

Modal

MAY 2026

Project Title: Survey: Establishment of a Public-Private Transportation Data Exchange Center

Task Number: 4512

Start Date: December 1, 2024

Completion Date: November 30, 2028

Task Manager:

Akm Islam
Transportation Engineer Electrical
Akm.Islam@dot.ca.gov

DRISI Division Chief:

Prakash Sah, PE
Prakash.Sah@dot.ca.gov

TPF-5(539) Establishment of a Public-Private Transportation Data Exchange Center

Develop framework for improving users' equitable access to, and experience of, payment across all modes of transportation.

WHAT IS THE NEED?

State Department of Transportations (DOT) across the country are paying third-party vendors to provide traffic data from their own roadways. The data is costly, and the source of the data is not verifiable. An entire industry is emerging that increasingly perceives DOTs as their primary financial source. Currently, a significant number of vehicles are equipped with sensors, cameras, and in some cases Light Detection and Ranging (LiDAR) technology, which have the capability to provide DOTs accurate information pertaining to vehicular movements on our roadways. This information is currently retained by the Original Equipment Manufacturers (OEMs). If this information was shared with the departments of transportation, it could lead to a safer and more efficient system for their users. Cooperative efforts by a consortium of state entities to facilitate this data exchange could yield substantial benefits for the DOT, the OEMs, but most importantly the people driving on the roadways.

In funding this project, the California Department of Transportation (Caltrans) will be an advocate for industry standardization of data which will make data more available and accessible. This should result in more interoperable data being available for Caltrans that should save costs of procuring complex custom solutions.

WHAT ARE WE DOING?

The project will have two phases. The final scope of work will be determined by the member states.

Phase 1 – Duration 1 year: At the core of this phase is the development of a shared computing infrastructure that will



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

be used to demonstrate the ability to securely ingest, integrate, store, and analyze multi-sourced data to support the safe and reliable operations of the United States (US) highway system. This phase is intended to build rapport and trust for seamless exchange of data and information between DOTs and OEMs. Three main tasks will occur during phase 1.

1. Explore existing DOT Infrastructure and data to identify potential opportunities that could create value for OEMs and their customers.
2. Develop a shared computing platform that can be used to securely load, store, and analyze datasets streaming from vehicular and infrastructure-mounted sensors.
3. Organize forums and focused group meetings that will showcase products resulting from pilot projects and gather feedback from OEMs to improve these products.

The initial set of data identified as being of primary interest includes geometry data detailing areas with sharp turns and increased inertia, hard-breaking locations, road condition data highlighting irregularities like potholes, environmental data indicative of weather conditions (e.g., usage of windshield wipers) and videos capturing retro-reflectivity of markers and signs, among others. To ensure the collection of the most pertinent data, a brainstorming session will be held with member states to identify the most valuable data to request.

Phase 2 – Duration 3 years: Phase 2 will begin with the strategic engagement and recruitment of OEMs, with an aim to collaborate with 2 to 3 partner OEMs. This phase will involve a series of focused tasks designed to enhance the collaboration and efficacy of the data exchange between all parties involved. The key activities planned include:

- Organize regular meetings with all stakeholders including agencies, academia, industry/OEMs and an advisory panel to ensure cohesive communication and alignment of project objectives.

- Propose, select, and launch projects will be proposed, selected, and initiated with a focus on those areas that would benefit most from this new data exchange. These projects will serve as testbeds for applying the new insights derived from the shared data.
- Build and make accessible a suite of data analytics tools and models that permit data sharing, integration, and analysis, ensuring privacy preservation and providing verifiable provenance information.
- Develop the framework for an ongoing data exchange system, however ongoing maintenance of the system will not be part of this pooled fund.

WHAT IS OUR GOAL?

The goal of the project is to develop a secure computing, data analytics, and storage infrastructure with a data repository (data warehouse or data lake) that will collect all relevant vehicle data as well as other types of data (including environment data, weather data, among other sources) and share the data with DOTs for data analyses without any identifying information attached to improve transportation decision-making. In supporting this project, Caltrans may be able to access data in a standardized manner that would otherwise require a costly customized solution.

WHAT IS THE BENEFIT?

This will work towards increasing the availability and accessibility of various types of data that state DOTs are interested in using. In doing so, it may reduce the cost to state DOTs due to standardized data and products.

WHAT IS THE PROGRESS TO DATE?

The Public Private Transportation Data Exchange Center successfully transitioned from strategic planning to active operational development. The research team finalized formal data sharing



agreements with NIRA Dynamics and Compass IOT, enabling the launch of critical pilot projects. Specifically, the research team initiated a four month pilot in Missouri using Compass IOT applications for the City of St. Louis and began planning a New Jersey DOT pilot focused on real time tire grip and road surface condition data. Furthermore, the research team expanded direct outreach to major manufacturers, moving into structured engagement with Volkswagen (VW). After conducting a comprehensive survey of member DOTs to catalog available data assets, the research team delivered a "Data Resource Catalog" to VW and drafted a dedicated legal framework to govern reciprocal data sharing.

On the technical front, the research team significantly enhanced its generative Artificial intelligence (AI) powered analytics platform to improve the actionability of connected vehicle data. The system was upgraded with advanced visualization capabilities, allowing it to move beyond text based responses to automatically generate complex plots and spatial visualizations from large scale datasets. These refinements ensure that natural language queries from member DOTs result in more accurate and intuitive representations of traffic patterns and vehicle behavior. The research team also initiated development of a scalable data exploration platform designed to efficiently manage and analyze the high volume telemetry data received through new third party partnerships.

The research team's immediate next steps include formalizing the partnership with VW by initiating the legal review of the drafted data sharing agreement. The research team will also launch the New Jersey DOT pilot to demonstrate how NIRA Dynamics' friction data can support winter maintenance operations and roadway safety monitoring. Additionally, the team will continue stress testing the AI platform's new visualization features using real world datasets, focusing on the seamless integration of crash, weather, and friction data into a unified analytical environment.