



R.12-12-011 - CPUC Workshop on Autonomous Vehicle Pilot Programs



California Public Utilities Commission

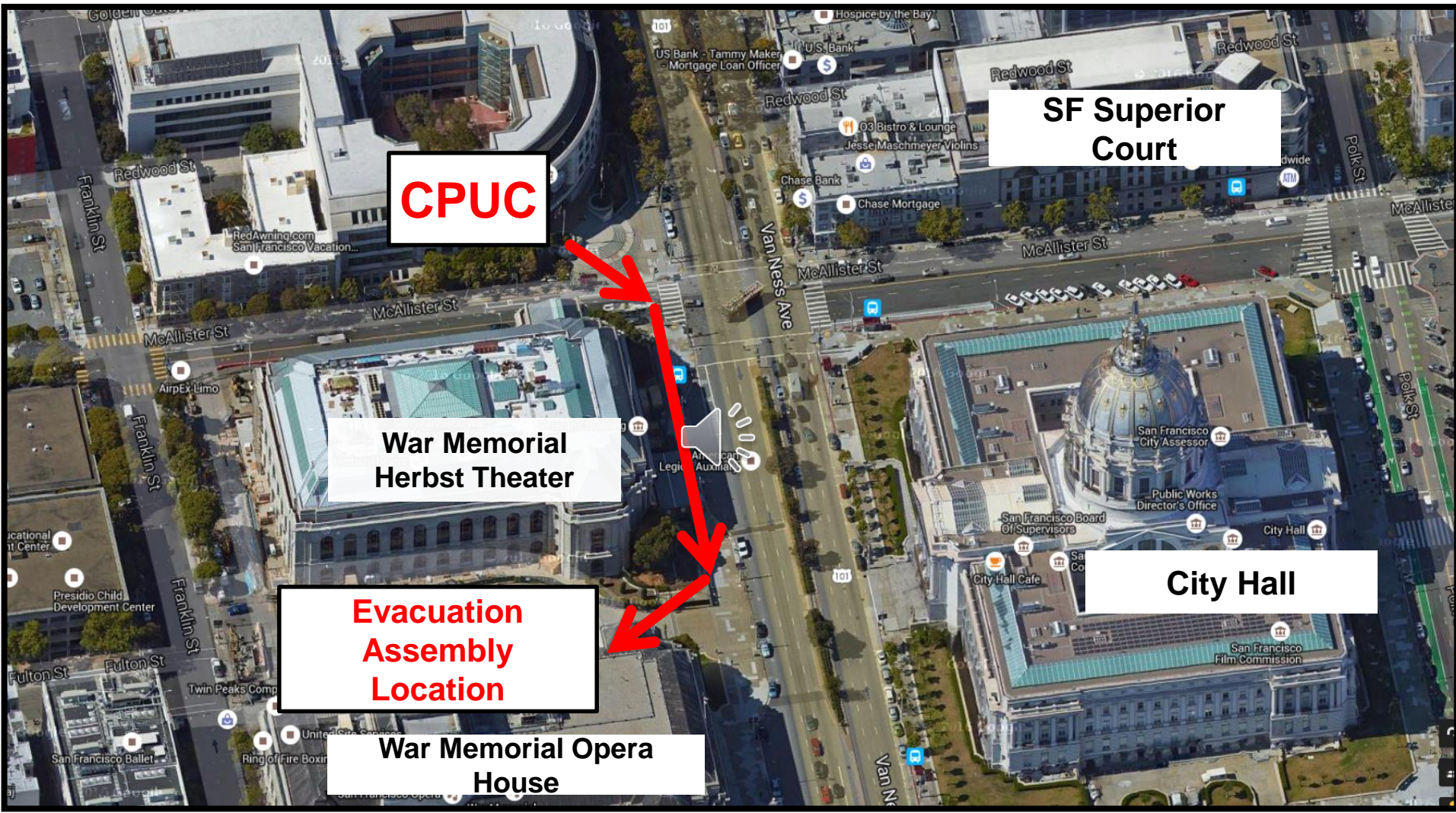
October 22, 2019

10am – 4:30pm





Emergency Instructions





Housekeeping

Remote Participation:

- WebEx Link:
[https://cpuc.webex.com/cpuc/j.php?MTID=m
ba8ce58ea1d4102ff41b898405f59363](https://cpuc.webex.com/cpuc/j.php?MTID=mba8ce58ea1d4102ff41b898405f59363)
- WebEx Meeting Number: 968 950 893
- WebEx Password: AVpilots

- Dial-In Number: 1-415-655-0002
- Dial-In Access Code: 968 950 893

WiFi:

- Network: cpucguest
- Username: guest
- Password: cpuc93019

WebEx:

- If you are signed into WebEx, your webcam is enabled by default. Please disable the webcam, otherwise you may be visible to all participants.

