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MAY 2026

Project Title: TPF-5(520), Improving Traffic Detection Through New Innovative i-LST Technology Demonstration Pilot

Task Number: 4508

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Transportation Pooled Fund (TPF)-5(520), Improving Traffic Detection Through New Innovative i-LST Technology Demonstration Pilot

A demonstration of inductive Loop Signature Technology (i-LST) in various corridors to show new, effective, and comprehensive data collection methods.

WHAT IS THE NEED?

The need is to gain first-hand experience, knowledge, and practices in utilizing signature technology to improve the California Department of Transportation (Caltrans') traffic monitoring program. This research provides the ability to model and project vehicle routing and demand.

Current traffic monitoring practices primarily focus on counting the number of vehicles, classifying vehicles by length or axle arrangement, and weighing vehicles. Additional critical information such as body type (tractor and/or trailer) is not readily captured due to technology limitations. However, body type data and information are vital for goods movement and freight analysis as different commodities are transported by different vehicles. For example, perishables and other temperature-sensitive goods are carried by the so-called reefer, a sealed trailer with a refrigerated unit to keep the truck contents at a cooled temperature. Liquids and gases are typically transported by tanker trucks. Flatbed trailers have open decks with no roofs or sides, offer the greatest flexibility to carry not only oversized goods but also a wide range of other freight. Intermodal trucks carry standardized ocean containers. Dry freight trailers provide significant protection to the freight being moved from both inclement weather and other detrimental effects. In addition to the body type identification challenge from current traffic monitoring technologies, current practices also miss the highly desired data regarding the travel time and on/off points where vehicles enter or exit a roadway network, such as where and when a given truck enters or exits a particular



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highway. Information like this is vital to modeling and projecting vehicle routing associated with demand analysis.

WHAT ARE WE DOING?

Caltrans, in partnership with the Federal Highway Administration (FHWA), is conducting a traffic monitoring technology demonstration project. The project will enable participating agencies to gain additional data and information (e.g., detailed 100+ vehicle classifications and trailer body types, freight network travel characteristics) on top of the traditional counts and axle-based classification information. No physical roadway activities are needed. Caltrans is an agency with networks and freight corridors covering both Interstate and other functional class roadways where inductive loop sensors are used as the existing traffic monitoring method.

This new technology relies on capturing high-resolution inductive loop signals from existing inductive loop sensors and then characterizing these high-resolution signals (signature) to obtain vehicle class, vehicle speed, vehicle and trailer body type, and on/off highway network point identifications. Corridors will include both Interstates and interconnected roadways to ascertain the full picture of travel patterns along routes and between routes.

WHAT IS OUR GOAL?

Caltrans' goal is to obtain a product which is a demonstration of a software application technology that provides new data about freight vehicles. Caltrans looks to see a demonstration of loop signature technology (i-LST) over various corridors across the United States to show the application of new, effective, and comprehensive data collection methods.

The conclusion of this research will provide additional options for enhancing the current detection sensors for truck data by improving quality and accuracy of

identifying truck types and classes. Implementation will include a distribution of the information gathered from this research that can be used at the district level. The dissemination of information may be completed within one year after research is completed.

WHAT IS THE BENEFIT?

Benefits include the following:

- New Data – in addition to gaining all the traditional loop data items, new data such as these listed below will also be provided:
 - Specific vehicle class data – meeting the needs of freight analysis.
 - Travel time – true corridor level reliability by vehicle type.
 - Vehicle on and off points for roadway systems – benchmarking data for travel demand modeling and analysis.
 - Slow speed scenario data (congestion) – gaining information otherwise not collected.
- Gaining first-hand experience, knowledge, and practices in utilizing signature technology
- Showcasing California's transportation practices to other agencies throughout the nation with peer-exchanges

WHAT IS THE PROGRESS TO DATE?

The team continued to work on the project and have completed all remaining deployments. The team began working on the data collection portion of the project with monthly data submittals. Data has been submitted for operating sites for December 2025, January 2026, and February 2026. The team has requested additional monthly data from deployment states with an alternate method of collecting classification data (i.e. piezos, Weigh in Motion, etc.). February 2026 data has been submitted for eight states so far.

A quarterly Technical Advisory Committee (TAC) meeting was held in February during which a project update was reported to the TAC members. During the meeting, the next stage of the project – data collection – was discussed with the TAC members. States with i-LST deployments were polled about their data collection processes. Additional data needs were discussed with these states. This was followed by a presentation by CLR Consulting Group about outputting monthly data in the Traffic Monitoring Guide (TMG) format in VSign. FHWA provided an update on Travel Monitoring Analysis System (TMAS) 3.0. Lastly, upcoming travel opportunities were discussed.

Dates were selected for the Type II Peer Exchange (April 21) and Type I Peer Exchange #1 in Austin, Texas (June 4). Save the dates were sent out for those events along with the National Travel Monitoring Exposition and Conference (NaTMEC) Group Demonstration/Workshop. Signups were tracked and based on the responses, the Type II Peer Exchange will be virtual only and the Type I Peer Exchange #1 will be both virtual and in-person. An agenda for the Workshop and second Group Demonstration at the NaTMEC was drafted. The agenda for the Type II Peer Exchange is currently being drafted. Denver was identified as a potential state for the second Type I Peer Exchange. The Colorado Department of Transportation (DOT) was contacted and has agreed to host the event.

After receiving comments, the Site Selection Report and the Technology Flyer were finalized. The Technology Flyer was sent out to members of the TAC after the Quarter 1 (Q1) TAC meeting in February.

IMAGES

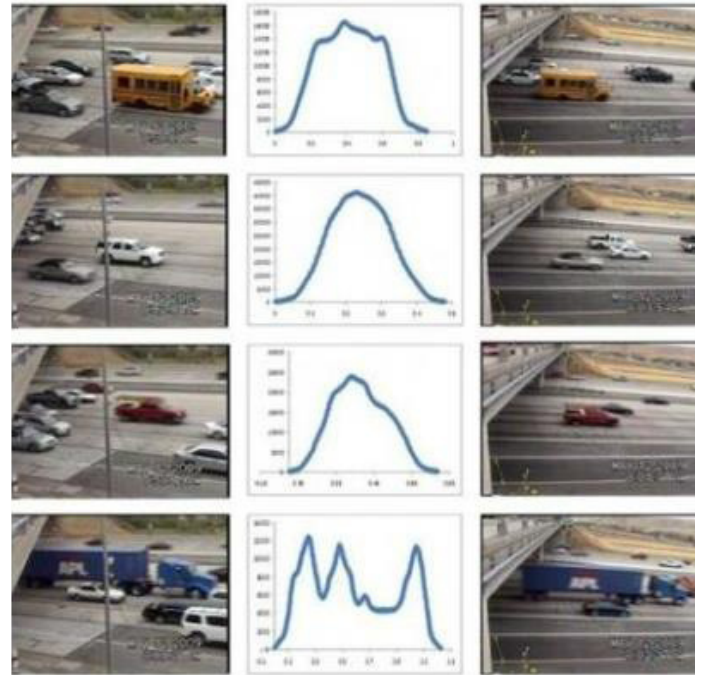


Image 1: Representative view of an electronic signature by vehicle type.