DRISI
CALTRANS DIVISION OF RESEARCH, INNOVATION AND SYSTEM INFORMATION
TRANSFORMING IDEAS INTO SOLUTIONS

Research Notes

Aurora Program – Pooled Fund Study – TPF-5(435)

Aurora Road Weather Information System (RWIS) Pooled Fund Study (PFS).

Rural

MAY 2025

Project Title:
Road Weather Information System (RWIS) Research

Task Number: 3241

Start Date: January 1, 2019

Completion Date: December 31, 2026

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WHAT IS THE NEED?

California Department of Transportation (Caltrans) has over 100 Road Weather Information System (RWIS) installations statewide that are deployed for many purposes, such as automated fog, ice, and wind warnings; for traveler info online (on QuickMap); and for planning winter maintenance and other roadwork. The Aurora Program is a technical-focused Pooled Fund Study (PFS) working on RWIS issues.

WHAT ARE WE DOING?

The Aurora Program is a consortium of public agencies focused on collaborative research, evaluation, and deployment of advanced RWIS that fully integrate state-of-the-art roadway and weather forecasting technologies with coordinated multi-agency weather monitoring infrastructures. Aurora's research projects are designed to improve the efficiency of highway maintenance operations and distribute effective real-time information to travelers. Its initiatives are expected to result in technological advancement and improvement of the existing RWIS, significantly reducing the adverse impacts of inclement weather on mobility. Caltrans Division of Traffic Operations and the Rural Program Steering Committee are supporting this effort.

Pooled Fund Information

- Iowa DOT – Lead State for Pooled Fund Study (PFS)
- 19 Participating State Department of Transportations
- Full Members: Alaska DOT&PF, Arizona DOT, California DOT, Colorado DOT, Delaware DOT, Illinois DOT, Iowa DOT, Kansas DOT, Maine DOT, Michigan DOT, Minnesota DOT, Missouri DOT, New York State DOT, North Dakota DOT, Ohio DOT, Pennsylvania DOT, Utah DOT, Virginia DOT, Washington State DOT, Wisconsin DOT.

Caltrans

DRISI provides solutions and knowledge that improves California's transportation system.

- Associate Members: FHWA, Goteborg University, InTrans at Iowa State University, MIT, Meteorological Service of Canada, National Center of Atmospheric Research, Ohio University, Penn State, Purdue University, Swedish Meteorological and Hydrological Institute, University of Minnesota-Duluth, University of North Dakota, University of Utah, University of Waterloo, University of Wisconsin-Madison & Milwaukee, and WTI at Montana State University.
- Caltrans committed $125,000 over 5 years:
  - FY 2018/2019 $25,000
  - FY 2019/2020 $25,000
  - FY 2020/2021 $25,000
  - FY 2022/2023 $25,000
  - FY 2023/2024 $25,000

WHAT IS OUR GOAL?

The program's mission is to support cooperative research, evaluation, and deployment of innovative technologies that advance road weather monitoring and forecasting in highway design, construction, maintenance, and operations and to serve as an international advocate for expanded uses of these technologies.

Six primary goals are:

1. To improve dissemination of road weather information to transportation providers and end users, ultimately increasing safety by reducing potential weather-related incidents and improving transportation safety, reliability, and mobility in both urban and rural areas.
2. To improve the efficiency of maintenance operations.
3. To aid in the development of technologies that seamlessly integrate to facilitate the formation of partnerships between maintenance and operations and facilitate the dissemination of road weather information.
4. To develop initiatives that assist public agencies in deploying RWIS technologies and methodologies.
5. To encourage greater cooperation and information exchange between transportation agencies and other agencies and groups.
6. To support the development of expanded uses of RWIS technologies.

WHAT IS THE BENEFIT?

- Caltrans involvement allows input on national standards, development, and implementation (device and communication).
- Caltrans will learn best practices from other states.
- Caltrans will be able to influence which studies are conducted, making California's priorities known.

WHAT IS THE PROGRESS TO DATE?

Recently Completed Research in 2024:

- Optimal RWIS Sensor Density and Location – Phase 4; https://www.aurora-program.org/research/completed/optimal-rwis-sensor-density-and-location-phase-4/
- Road Weather Management Using Connected Vehicle Technology; https://aurora-program.org/research/completed/road-weather-management-using-connected-vehicle-technology/
- Assessment of Connected Vehicle Friction Measurement Data on DOT Winter Maintenance Use Cases; https://aurora-program.org/research/completed/assessment-of-connected-vehicle-friction-measurement-data-on-dot-winter-maintenance-use-cases/
- Integration of Connected Vehicle and RWIS Technologies; https://aurora-program.org/research/completed/integration-of-connected-vehicle-and-rwis-technologies/

- Roadway Ice/Snow Detection Using a Novel Infrared Thermography Technology; https://aurora-program.org/research/completed/roadway-ice-snow-detection-using-a-novel-infrared-thermography-technology/
- Evaluation of Spring Load Restriction (SLR) Removal Protocols; https://aurora-program.org/research/completed/evaluation-of-spring-load-restriction-removal-protocols/

Research in Progress:

- Roadway Friction Forecasting Using Stationary And Mobile Friction Data; https://aurora-program.org/research/in-progress/roadway-friction-forecasting-using-stationary-and-mobile-friction-data/
- An Intelligent Human-Centric Communication System for Adverse Weather and Road Conditions; https://aurora-program.org/research/in-progress/an-intelligent-human-centric-communication-system-for-adverse-weather-and-road-conditions/
- Standardized Framework for Winter Weather Road Conditions Indices; https://aurora-program.org/research/in-progress/standardized-framework-for-winter-weather-road-condition-indices/
- Automating Variable Speed Limits Using Weather, Traffic, and Friction Data; https://aurora-program.org/research/in-progress/automating-variable-speed-limits-using-weather-traffic-and-friction-data/
- Real User Friction for Winter Maintenance Operation and Evaluation; https://aurora-program.org/research/in-progress/real-user-friction-for-winter-maintenance-operation-and-evaluation/

WEBSITES

- https://www.pooledfund.org/Details/Study/658
- http://www.aurora-program.org/

IMAGES

Image 1: AURORA Logo.

Image 2: Aurora Website – RWIS Life Cycle Cost Analysis.

Image 3: Aurora Website – Non-Invasive Sensor Deployment in Aurora Member States.