Materials and Process:

- The audio will be recorded.
- Slides will be made available online after the workshop at
<https://www.cpuc.ca.gov/avcpilotinfo/>.





OPENING REMARKS





Comment Process

- Phone lines:
 - Listen-only.
 - Email transportationprograms@cpuc.ca.gov with comment to be read during discussion periods.
 - If you have issues with the phone bridge, email eh1@cpuc.ca.gov.
- Comments:
 - Please hold questions until discussion slides, with exception of short clarifications.
 - At beginning of comment period, staff will ask participants whether they want to speak. After that, staff will call on speakers in order.
 - Speakers should state their name and affiliation at the beginning of their comment.
 - Speakers who are attending in person should the microphone while speaking.





Goals for Today

- Provide overview of autonomous vehicle (AV) pilot activity to date.
- Discuss methods to evaluate current state and measure progress.
- Discuss next steps both from policy and procedural perspectives.





Agenda

Est. Time	Presenter	Agenda Item and Discussion Topics
10:00am – 10:10am	Commissioner Shiroma	<ul style="list-style-type: none"> • Opening Remarks
10:10am – 10:30am	CPUC Staff	<ul style="list-style-type: none"> • Background of Pilots <ul style="list-style-type: none"> ○ Discuss the origin of pilot, its goals and scope, and the requirements for participation in the pilot.
10:30am – 11:00am	CPUC and DMV Staff	<ul style="list-style-type: none"> • AV Activity to Date <ul style="list-style-type: none"> ○ Participation in California Public Utilities Commission's (CPUC) pilots and application Department of Motor Vehicles' (DMV) permitting processes. ○ Data gathered to date by CPUC and DMV.
11:00am – 11:45am	Pilot Participants	<ul style="list-style-type: none"> • Updates from Pilot Participants <ul style="list-style-type: none"> ○ Overview of qualitative and quantitative results of pilots. ○ Engagement with accessibility advocates.
11:45am – 12:30pm	-	<ul style="list-style-type: none"> • Lunch
12:30pm – 2:00pm	Open Discussion	<ul style="list-style-type: none"> • Data & Metrics <ul style="list-style-type: none"> ○ What are the appropriate metrics for the CPUC to evaluate progress toward the pilots' goals? ○ What data sources are available and useful? For example, what is the value of experiences and data points from activities outside the state? ○ Are the data identified above <u>sufficient</u> for the CPUC to evaluate the pilots' progress? If not, what type and volume of data are necessary for a robust evaluation?
2:00pm – 2:10pm	-	<ul style="list-style-type: none"> • Break
2:10pm – 3:00pm	Open Discussion	<ul style="list-style-type: none"> • Deployment <ul style="list-style-type: none"> ○ For metrics identified above, what are the appropriate milestones (if any) to measure progress? ○ What are the necessary adjustments to the current regulatory approaches to AVs? For example, consider (a) the requirements placed on test operators or (b) whether the current TCP carrier rules are an appropriate fit for AV operators.
3:00pm – 3:10pm	CPUC Staff	<ul style="list-style-type: none"> • Next Steps <ul style="list-style-type: none"> ○ Identify outstanding issues. ○ Procedural next steps.
3:10pm – 3:25pm	Open Discussion	<ul style="list-style-type: none"> • Public Comment
3:25pm – 3:30pm	CPUC Staff	<ul style="list-style-type: none"> • Closing Remarks





BACKGROUND





Origin of CPUC Pilots

- Autonomous Vehicle-related issues are part of proceeding R.12-12-011.
- R.12-12-011 addresses AVs and Transportation Network Companies (TNCs) more broadly.
- On May 31, 2018, the CPUC issued Decision D.18-05-043 authorizing two autonomous vehicle (AV) pilot programs, one “Drivered” and one “Driverless.”
- Decision required formation of an AV Accessibility Working Group to discuss accessibility as it applies to AV passenger service.





Goals of Testing Period

- Gather real-world data that informs Commission’s current and future regulation of AVs, including fare collection and deployment frameworks.
 - Pilot participants report data on vehicle miles traveled (VMTs), including electric VMTs, “deadheading,” idling/dwell time, vehicle occupancy, accessible ride requests fulfilled/unfulfilled/declined.
- Evaluate AV passenger service including its impacts to:
 - Safety;
 - Accessibility;
 - Impacts on environment, traffic, and other road uses; and
 - Discovering the “unknown unknowns” – deploying AVs is new territory.





