



Public Workshop on CPUC Autonomous Vehicle Program Data Reporting

Rulemaking 12-12-011

June 22, 2023

Facilitated by:

Consumer Protection and Enforcement Division (CPED)

Josh Huneycutt, Transportation Policy Supervisor

Ashlyn Kong, Lead Analyst



**California Public
Utilities Commission**

Opening Remarks



Genevieve Shiroma
Commissioner



John Reynolds
Commissioner

Workshop Introduction

- Objectives
- Guidelines & Logistics
- Agenda

Today's workshop focuses on data reporting in the CPUC AV programs

The May 25 Assigned Commissioner's Ruling:

Highlighted the need for **continued development in regulatory policy** as the AV industry evolves

Expressed concern about **AV incidents** and underscored the need to **move beyond anecdotal data**

Directed parties to provide comments on **metrics, feasibility, cadence, transparency** and **staff data proposal**

Today's workshop focuses on data reporting in the CPUC AV programs

Our objectives for today:

1

Identify **challenges** with the current reporting framework

2

Develop **shared goals** for a revised reporting framework

3

Develop **shared understanding** of data categories and/or metrics and **feasibility of collection**

4

Provide a **forum for stakeholders** to develop relationships, discuss amongst each other, and work toward consensus.

5

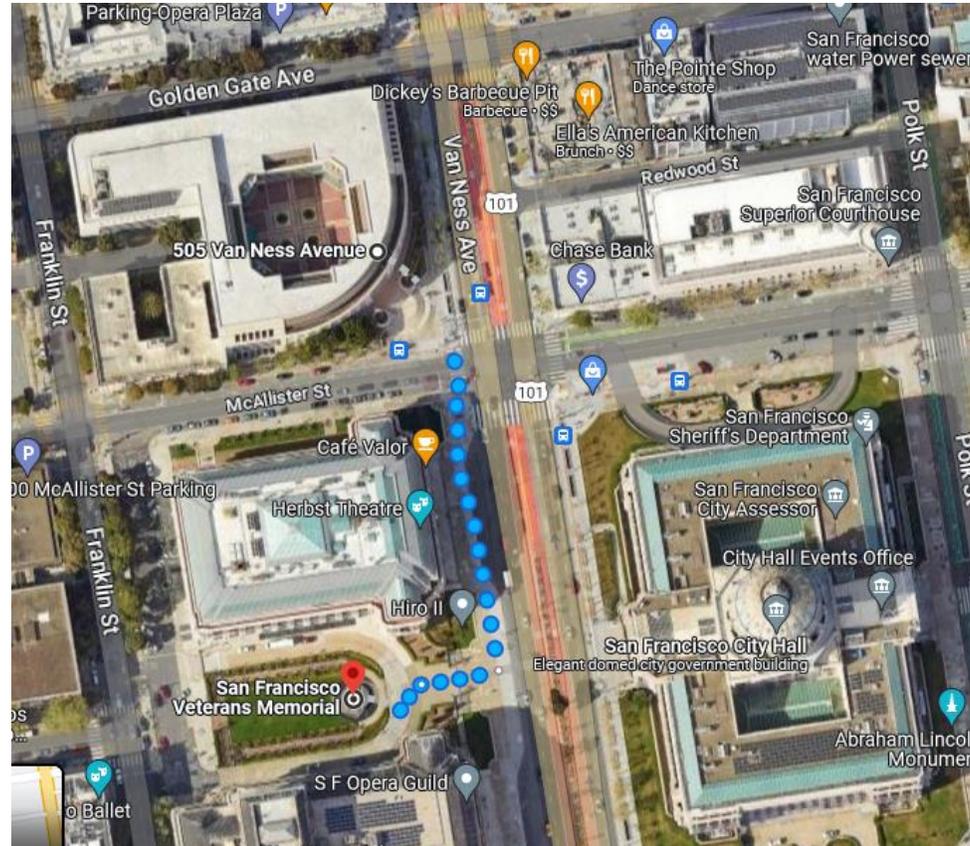
Provide an opportunity for stakeholders to **provide feedback** on and/or alternatives to CPUC's data reporting proposal.

