

# DRISI

CALTRANS DIVISION OF RESEARCH,  
INNOVATION AND SYSTEM INFORMATION

# Research Notes

Rural

MAY 2024

Project Title:  
Connected Vehicle Highway Grip  
Factor Reporting to Snowplows

Task Number: 4149

Start Date: February 2024

Completion Date: April 2026

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## TPF-5(494) Connected Vehicle Highway Grip Factor Reporting to Snowplows

Snowplows using real-time RWIS data will enhance road conditions and reduce costs

### WHAT IS THE NEED?

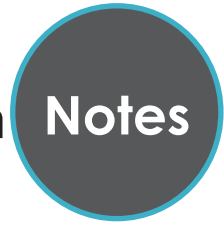
D2 Maintenance staff uses publicly available weather data from multiple sources and reconnaissance to determine the rate, volume, and when to apply surface treatment chemicals to the road during inclement weather. In many cases, there is a significant delay between when the current weather is observed and when field crews travel to the site to apply the surface treatment. The delay can lead to a judgment call by field staff as to how to augment the surface treatment to fit existing conditions. Judgment by field staff is subject to error, resulting in under-treated roads and unsafe conditions or over-treated roads and unnecessary expense. For example, District 2 spends approximately \$2.5 million per year applying surface treatment to the roadway. If District 2 knew when and how much treatment to apply strategically, better coverage and lower costs could result. Road Weather Information System (RWIS) station out of pavement surface sensors can measure the frictional characteristics of the State Highway at spot locations. Caltrans needs to communicate highway surface status conditions to Field Maintenance staff in real-time in rural areas where communications are unavailable to reduce the uncertainty of highway surface treatment applications.

### WHAT ARE WE DOING?

We will procure, install, operate, and evaluate two Advanced Safety Warning System Controllers (ASWSC) – previously developed by DRISI, two connected vehicle road-side units (RSUs), and two connected vehicle on-board units (OBUs) in District 2. A connected vehicle module will be developed for



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the ASWSC to integrate communications and interface the ASWSC and the RSU/OBU. The ASWSC controllers will be installed at Road Weather Information System (RWIS) stations located on remote State Highways in mountainous terrain that experience heavy snow and icy conditions annually. The OBUs will be installed in Maintenance supervisor vehicles and snowplows within the maintenance jurisdiction of the respective RWIS stations. Surface conditions will be monitored in real-time by the ASWSC and reported to the passing Maintenance vehicle via the RSU/OBU as it passes by the ASWSC. This project will evaluate the procurement, construction, installation, integration, operation, and maintenance processes of two selected sites in winter-impacted rural regions of the state.

## WHAT IS OUR GOAL?

To improve the efficiency of highway surface treatment best practices during winter operations. Communicating accurate and timely surface condition information to Field Maintenance will greatly improve the ability of Field Maintenance staff to make informed decisions and better predict the spread rate, volume, and timing of the surface treatment needed during inclement weather.

## WHAT IS THE BENEFIT?

Timely and accurate highway surface condition reporting provided directly to the field staff applying the surface treatment will result in more accurate surface treatment applications ultimately saving the department money and improving the safety of our roads.

## WHAT IS THE PROGRESS TO DATE?

The technical advisory panel is soliciting scope of work statements from research teams. We are anticipating a start work date of February 2024.

- Montana State University was selected as the research institute with assistance from Iowa State.
- Details of the research are being put together and SOW is being finalized.
- This research will leverage prior (Automated Safety Warning System Controller) ASWSC research as well as current Multi-Model Intelligent Traffic Signal System (MMITSS) pilot study.