
Overview of California Connected Vehicle Testbed

**Presented By
Ben McKeever, UC Berkeley PATH
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Agenda

- **History**
- **Technical Description**
- **Ongoing Research**
- **Support for Industry Partners**
- **Future Plans**

Testbed Beginnings

- **Established in 2005 by Caltrans, Metropolitan Transportation Commission and PATH in Palo Alto**
 - **First dedicated short-range communications (DSRC) testbed in U.S. that was locally funded**
 - **5 intersections on El Camino Real (ECR) equipped with Denso 5.9GHz roadside units (RSUs)**
- **Allowed for Vehicle-to-Infrastructure (V2I) Testing in a real world environment**
 - **Early users included Daimler, VW and Toyota**
 - **Early use cases included red-light violation warning, traveler information, probe data, in-vehicle signage**

2014 Testbed Upgrade

- **Expanded to 11 intersections on El Camino Real**
 - **Connected to new state-of-the-art Type 2070 traffic signal controllers**
 - **Broadcast signal phase and timing (SPaT) and MAP messages over DSRC**
 - **4G LTE backhaul**
- **Supported by USDOT**
 - **Complies with latest Connected Vehicle (CV) standards**
 - **Part of USDOT's network of Affiliated CV Testbeds**

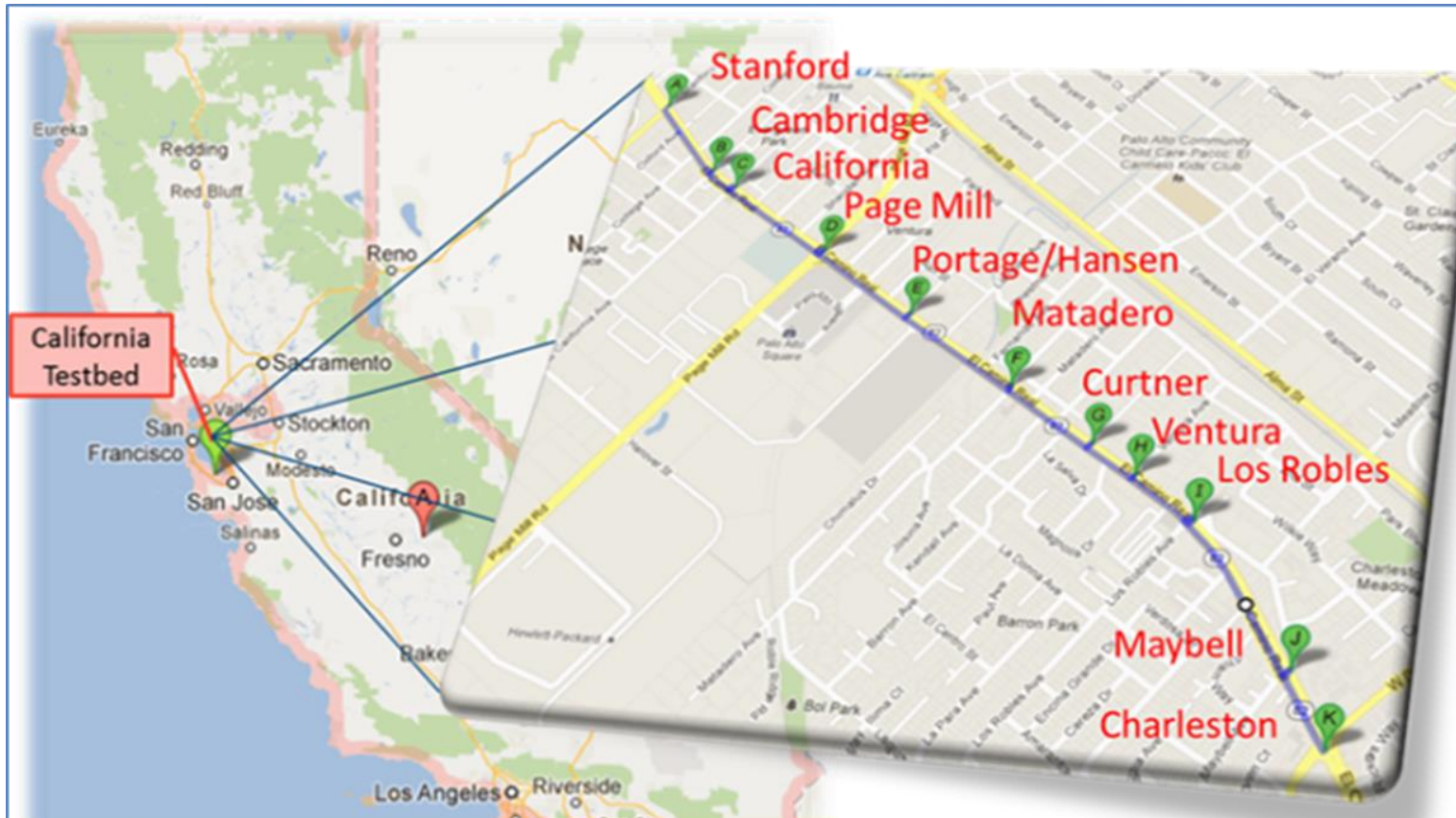


- **DSRC Radio**
- **DSRC Antenna**
- **Processor**
- **Network switch**
- **4G Backhaul**



Current California CV Testbed

- **11 DSRC intersections covering 2 miles of ECR**
 - Near OEM research facilities, tech companies, start-ups
 - ECR carries over 60,000 veh/day with busy transit routes



Current California CV Testbed



Ongoing CV Research

- **Multi-modal Intelligent Traffic Signal System**
 - Supports emergency vehicles, transit, freight and pedestrians at intersections
- **CV Pilot Deployment Project**
 - Expansion and upgrade to 17 intersections (new RSUs provided by USDOT)
 - Connection to USDOT's Security Credential Management System
 - Broadcast position correction messages
 - Enhanced CV applications including transit signal priority and eco-approach and departure
 - Partner with VTA to equip buses and test applications

Testbed Maintenance and Support

- **Provided by PATH through multi-year Caltrans contract**
 - **Web-based monitoring tool**
 - **User guide**
 - **Connection to National CV Data Warehouse**
- **Eligible for USDOT tools and support as a member of Affiliated Testbeds**

Future Plans

- Prospect Silicon Valley partnership
- AV Testing
- Regional CV Testbed (pending funding)
 - 35 miles, over 150 intersections

