Rural

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Project Title:
Connected Vehicle Highway Grip Factor Reporting to Snowplows

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

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?

California District 2 (D2) Maintenance staff uses publicly available weather data from multiple sources and reconnaissance to determine the rate, volume, and best time to apply surface treatment chemicals to the road during inclement weather. In many cases, there is a significant delay from start of snow accumulation to the time the field crews travel to the site to apply the surface treatment. This is due to the lack of rural TMS network communication. Once on site, crews use stale data to determine the amount of treatment to apply to the road. As a safety precaution, crews often overtreat the road resulting in unnecessary expense. District 2 spends approximately $2.5 million per year applying surface treatment to the roadway. If District 2 snowplow operators have more accurate and real-time road surface conditions, better coverage and lower costs could result. Road Weather Information System (RWIS) out-of-pavement surface sensors can measure the frictional characteristics of the State Highway at spot locations. The California Department of Transportation (Caltrans) needs to communicate highway surface status conditions to Field Maintenance staff in real-time and locally in rural areas where network 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 the Division of Research, Innovation and System Information (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 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 realtime 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 in the first quarter of 2025.

- 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) ASWS research as well as current Multi-Model Intelligent Traffic Signal System (MMITSS) pilot study.
- The two software code bases and hardware integration will be done in house at the METS lab.
- A group of Sac State students have been selected to merge the two software code bases as their senior project.