lufft R2S Sensor

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**Champion:** Ralph Patterson, Utah Department of Transportation

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**Objective:** The purpose of this project is to fund Aurora to market the idea of a national testing facility to 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).

**Status:**

- Minnesota and New York are in the process of conducting tests.
- The group planned to give multiple awards for completion of sensor analysis.
- It was considered that the approach change to comparison of outputs from multiple sensors.
- The project is on hold:
  - Awaiting feedback from Curt's efforts on a similar project currently in progress.
  - Development of a multi-award contract to be sent out to agencies, universities, and private companies who are interested and capable to bid Aurora projects focused on instrumentation testing and analysis.
  - Considering a comprehensive study summarizing different agencies' experiences with the sensor.
- A mini-meeting was held at the Boulder board meeting.
- This project is under significant re-scoping

**Approximate % Complete:** 5 %

**Barriers/Issues:** None

**Recommendations:**  continue as planned  
 continue with modifications  
 discontinue

**Additional Comments:**

- This project was funded for \$55,000 in FY 2009
- Project Team: Dawn Gustafson (champion), Curt Pape, Jack Stickel, Dean Kernan, Joe Doherty

## **Project Status Report**

March 9, 2011

**Project:** 2009-03: Knowledge Base

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

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**Objective:** The objective of this project is to develop a web-enabled knowledge base (wiki-like) that allows sharing and retrieval of road weather information, with specific emphasis on data loggers. The application will have a search capability, various levels of administrative update control, be easy to update, and include capabilities for adding/replacing material. The knowledge base might have links to web-based information, stand alone articles, user manuals, and frequently asked questions. The data logger knowledge base may contain:

- commonly user sensor configurations, setup, and operation
- Site setup and environmental considerations
- Data logger programs
- Troubleshooting information
- Best practices

**Status:**

- A conference call was held with CTRE support staff and the project team to discuss options for completing the project.
- CTRE has the capability to produce the knowledge base, and a budget and scope were prepared and sent to Jack Stickel.
- The team held another call to discuss further the desired capabilities for the site, and Jack will prepare a draft Concept of Operations that was distributed for the group to review.
- A conference call was held on September 16, 2010.
- A mini-meeting was held at the board meeting in Boulder.

**Approximate % Complete:** 95 %

**Barriers/Issues:** None

**Recommendations:**  continue as planned  
 continue with modifications  
 discontinue

**Additional Comments:**

- This project was funded for \$20,000 in FY 2009
- Clear Roads recently approved \$9,000 in additional funding for this effort.
- Project Team: Jack Stickel (champion), Ralph Patterson, Bill Hoffman, Max Perchanok, Curt Pape, Jeff Tilley

## **Project Status Report**

September 22, 2010

**Project:** 2009-04: Road Weather Education Enhancements and Dissemination

**Champion:** Dawn Gustafson, Michigan Department of Transportation

**Objective:** The objective of this project is to develop methods and/or materials to disseminate existing road weather and RWIS educational materials. This project idea stemmed from the 2007 peer exchange, and it was considered to present this topic for discussion again at the 2009 peer exchange for additional input into the project's focus.

### **Status:**

- Questions that need answers
  1. What materials need to be covered by this umbrella?
  2. What materials are out there, but are difficult to access?
  3. What educational materials are lacking and need to be developed?
- Mike Adams had shared that the Wisconsin DOT library would be able to perform a literature search and assist in developing and distributing a survey for the group free of charge, so the group agreed to proceed through them for Phase I. The literature search completed by Wisconsin DOT. In general, most information obtained showed heavy use of AASHTO AI/RWIS training. Does this provide what is needed? Can we set up some guidance as to what training would be helpful for AI or RWIS (individually)?
- Project mini meeting was held in Salt Lake City. Another is scheduled for Des Moines.
- To date, it has been decided that:
  - A training section will be included under the 'wiki'
  - Include all materials such as power points, hand outs, etc. Each must be dated
  - After materials are collected, answer - "What gaps still exist?"
  - Review TCCC website and Peer Exchange information
  - Each survey respondent will be contacted to see if they are willing to share training materials.

**Approximate % Complete:** 30 %

**Barriers/Issues:** None

**Recommendations:**  X  continue as planned  
    continue with modifications  
    discontinue

### **Additional Comments:**

- This project was funded for \$20,000 in FY 2009
- Project Team: Dawn Gustafson (champion), Max Perchanok, Ralph Patterson, Jeff Tilley, Mike Adams, Bill Hoffman

## Project Status Report

January 7, 2011

**Project:** 2009-05: Further Development of Pavement Precipitation Accumulation Estimation System

**Champion:** Ralph Patterson, Utah Department of Transportation

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**Objective:** The two primary objectives of this project are the utilization of RWIS data within PPAES and the blending of PPAES products produced using different observation platforms.