Workshop Guidelines

- This workshop will include a mix of presentations and discussion and a diversity of perspectives. *Active, constructive, and on-topic* participation is encouraged!
- This is a hybrid in-person/remote workshop.
 - Staff will facilitate comments and discussion between in-person participants.
 - Staff will monitor the Webex chat and raised hands feature throughout the workshop and communicate questions and comments to speakers.

In-person logistics & emergency procedures

- Restrooms are in the main lobby
 - Exit the Courtyard Room, lobby is to the right (west). Restrooms down the hallway to the left.
- In case of emergency
 - Proceed to nearest exit.
 - Walk to agency's evacuation meeting spot at the Garden Plaza, next to the War Memorial Opera House



Agenda

Estimated Time	Topic	Speakers
12:30 pm – 12:45 pm	Opening Remarks	Commissioner Shiroma Commissioner Reynolds
12:45 pm – 1:00 pm	Workshop Introduction	CPUC Staff
1:00 pm – 1:30 pm	Presentations: AV Regulatory and Data Collection Framework	CPUC Staff DMV Staff
1:30 pm – 2:30 pm	Academic Panel: Data Collection Principles and Goals	Mollie D'Agostino (UC Davis) Dr. Billy Riggs (University of San Francisco) Dr. Steven Shladover (UC Berkeley)
2:30 pm – 2:45 pm	Break	
2:45 pm – 4:00 pm	Presentations from Parties Cruise – Unplanned Stops/MRC Waymo – First Responder Interactions San Francisco – Proposed New Metrics	Cruise Waymo San Francisco
4:00 pm – 4:20 pm	Public Comment	
4:20 pm – 4:30 pm	Closing Remarks	Commissioner Shiroma Commissioner Reynolds CPUC Staff

Presentations: AV Regulatory and Data Framework

- CPUC
- California DMV

AVs in California are regulated by both the DMV and the CPUC

**Department of Motor Vehicles
(DMV)**

Can the AV **operate safely on public roads** in California?

Fitness of underlying AV technology

Use case and ownership agnostic (e.g., passengers, delivery, fleet, individual)



**Public Utilities Commission
(CPUC)**

Can the AV transportation service provider **safely transport passengers?**

Policies and procedures to protect passenger/public safety

For-hire passenger service only

Ongoing data collection and oversight to support safety and compliance

The CPUC has set four broad goals for its AV programs

1

Protect **passenger safety**

2

Expand the benefits of AV technologies to **all Californians**, including people with disabilities

