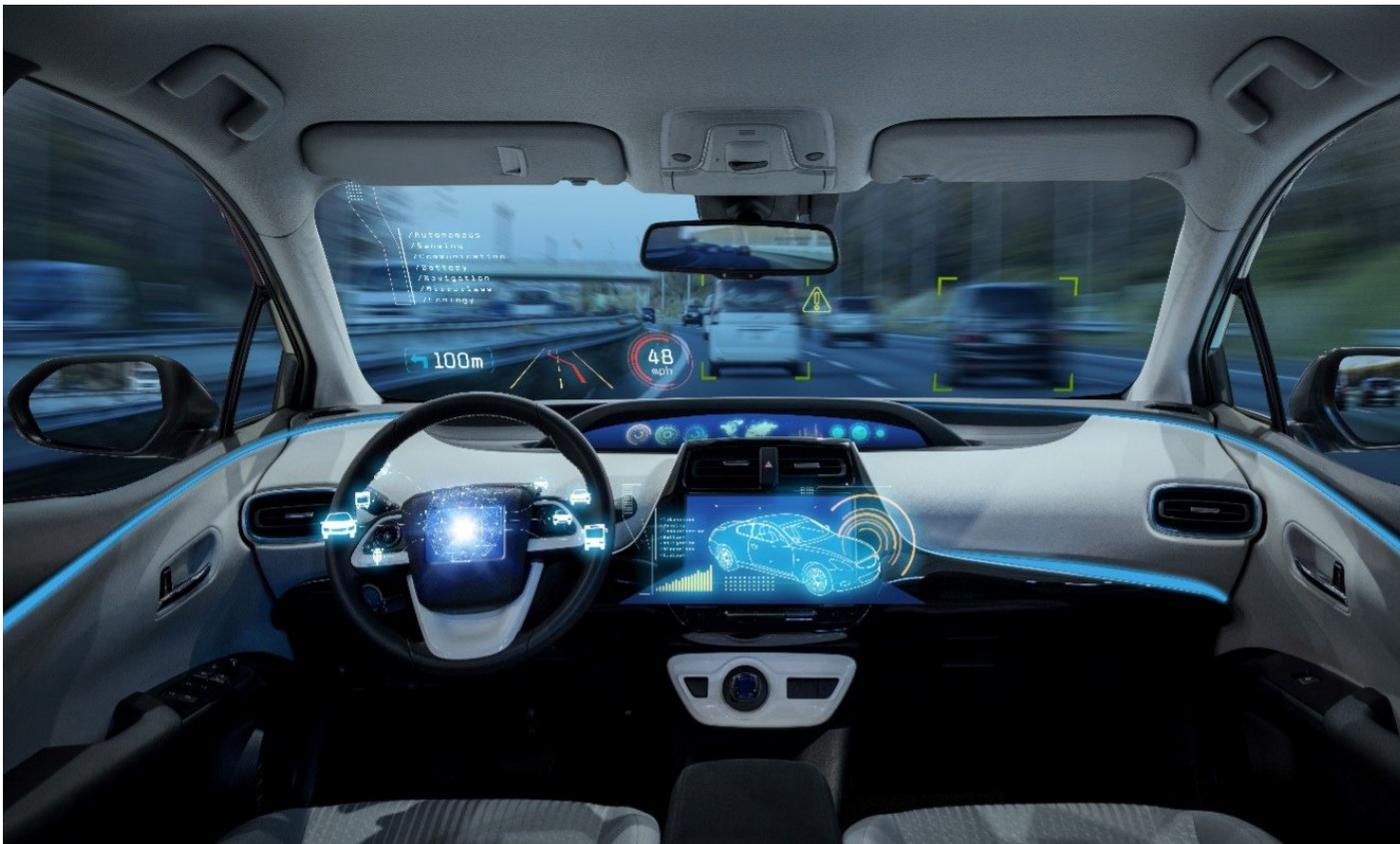


CHAPTER 7

Innovations in Technology



SEVEN

Technology affects many parts of our lives including how we communicate with each other, where we live and work, and the personal choices we make. In recent years, the intersection of transportation and technological innovations has grown at an exponential rate. The private sector is rapidly testing new ideas and products such as mobile applications for ridesharing, automation for package deliveries, and self-driving vehicles. This has led to new private-public partnerships in the transportation sector and opportunities to build upon best practices.



A Briefing on Autonomous Vehicle Policy

As part of a series of emerging policy briefings in 2019, SJCOG explored the future role of autonomous vehicles (AV) on the transportation landscape. The briefing was foundational in preparing the region for possible disruptive effects of automation on the future transportation network. The identified future AV projections, AV challenges and benefits, a policy framework, and AV policies and projects in San Joaquin County has and will continue to be explored and updated with future planning work.

