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MAY 2026

Project Title: ADA Van as Tech Demonstrator for Disabled Travelers

Task Number: 4290

Start Date: March 1, 2024

Completion Date: February 28, 2026

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ADA Van as Tech Demonstrator for Disabled Travelers

This project develops an Americans with Disabilities Act (ADA) van to create high-definition (HD) maps, test precise Global Navigation Satellite System (GNSS), and demonstrate vehicle-to-cloud (V2C) work zone warnings.

WHAT IS THE NEED?

The California Department of Transportation (Caltrans) Division of Research, Innovation and System Information (DRISI) deserves to assume a leading position in transit automation, automated driving, connected automated vehicles (CAV), connected infrastructure, and vehicle communication (V2X). Presently, DRISI owns the connected infrastructure testbed at El Camino Real in Palo Alto, and is effectively working on utilizing it and demonstrating the benefits of the connected environment. The ADA Van project is driven by the need for a specialized platform to showcase and advance intelligent transportation technologies, particularly focusing on accessibility for individuals with disabilities and benefiting the broader transportation network. The project aims to create a "technology demonstration platform" for testing and exhibiting various sensor and software combinations in real-world scenarios. The project will contribute to developing intelligent transportation systems (ITS) with a focus on HD maps, high-precision GNSS, and V2C applications, all crucial for the advancement of connected and automated vehicles, improving transportation services, and enhancing the overall user experience. The ADA Van will serve as a mobile "mini-lab" for conducting advanced research and will specifically incorporate features designed to improve accessibility for individuals with disabilities, including precise vehicle localization for ramp deployment, automated vehicle location reporting for paratransit services, and a user-centric informational trip assistant. The project fosters collaboration and knowledge sharing between UC Berkeley PATH (Partners for Advanced Transportation Technology) and Caltrans DRISI, aligning research with practical needs, and promoting the adoption of innovative transportation solutions.

The fundamental need is for Caltrans DRISI to take the lead



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

nationally in emerging transportation technologies like transit automation, CAV, connected infrastructure, and V2X.

The ADA Van project is essential because it provides a specialized, mobile platform for immediately showcasing and testing intelligent transportation systems in real-world environments. This platform specifically focuses on improving accessibility for travelers with disabilities (such as precise ramp deployment and automated location reporting for paratransit). By creating this “mini-lab on wheels,” DRISI can develop critical ITS elements like HD maps, high-precision, and V2C applications, which are vital for safer, more efficient automated vehicles and a better overall user experience. This project also strengthens the partnership with UC Berkeley PATH, ensuring research directly meets practical state needs.

WHAT ARE WE DOING?

UC Berkeley PATH will build a connected and automated bus that will be a lab on wheels for conducting a wide variety of cutting-edge experimental research in the areas of transit safety, safety of vulnerable road users (VRU), transit automation, V2X, user experience, AI applications for transportation (e.g., shared perception), air quality measurement, mobile drone platform, mobile access point in emergency scenarios. This bus will be built in cooperation with the Saxton Transportation Operations Laboratory (STOL), which is developing the CARMA platform (<https://highways.dot.gov/research/operations/CARMA-products>) – the brains for CAVs. The lab bus will be operated using CARMA.

The initial 18-month project involving the lab bus will include: 1) VRU protection at intersections and shared perception – augmentation of onboard sensing with information from infrastructure and informing infrastructure about the surrounding environment; 2) Cloud-based Conditional Transit Signal Priority (C-TSP), where the El Camino Real signals will receive GTFS-RS messages with bus locations and passenger counts; 3) Driver

experience study at the intersections with and without VRU presence warnings.

WHAT IS OUR GOAL?

The primary goal of the ADA Van project is to establish a technology demonstration platform where different combinations of sensors and software modules can be used for various intelligent transportation applications. This platform, in the form of an ADA-compliant van, will serve as a “mini-lab on wheels” for conducting a range of advanced experimental research in areas like CAV, paratransit and micro-transit automation, disabled traveler assistance, and user experience. The van’s capabilities will be demonstrated in controlled environments, such as GoMentum Station testbed, as well as on real city streets and California highways. The project aims to showcase the benefits of HD maps, high-precision GNSS, and V2C technologies in areas such as safety, traffic management, transit, and curb management.

WHAT IS THE BENEFIT?

- This project is a perfect complement to the El Camino Real Testbed, in which Caltrans invested for 17 years: together, they will demonstrate the value of connected infrastructure to transit buses and the technology bridge for cooperation between cities and transit agencies. Cities provide connected infrastructure that enhances transit safety and reliability, while transit collects and shares data that is valuable for cities – curb usage, violations, hazard hotspots.
- The lab bus is a vehicle for making DRISI an innovation leader nationwide – it would demonstrate creative thinking and vision of the management.
- One investment with significant benefits for several research areas: multimodality, safety, traffic operations, advanced research, and future research – e.g., air quality, drone applications, emergency response.

- It will be an attractor for the external (e.g., federal) funding and an enabler for partnerships, where DRISI will be a central player.
- It has the potential to be a perfect promotional and showcasing tool, enabling live, as opposed to PowerPoint, demonstrations.

WHAT IS THE PROGRESS TO DATE?

The project is in its final stage, with nearly all tasks completed.

Van instrumentation is fully operational. The team tested and identified a reliable solution using high-end stereo cameras with USB streaming and onboard geotagging, which has been installed in the van. Final hardware specifications are being finalized. The HD mapping software has advanced significantly – detected objects are now overlaid directly on the map, with accurate identification of work zone elements. Development continues to expand detection coverage to cones, signs, road markings, pedestrians, equipment, curbs, parking areas, vehicle counts, and road conditions, supporting applications in work zone safety, traffic monitoring, curb management, and asset tracking.

Cloud-based ITS integration, including Work Zone warning (Task 5), Automatic Vehicle Location (AVL) reporting via GTFS-flex (General Transit Feed Specification; Task 6), and use case documentation developed in coordination with Caltrans DRISI (Task 7), are all complete.

The only remaining work is the final demonstration of use cases (Task 8) – presenting the integrated system capabilities across safety, traffic management, transit, and curb management scenarios.

The project remains on time, on budget, and on scope.