3

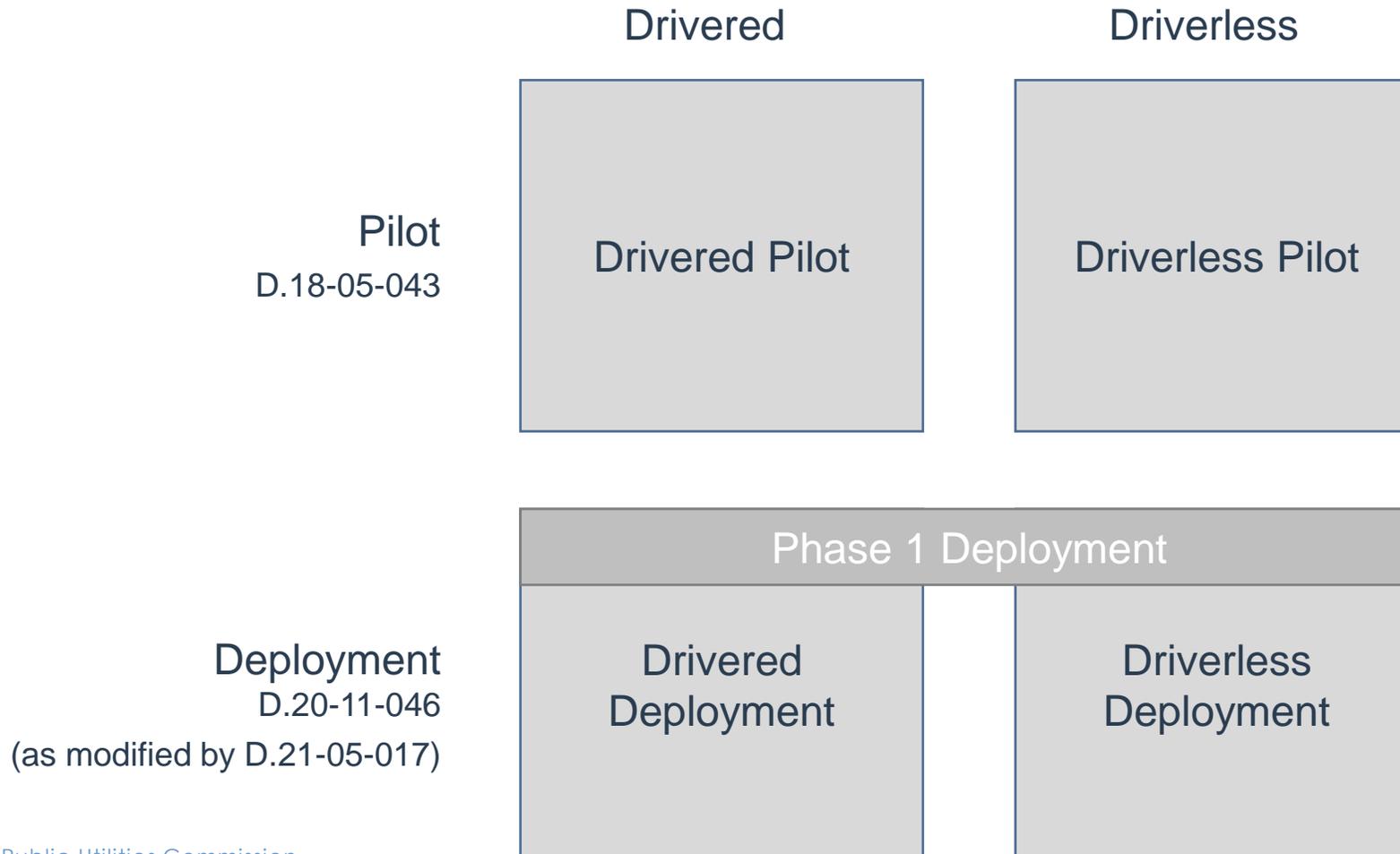
Improve **transportation options for all**, particularly for disadvantaged communities and low-income communities

4

Reduce **greenhouse gas emissions, criteria air pollutants, and toxic air contaminants**, particularly in disadvantaged communities

CPUC AV Program Structure

CPUC's AV oversight is focused on safety in the context of AV passenger service. When an AV manufacturer seeks to provide passenger service, **it must first obtain DMV authorization** and then seek authorization from CPUC in the form of a **charter-party carrier permit** with permission to use autonomous vehicles.



Current Authorizations (June 2023)



Pilot
D.18-05-043

Drivered

Drivered Pilot
7 participants

Driverless

Driverless Pilot
2 participants



Deployment
D.20-11-046
(as modified by D.21-05-017)

Phase 1 Deployment

Drivered Deployment
2 participants

Driverless Deployment
1 participant
1 applicant



Driverless AV permits require submission of a Passenger Safety Plan

PSP must include reasonable strategies for protecting passenger safety, including:

Driverless ride safety

Shared ride safety; assaults and harassment

Unsafe scenarios inside and outside vehicle

Educating and orienting passengers

Identifying, entering, and exiting AV

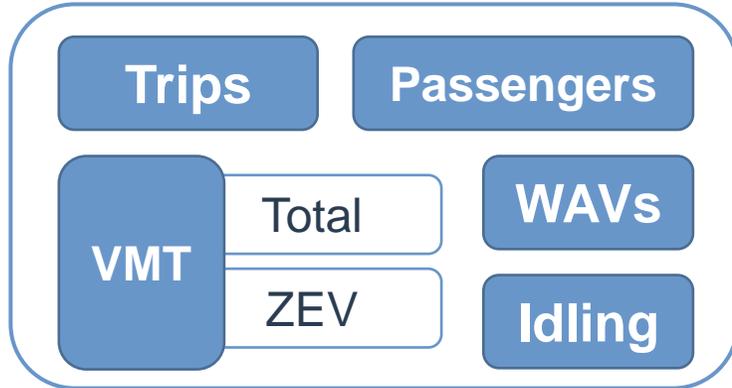
Passenger contact and carrier response

Comments and complaints

Accessibility

We collect data at least quarterly to evaluate program performance and inform policy development