Transportation Innovation Planning Study

In 2020-21, SJCOG staff used California Senate Bill 1 funds to create this Innovation Study. This Innovation Study identified potential innovative solutions that address regional needs in San Joaquin County. With an understanding of these solutions, this study generated innovative solution-inspired strategies to consider in this plan and recommended a pilot project for SJCOG's consideration. SJCOG is currently implementing the recommended pilot project, the Fiber Readiness Plan (see next page).



EZHub

The Vamos EZ Hub app will make using public transit safer and easier to access and pay for throughout San Joaquin County. Once downloaded, transit riders can use the app to plan their journeys and purchase tickets for any of the seven participating transit systems.

INNOVATION HIGHLIGHTS



Trends in Long-Term Innovative Solutions

Long-term innovative solutions are defined as technology that will be widely implemented throughout the region beyond 20 years from now. These technologies may use or need incremental improvements to the existing roadway network to support their development. Trends and ways the San Joaquin Council of Governments (SJCOG) is moving to meet technology challenges are discussed below.

“Once autonomous vehicles replace today’s cars, near misses in the nation’s 300,000 or so signalized intersections won’t be near misses. They’ll be carefully orchestrated movements under the control of computers...”

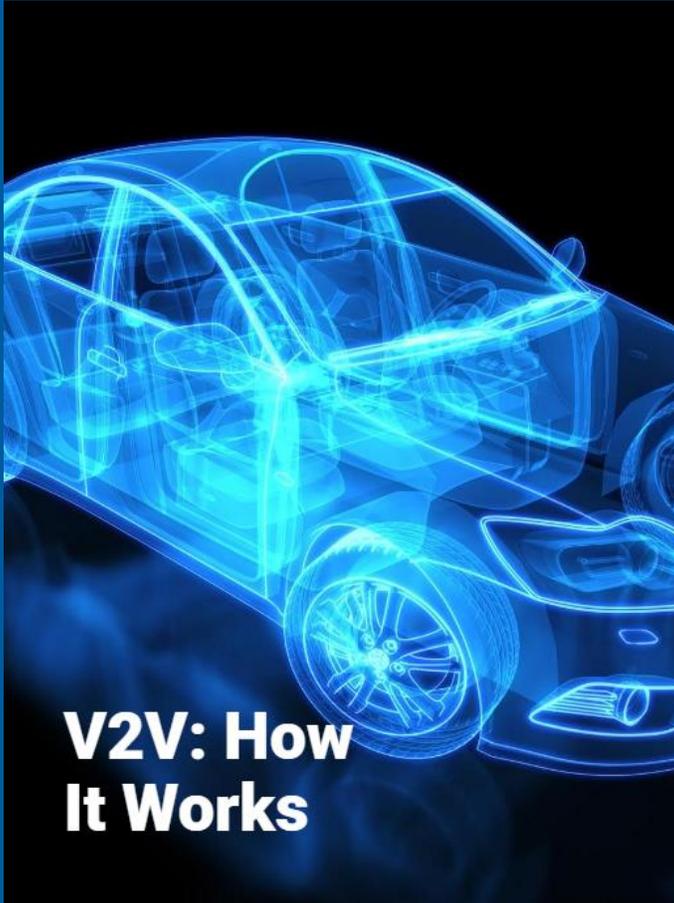
**– NBC MACH
(Science News)**

Connected Autonomous Vehicles

Connected Autonomous Vehicles (C/AV) encompass a suite of technology advancements that allow a vehicle to be connected to coordinate with other vehicles to enhance safety and efficiency and be operated without a human driver, or automated. C/AVs can be broken up into two distinct innovative technologies that are being simultaneously developed: autonomous operation and connected vehicle operation. These transformational technologies have the potential to transform how we travel every day, ranging from improving safety on the road to increasing traffic efficiency.

Autonomous vehicles use tools such as satellite mapping and onboard sensing to operate without human input, while connected vehicle operation uses real-time information and intelligent transportation systems for vehicles to communicate with each other and roadway infrastructure. Connected vehicle operation is further broken down into Vehicle to Vehicle (V2V) communication and Vehicle to Infrastructure (V2I) communication.

Connected or automated technology is not limited to passenger vehicles. Truck platooning, where connected and automated technology allows two or more heavy duty trucks to become linked, may become a common way of transporting goods in the future. While ships are limited to waterways, trains to rail lines and airplanes to airports, trucks can use the diverse roadway network to access most places. Rail transit has also adopted connected technology and can implement automated technology.