### **Status:**

- Algorithm Development:
  - Precipitation rate analysis software (that uses both *Clarus* and MADIS surface observations) completed.
  - Blending of radar and surface precipitation occurrence and rate analyses software completed.
  - Visualization software for blended products completed.
  - A model-based virga identification routine was incorporated into the radar and surface precipitation occurrence and rate blending software.
- Validation Activities: Software testing and validation is being performed incrementally as new software modules are developed.
- Challenges Encountered:
  - In the utilization of surface-observation present weather information, determining appropriate weights for the second and/or third type of precipitation, specifically when multiple precipitation types are reported, has been a challenge.
  - Another challenge was designing a routine to appropriately weigh analysis values produced using radar and surface data when blending radar- and surface-observation-based analyses. This is an aspect of PPAES that is actively being tested.
  - We are running into limitations of our present disk storage capacity. We have made a request to the Project Champion to approve purchase of a 2Tb external disk drive in order to allow for the validation to proceed at the planned pace.
- Schedule: During first quarter of 2011: Complete flat terrain testing of the current version of PPAES, including validation (with contingency table-based and summary performance metrics) and subsequent refinement based on the results of the validation. Begin work on software to handle complex terrain issues. This is a task which will involve multiple quarters of work.

**Approximate % Complete:** 25 %

**Barriers/Issues:** None

**Recommendations:**  X  continue as planned  
    continue with modifications  
    discontinue

### **Additional Comments:**

- This project was funded for \$83,000 in FY 2009
- Project Team: Ralph Patterson (champion), Jack Stickel, Dean Kernan, Bill Hoffman

## **Project Status Report**

March 9, 2011

**Project:** 2009-06: Salinity Sensor Improvements and Development

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**Champion:** Tina Greenfield, Iowa Department of Transportation

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**Objective:** The objective of this project is 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.

**Status:**

- It was considered that this project be done with a pooled fund-type scope
- CTRE could complete a survey baring in mind the following questions:
  1. What are the needs?
  2. How will this be used?
  3. What amount of payment would be reasonable?
  4. What quantity would be needed?
- Recent discussions have pointed to the vendor community as the primary force behind this idea.
- Tina Greenfield talked to Monty Mills from PNS, and he said they've not done any work on salinity sensing. He talked to Paul Brown, and both think that industry needs to take the lead.
- The project team considered ideas for this project, but ultimately decided that the vendor community has to address this. Aurora is not well suited for sensor development, but we have mentioned it at the last two Friends of Aurora vendor conferences and will hold it up as an unmet need as far as we are concerned.
- The direction of this project was discussed in Des Moines on September 22, 2010.
- A member of Clear Roads (Cliff Spoonemore) talked to Tina Greenfield in December about reviving the sensor project – Annette or Jason will have to let us know if that project was accepted. If so, we'll have to figure out how to work together on it.
- This project was discontinued.

**Barriers/Issues:** None

**Recommendations:**     continue as planned  
                                   continue with modifications  
                                   discontinue

**Additional Comments:**

- This project was funded for \$50,000 in FY 2009
- Funding was reduced to \$5,000 at the April 2010 board meeting.
- Project Team: Tina Greenfield (champion), Max Perchanok, Dean Kernan, Mike Kisse, Jeff Tilley

## **Project Status Report**

September 22, 2010

**Project:** 2010-01: Enhancements of AI/RWIS CBT

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**Champion:** Tina Greenfield, Iowa Department of Transportation

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**Status:**

- This was the #1 Ranked Peer Exchange Project from 2009.
- A conference call was held in March to discuss this project.
- Lee Smithson and Tina Greenfield are working to get more money funded for the project.
- The team is in the scoping phase for splitting the AI/RWIS CBT and we've held some meetings with GanTek and the other stakeholders about this. The hang-up is money right now. We have a number of changes in mind, but not the funds to do them yet according to the quotes from GanTek.
- Lee Smithson, Steve Lund, and Bill Hoffman presented a resolution (asking permission) at the Summer AASHTO SCOM Meeting this past July in Savannah, to have AASHTO ask State DOT's to Contribute \$3,750 for this CBT enhancement. They should get an answer from AASHTO within the next couple of months.
- A mini-meeting may be necessary in Boulder.

**Approximate % Complete:** 20 %

**Barriers/Issues:** None

**Recommendations:**  continue as planned  
 continue with modifications  
 discontinue

**Additional Comments:**

- This project was funded for \$50,000 in FY 2010
- Project Team: Tina Greenfield (champion), Dawn Gustafson, Dean Kernan, Mike Adams, Max Perchanok, Jeff Tilley, Bill Hoffman
- Partners include Clear Roads and AASHTO representatives as well.