AV Pilot

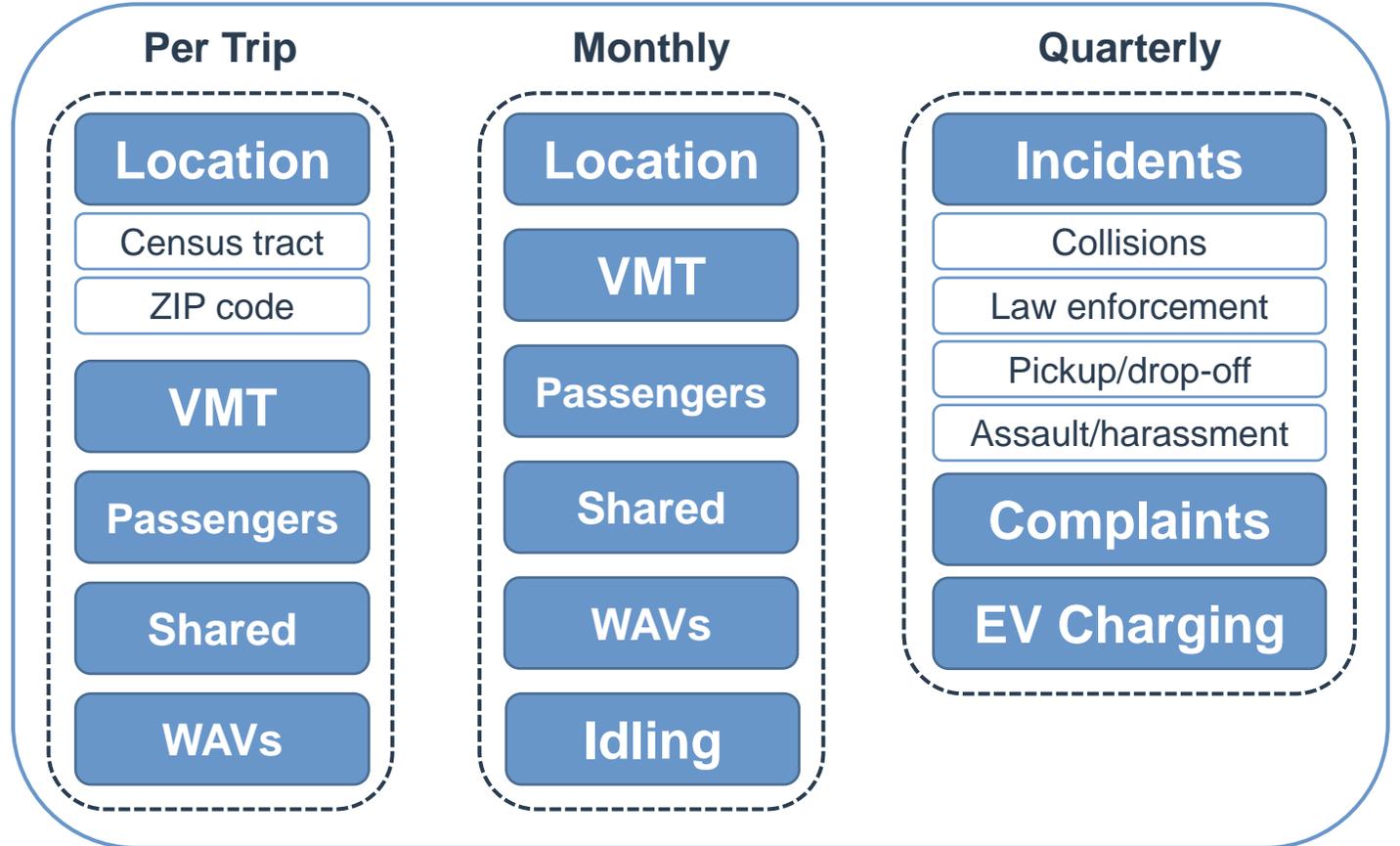


DMV Collision forms SR-1 and OL-316 are simultaneously reported to CPUC

CPUC staff have the authority to request additional data from carriers at any time

Quarterly data are posted publicly; carrier confidentiality claims may apply

AV Deployment



Growth in AV operations has highlighted need for continued development of data policy

The CPUC has a broad mandate to protect **passenger and public safety** in its regulation of charter-party carriers, including AVs

Stakeholders have raised & staff have observed potential safety issues as AV operations, especially driverless, have scaled up

Collisions

Unplanned stops

First responder interactions

In-lane pickup and drop-off

How should the CPUC move beyond anecdotal and/or ad-hoc information so we may quantitatively and objectively monitor impacts (positive or negative) of AV operations to promote passenger and public safety, AV program goals?