Safety Facts

6.7 M

Police-Reported Motor vehicle crashes in 2019. V2V technology has the potential to address a majority of multi-vehicle crashes

Information and Image Source: [nhtsa.gov](https://www.nhtsa.gov)

Existing Initiatives

While autonomous vehicle design and development are largely being driven by the private sector, public agencies are starting to plan and pilot developments in select areas.

- **2021 C/AV Strategic Plan (Caltrans):** This plan defines vision and strategy for Caltrans leadership in preparing for C/AV deployment, initiates C/AV policy development process, collects data, and develops C/AV action that defines specific activities for Caltrans to undertake in the coming years.
- **Fiber Readiness Plan (SJCOG):** Progress toward supporting C/AV regionally requires various pilots and plans to build out the regional infrastructure. One vital step includes expanding the significant amount of data needed to support connected and automated technology. A SJCOG-sponsored Fiber Readiness Plan will better prepare the region for high-speed internet via widespread fiber optic installation. This plan will be a three-part process including an existing inventory assessment, a review of utility policies, and streamlining utility permitting.
- **General Plans:** The city of Stockton's General Plan has an implementation measure to monitor technological advances and adjust roadway infrastructure and parking standards to accommodate AV technology and parking needs. The city of Manteca's General Plan has a similar implementation measure but also specifically requires the planning of an autonomous roadway network along major roadways.



FEATURED INNOVATION POLICY:

FIBER READINESS PLAN

A strong fiber network can improve access to jobs, education, health care, and logistics for residents and employers in San Joaquin County. Currently, 61% of the county's rural population doesn't have access to a single internet service provider offering 100 Mbps speed (the FCC's recommended download rate for general household internet access).

High-speed internet access makes it possible for residents to telework effectively and makes the communities of San Joaquin County more desirable for companies to set up satellite offices where their employees live.

As the result of the Transportation Innovation Planning Study, SJCOG is implementing a study addressing the middle-mile fiber network in San Joaquin County (known as the Fiber Readiness Plan). Installing fiber optic cable can be expensive and expanding the middle-mile network reduces the cost of connecting fiber to businesses and homes. SJCOG conducted an existing inventory assessment, reviewed local utility policies and permitting processes, and identified high impact areas for jurisdictions and other agencies to consider. Although fiber expansion is outside of SJCOG's authority, this Fiber Readiness Plan is the critical first step to help jurisdictions and/or other agencies plan for expanding their fiber network.



Next Steps

SJCOG will continue to explore ways to facilitate the adoption of infrastructure technologies and work with its regional partners to develop the supportive policies needed to aid CAV deployment in San Joaquin County. Initiatives that SJCOG will consider include:

- **Intelligent Transportation System (ITS) Master Plan:** The Intelligent Transportation System (ITS) Master Plan is a planning document that guides investment decisions by identifying needs and recommending strategic projects throughout the county to maintain and update the critical infrastructure that will support the deployment of innovative solutions, such as automated vehicles. SJCOG will coordinate with its local partners to determine the need for this plan because the ITS Master Plan requires the support of SJCOG's local partners who own, operate, or manage the ITS infrastructure. Through an extensive public outreach effort with SJCOG's local partners, the ITS Master Plan can recommend ITS projects with a medium to high chance of implementation.

- **Preparation of a Potential C/AV Pilot Deployment:** Once the region's infrastructure can support connected and automated vehicles, SJCOG will consider sponsoring or partnering to deploy an automated vehicle pilot. Examples include a low-speed passenger shuttle or last-mile goods delivery vehicle.

Replacing Gasoline and Diesel

Petroleum gasoline and diesel have been the primary energy source used to power various forms of transportation, including passenger vehicles, rail, bus, and light- and heavy-duty trucks. These forms of transportation run on gasoline and diesel and produce more greenhouse gas emissions and pollutants than their alternative fuel counterparts, leading to harmful air quality concentrations.

The state of California is actively working to increase fuel efficiencies, promote alternative fuel vehicles, improve air quality, and decrease dependency on petroleum gasoline using policies and regulations. Regional efforts support zero-emission vehicle fuels such as electricity and hydrogen. Other examples of alternative fuels include natural gas, biodiesel, and ethanol.

Existing Initiatives

A variety of state and regional programs are aimed at accelerating fleet electrification to meet California standards and goals. Not only do these programs improve air quality, reduce petroleum use, and help achieve greenhouse gas emission reduction goals, they also improve public health and attract investments and high-quality jobs.