CPUC Pilots

	Drivered Pilot	Driverless Pilot
Test Driver Location	In car	Remote, but always accessible by communication link
DMV Permits Required	Drivered Test Permit	Driverless Test Permit
Requirements for Test Drivers	Drug testing, monitoring of driving record	Drug testing, monitoring of driving record; identical to in-car drivers
Can charge for rides?	No	No
Can offer shared rides?	Yes	No
Data Sharing	Detail later in deck Basics: miles driven, trips taken, and accessibility of trips	Detail later in deck Basics: miles driven, trips taken, and accessibility of trips
Location Restrictions	Operational Design Domain (ODD) defined by company, 30 days of testing in ODD required	
Duration	Indefinite	Indefinite





Questions & Discussion





AV ACTIVITY TO DATE





Pilot Activity to Date

- CPUC pilot participation has been relatively low compared to number of DMV permits issued.

	Drivered	Driverless
DMV Test Permits issued	63	1
CPUC Pilot Permits issued	4 (three granted in last 5 months)	0
DMV Deployment permits issued	0	0





CPUC Data Gathered to Date

- On Sep 1, 2019, CPUC received pilot data reports from all four pilot participants. That data is summarized below.

Data Point	Total
Total VMT	60,328
Total eVMT	0
Total Period 1 ("Deadhead") miles	48,137
Total idle time between rides	4,083
Vehicle occupancy per trip	n/a
Fulfilled accessible rides	38
Unfulfilled accessible rides	0
Declined accessible rides	0
Total number of passengers transported	6,299



California DMV Autonomous Vehicles PROGRAM OVERVIEW

SINCE September 2014

69 Companies approved to test with a driver
&

1 Company approved to test **WITHOUT** a driver

3.6 MILLION
AUTONOMOUS MILES
driven on public roads

2,788 TEST DRIVERS



VEHICLES
permitted on public
roads

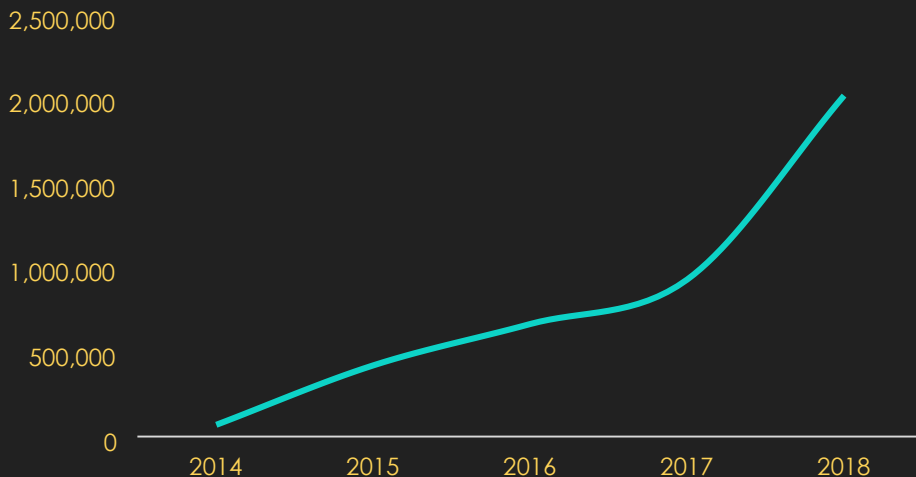
842 

64 ACTIVE companies
permitted to test on
California's public roads

COLLISIONS **202**



Autonomous Miles Driven



September 25
Senate Bill
1298
authorizes
DMV to
regulate AV
operations



2012

September 16
First set of
regulations
governing AV
testing with a
driver on CA
roads



2014

April 2
Regulations
for driverless
AV and AV
deployment



2018

April 12
Proposed
regulations
allowing
autonomous
delivery
vehicles
weighing
<10,000 lbs
published



2019



Questions & Discussion





PRESENTATIONS FROM PILOT PARTICIPANTS





Presentations from Pilot Participants

- All four pilot participants were asked to present their data and respond to the following questions:
 - What we can learn from the data regarding as it ties back to the pilot goals of safety, accessibility, impacts on environment, traffic, and other road uses, and identifying new issues that merit consideration; and, passenger experiences?
 - What accessibility options have you provided both in terms of vehicle design and operations?
 - How have you engaged with disability advocates?
 - What other key takeaways are important to highlight?