## **Project Status Report**

March 10, 2011

**Project:** 2010-02: Mobile-Weather Data Collection Guidelines

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**Champion:** Curt Pape, Minnesota Department of Transportation

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### **Status:**

- Bill Hoffman has suggested teaming up with the AASHTO equipment group.
- This project is just underway.
- This project is a sister project 2010-04.
- The first step will likely be a synthesis.
- Paul Brown, Clear Roads Chair, will be hosting a vendor workshop at the Clear Roads Winter Meeting in Virginia to discuss how the Vendors will begin working with DOTs on Open Architecture and Open Data Platforms. We should get some very good information on how best to create guidelines for Mobile Weather Data Guidelines.
- A mini-meeting may be necessary in Boulder.

**Approximate % Complete:** 10 %

**Barriers/Issues:** None

**Recommendations:**  continue as planned  
 continue with modifications  
 discontinue

### **Additional Comments:**

- This project was funded for \$25,000 in FY 2010
- Project Team: Curt Pape (champion), Max Perchanok, Dean Kernan, Gabe Guevera, Joe Doherty, Li Fu, Jeff Tilley, Sheldon Drobot

## **Project Status Report**

November 30, 2010

**Project:** 2010-03: Results Based Winter Road Maintenance Standards

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**Champion:** Max Perchanok, Ontario Ministry of Transportation

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### **Status:**

- Three-year agreement is in place for MTO funding, and graduate students are at work.
- Major components:
  - Evaluation and Intercomparison of road surface condition monitoring and prediction tools, and their sampling regimes
  - Modeling of safety and mobility in relation to road surface condition
  - Development of tools to analyze and evaluate the relation between alternative winter maintenance performance standards, and outcomes of safety and mobility.
- Progress in previous 4 months:
  - Development of a cost-benefit framework for the project
  - Development of Road Surface Index and conversion of MTO road report archive to RSI format.
  - Completion of RSI-based analysis on sample Class IV and V highways
  - Expanded weather-road condition-traffic-accident database to 34 Class I and II highways across Ontario
- Change in personnel for mobility component (new grad student)
- Progress in past 4 months:
  - Planning field work and developing instrumentation for winter 2010-11
    - Intercalibration of Haliday, Pon-Cat, Coralba, DSC111, video measurements
    - Calibration of measurement technology to visual RSI and BP reports
  - Initial review of WSI; to account for winter severity in setting performance measures
    - Snow removal performance (RSI or road conditions)
    - Salt management performance (annual salt application)
    - AURORA and MTO-BP index
  - Short term RSI prediction model
  - Working on simple, empirical cost-benefit model prior to developing predictive model.

**Approximate % Complete:** 35 %

**Recommendations:**  X  continue as planned  
     continue with modifications  
     discontinue

### **Additional Comments:**

- This project was funded for \$120,000 in FY 2010
- Project Team: Max Perchanok (Champion), Bill Hoffman, Dawn Gustafson, Joe Doherty, Sheldon Drobot, Neil Hawkins

## **Project Status Report**

March 10, 2011

**Project:** 2010-04: RWIS Sensor Density Grid

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**Champion:** Max Perchanok, Ontario Ministry of Transportation

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**Status:**

- This project is new for FY 2010.
- The team is planning a kickoff meeting.
- One approach may be to have InTrans staff do a literature review.
- A mini-meeting has been scheduled for the Boulder board meeting.

**Approximate % Complete:** 5 %

**Barriers/Issues:** None

**Recommendations:**  continue as planned  
 continue with modifications  
 discontinue

**Additional Comments:**

- This project was funded for \$100,000 in FY 2010
- Project Team: Max Perchanok (champion), Jack Stickel, Ralph Patterson, Dawn Gustafson, Sheldon Drobot, Mike Adams, Jason Norville, Dean Kernan, Tina Greenfield

## **Project Status Report**

September 22, 2010

**Project:** 2010-05: Determining RPU and Sensor Failure

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

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**Status:**

- This project is new for FY 2010.
- The team is scheduling a meeting to coordinate the approach.

**Approximate % Complete:** 5 %

**Barriers/Issues:** None

**Recommendations:**  continue as planned  
 continue with modifications  
 discontinue

**Additional Comments:**

- This project was funded for \$5,000 in FY 2010
- Project Team: Jack Stickel (champion), Ralph Patterson, Tina Greenfield, Jason Norville, Sheldon Drobot

## **Project Status Report**

March 9, 2011

**Project:** 2011-01: Third Peer Exchange

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**Champion:** Tina Greenfield, Iowa Department of Transportation

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**Background:** 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, information and research results sometimes do 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. Therefore, the objective of this project is to conduct a National winter maintenance meeting for Aurora, Clear Roads, SICOP, PNS and the FHWA to share research results from the Peer Exchanges held in 2007 and 2009, 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.