- **State-Level Regulations:** State Senate Bill 350, the Clean Energy and Pollution Act of 2015, describes the importance of widespread transportation electrification for meeting state climate goals and meeting federal air quality standards. Senate Bill 1275 is the Charge Ahead California Initiative that aims to phase out high-polluting vehicles. Executive Order N-79-20 requires all California-sold new cars, passenger trucks, and drayage trucks be zero-emission vehicles by 2035, medium-to-heavy-duty vehicles be zero-emission by 2045, and off-road vehicles by 2035, where feasible.
- **Stockton Mobility Collective Project (SJCOG):** This program will provide 30 electric cars and 10 to 15 charging stations primarily in communities of concern in Stockton. In addition, SJCOG will fund an additional 11 electric cars and five charging stations at San Joaquin County Housing Authority-owned

properties. Users can access these cars by using the Vamos Mobility app that connects people to various clean transportation options. The California Air Resources Board awarded SJCOG a \$7.4 million Sustainable Transportation Equity Project (STEP) grant to implement this program.

- **Public Fleet:** The San Joaquin Regional Transit District (RTD) Route 44 Express Bus was the first of its kind, an all-electric bus rapid transit (BRT) route. RTD is the fourth in the nation to operate fully electric buses. The California Energy Commission awarded RTD, in partnership with Proterra Inc., a pair of 100 percent battery-electric buses and the funding for an automated fast-charging station. RTD's Solar Energy Project installed solar panels at the Regional Transportation Center.
- **General Plans:** Stockton's General Plan has an implementation measure that requires commercial, retail, office, industrial and multifamily developments to provide charging stations and prioritized parking for electric and alternative fuel vehicles. Manteca's General Plan has an implementation measure that supports efforts to reduce environmental impacts of truck operations through use of electric vehicles and other advanced technologies for goods and freight movement.

Photo Credit: Captivating Photos



Next Steps

SJCOG is currently completing an Alternative Fuels Vision Plan for the region. This plan is considering hydrogen, propane, and liquified and compressed natural gas as alternative fuels for vehicles. It is expected to be completed in early 2023. The completion of this plan will better prepare San Joaquin County for EV by addressing the county's EV infrastructure needs. SJCOG will also actively search for regional level funding opportunities for local jurisdictions and assist local jurisdictions and transit operators in securing Federal Alternative Fuel Vehicle (AFV) and Fueling Infrastructure grants. Finally, SJCOG will work with the San Joaquin Valley Air Pollution Control District and partners to implement recommendations from the 2014 Plug-In Electric Vehicle (PEV) Readiness Plan that was prepared by the Air Pollution Control District.

Transportation agencies will be taking actions to convert their operations from using gasoline and diesel to electricity and other fuel alternatives. Examples include the San Joaquin Regional Rail Commission (SJRRC) planning to purchase electrified trains and the RTD's Strategic Plan identifying the exploration of zero-emission bus technology to ensure viable energy and fuel alternatives, such as hydrogen.

Other Innovative Solutions

Certain innovative solutions that do not fit within one transportation technology category can transform the way the region addresses mobility challenges, supply new means of accessibility, improve the safety and equity of the transportation system, and support resilient communities.

Existing Initiatives

- **Vamos EZHub (SJCOG):** Vamos EZHub provides a cashless mobile ticketing and fare payment system that allows a rider to pay fares for any transit in San Joaquin County, including Escalon E-trans, Lodi Grapeline, Manteca Transit, RTD, Ripon Blossom Express, Tracy Tracer and Altamont Commuter Express.
- **Public Fleet:** RTD is currently piloting a second phase of its RTD Van Go! on-demand rideshare service pilot program. Van Go! riders can travel anywhere in San Joaquin County, allowing access to rural areas and eliminating the inconvenience of multiple transfers with one or more transit agencies. Tri-Valley San Joaquin Valley Rail Authority, or Valley Link, is planning a rail connection between Dublin/Pleasanton BART station and San Joaquin County.
- **Managed Lanes I-205:** This project widens I-205 from the San Joaquin County/Alameda County boundary line to I-5 to potentially include new high occupancy toll (HOT) lanes, while leaving space in the median for a future bus lane or passenger rail line. Also, informational signs will be placed throughout this corridor to inform drivers of accidents and identify affected lanes. If these HOT lanes become the preferred alternative for the corridor, they could be a funding generator, like existing HOT lanes along the I-580 between I-680 and Vasco Road. This project is currently in the preliminary planning and environmental phase.





Next Steps

SJCOG will enhance partnerships to improve travel through the Altamont Pass. As a key partner in the successful implementation of integrated corridor management, SJCOG can lead by example through adopting recommended projects in the RTP/SCS, continuing collaboration, and dedicating staff resources for innovative grant applications.

SJCOG will plan for emerging revenue sources. SJCOG and its partners could collaborate with economic forecasting and modelling specialists to study potential revenue sources over long-term planning horizon for inclusion in SJCOG RTP/SCS.