Participants' Presentations

- This slide intentionally blank – participants' presentations displayed separately.





Questions & Discussion

- First:
 - Questions and comments regarding participants' presentations of pilot data.
- Second:
 - Why is participation in each program relatively low?
 - What would encourage higher participation?





LUNCH





METRICS & DATA





Metrics

- Metrics help identify issues and evaluate progress.
- Can be qualitative or quantitative and forward-looking or past-looking (i.e., 30 days' testing vs collision reports).

**Examples
for
discussion**

Category	Issue	Potential Metric
Safety	<ul style="list-style-type: none"> • Incident data • Technology readiness 	<ul style="list-style-type: none"> • DMV Collision Reports • 30 days' testing within detailed ODD • Pilot participation levels • Evaluations from other regulatory agencies, academics, industry
Accessibility	<ul style="list-style-type: none"> • Availability of wheelchair accessible vehicles 	<ul style="list-style-type: none"> • Number of accessible rides • Accessible requests fulfilled/unfulfilled/declined
Impacts on environment	<ul style="list-style-type: none"> • Carbon emissions 	<ul style="list-style-type: none"> • Portion of miles from electric vehicles (%eVMT) • Dwell time
Impacts on traffic and other road uses	<ul style="list-style-type: none"> • Congestion 	<ul style="list-style-type: none"> • Idle time
Unknown unknowns	<ul style="list-style-type: none"> • Enough drive time to have experienced "edge cases." • Passenger response in challenging scenarios 	<ul style="list-style-type: none"> • Total time in pilot • Total miles traveled • Law-enforcement interaction plans • Passenger feedback





Discussion

- What are the appropriate metrics?
- What should be the priority metrics for the CPUC to understand the current state of the pilots?





Data Sources

- Outside activities can potentially supplement pilot data.

Testing

- CPUC pilot data
- DMV reports
- Closed course testing
- Simulations
- Dry runs and drills (e.g., planning w/ CHP)

Deployment

- Private property within CA
- Outside of CA (other states, cities, countries)

Other

- Studies
- Industry standards (UL, SAE)
- National standards





Discussion

- Of these data sources, which are available and useful?
 - For example, what is the value of experiences and data points from activities outside the state?
- What data sources are missing?





BREAK





DEPLOYMENT





Use of Terms

- For this discussion:
 - Testing (current state)
 - Prohibition on shared rides for driverless and fare collection for drivered and driverless
 - Limited deployment
 - Shared rides and/or fare collection
 - Deployment
 - Fare collection and shared rides



California DMV Autonomous Vehicles TESTING

At Minimum

Participants must

- Carry \$5m insurance, bond, or self-insurance
- Identify test vehicles
- Report any crash within 10 days
- Exclude from testing
 - Commercial vehicles >10,000 lbs GVW
 - Motorcycles



With a Driver

Test Driver Requirements

- No DUI
- No at-fault
- No more than 1 point
- Successful completion of training program
- Must be employee, contractor, or designee of manufacturer



Without a Driver

Manufacturer Requirements

- Communication link with remote operator
- Process to display/communicate vehicle owner/operator information to law enforcement
- Meet the description of Level 4 or 5 automated driving system
- Law Enforcement Interaction Plan
- No charging a fee or receiving compensation to provide rides to members of the public



California DMV Autonomous Vehicles Deployment (Public Use)

- Full description of ODD
 - Restrictions
 - How vehicle responds when outside ODD
 - Must comply with all CVC and local regulations
- Summary of technology testing in ODD
 - Number of vehicle test miles
 - Description of testing methods
 - Collision details while operating in Autonomous Mode
- Compliance with FMVSS
- Data Recorder
 - Cyber-security
- Certify consumer protections are in place
 - Recalls
 - Technology and mapping updates
 - End user manuals and education
- Law Enforcement Interaction Plan



Discussion

- Should the commission's framework be more prescriptive or holistic?
- What immediate next steps (fare collection?), if any, are justified by current status of pilots and broader AV activities?





NEXT STEPS





Outstanding Issues

- Multiple outstanding issues, including:
 - Requirements for test operators, both in-vehicle and remote;
 - Data collection and access;
 - Passenger protections (personal safety, individuals' privacy);
 - Regulatory/permitting logistics (e.g., contractors as test drivers);
and,
 - Vehicle maintenance and inspection.





Discussion

- What's missing?
- What are the priority issues for the Commission to tackle?





PUBLIC COMMENT





CLOSING REMARKS