**Status:**

- This project is new for FY 2011.
- Lee Smithson is scheduling a meeting to coordinate the approach.
- The event will be held in September 2011.

**Approximate % Complete:** 55 %

**Barriers/Issues:** None

**Recommendations:**  continue as planned  
 continue with modifications  
 discontinue

**Additional Comments:**

- This project was funded for \$30,000 in FY 2011.
- Aurora, Clear Roads, PNS, SICOP and FHWA would be equal partners in developing the agenda for the multi-day meeting.
- Project Team: Tina Greenfield (champion), Bill Hoffman, Dawn Gustafson, Dean Kernan

## **Project Status Report**

February 7, 2011

**Project:** 2011-02: RWIS Training Tool

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**Champion:** Tina Greenfield, Iowa Department of Transportation

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**Background:** It is often the case across states and even within states that winter maintenance supervisors or foremen do not have a consistent understanding of RWIS and weather information in real-world decision making. Training may be administered but it is difficult to determine how much is retained, whether understanding was reached, and which parts of the training were successfully integrated into decision making practice. Therefore it is difficult to assess supervisor/foremen competency and it is difficult to tailor training to their needs. This is especially a problem when hiring new staff or hiring contractors because there are few tools to evaluate their ability to perform as required. This project involves the creation of a supervisor evaluation tool which can measure a supervisor's ability to incorporate RWIS and risk management into their decision making process.

**Status:**

- This project is new for FY 2011.
- This project is estimated to last 3 years.
- A draft scope/concept drawing was sent to the team for review. Tina needs their comments so we can get the project going.

**Approximate % Complete:** 5 %

**Barriers/Issues:** None

**Recommendations:**  continue as planned  
 continue with modifications  
 discontinue

**Additional Comments:**

- This project was funded for \$200,000 in FY 2011.
- Project Team: Tina Greenfield (champion), Dean Kernan, Bill Hoffman, Max Perchanok, Sheldon Drobot

## **Project Status Report**

October 29, 2010

**Project:** 2011-03: Benefit/Costs and Instruction for Migrating to Open RWIS

**Champion:** Tina Greenfield, Iowa Department of Transportation

**Background:** The objective of this project is to create a do-it-yourself guide for RWIS sensors, servers, data bases, web displays, etc. This project concept could possibly be added as an extension to the 2009-03 Wiki database project.

**Status:**

- This project is new for FY 2011.

**Approximate % Complete:** 5 %

**Barriers/Issues:** None

**Recommendations:**  continue as planned  
 continue with modifications  
 discontinue

**Additional Comments:**

- This project was funded for \$75,000 in FY 2011.
- Project Team: Tina Greenfield (champion), Ralph Patterson, Bill Hoffman, Dawn Gustafson, Jack Stickel

## **Project Status Report**

October 29, 2010

**Project:** 2011-04: Study of MDSS Costs

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**Champion:** Mike Adams, Wisconsin Department of Transportation

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**Background:** This project concept was presented as a concern at the 2009 Peer Exchange and ranked at #9 among those ideas. The objective of this effort is to determine the upfront costs vs. long-term benefits for implementing MDSS systems. Also, determine necessary equipment, how to best equip the trucks, and quantify secondary benefits of equipping the fleet for MDSS. Initially this project will require a survey of the states. Aurora will team up with Clear Roads and MDSS Pooled Fund to realize this project's goals.

**Status:**

- This project is new for FY 2011.
- This project was funded for \$20,000.

**Approximate % Complete:** 5 %

**Barriers/Issues:** None

**Recommendations:**  continue as planned  
 continue with modifications  
 discontinue

**Additional Comments:**

- This project was funded for \$20,000 in FY 2011.
- Project Team: Mike Adams (champion), Mike Kisse, Jason Norville, Sheldon Drobot

## **Project Status Report**

October 29, 2010

**Project:** 2011-05: Funding Sources Identification

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

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**Background:** Road weather management programs and Road Weather Information Systems (RWIS) can tap into various federal funding sources. This includes standard funding allocations and grant allocations. These sources are not well known to all agencies. This project will compile potential funding sources and approaches that state department of transportation agencies can tap to fund the road weather management program. This would include funding partnerships, grants, standard allocations, and shared cost opportunities.

**Status:**

- This project is new for FY 2011.
- This project was funded for \$5,000.
- This will involve surveying the Aurora member agencies on the funding sources they use, how to tap into them, and the processes they use to secure the funding
- The resulting document would be posted on the Knowledge Base web site.

**Approximate % Complete:** 5 %

**Barriers/Issues:** None

**Recommendations:**  continue as planned  
 continue with modifications  
 discontinue

**Additional Comments:**

- This project was funded for \$5,000 in FY 2011.
- Project Team: Jack Stickel (champion), Joe Doherty, Bill Hoffman