Staff Proposal includes expanded collision and incident reporting, enhanced Pilot data

Deployment Collision Reporting

Current Deployment reporting lacks key information (e.g., location, narrative) needed to understand individual incidents and trends

Enhanced Pilot Reporting

To enable broader understanding of all AV operations and their impacts, and collect data to inform evaluation of future Deployment applications

Monthly Operations & Incident Reporting

To facilitate ongoing monitoring and evaluation of AV operations and non-collision incidents

Current reporting lacks detailed incident data, quarterly frequency limits response time to concerning trends

Presentations: AV Regulatory and Data Framework

- CPUC
- **California DMV**

California Department of Motor Vehicles

Autonomous Vehicles Program

Miguel Acosta, Branch Chief
Policy Division
June 2023

AGENDA

03

Autonomous
Vehicles
Program
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2015-2022
Disengagement
Analysis

Autonomous Vehicles Program Overview

40

MFRs authorized to test AV **WITH** a driver

7

MFRs authorized to test AV **WITHOUT** a driver

4

MFRs approved to **DEPLOY** AV on public roads

1,950

Active **DRIVERED** Vehicles

602

Active **DRIVERLESS** Vehicles

2,936

Active Test Drivers

612

Traffic Collisions

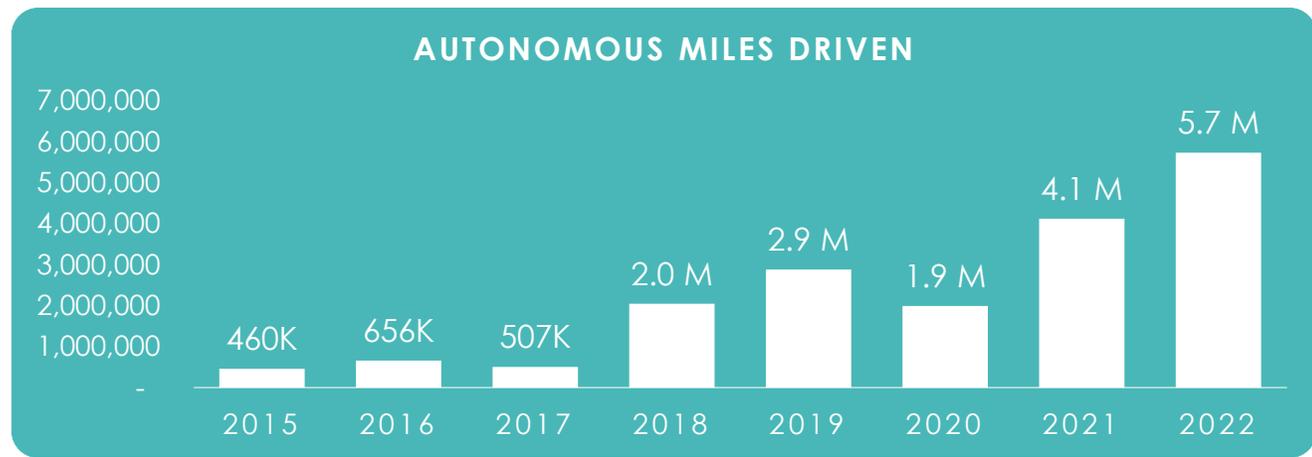
44

Driverless Collisions

Cruise: 30
Waymo: 12
Pony.ai: 1
WeRide: 1

18.3 MILLION

Autonomous Miles Driven on CA public roads



AUTONOMOUS VEHICLES PROGRAM LOCATIONS



Driverless Testing

Manufacturer Name	Date of Approval	Headquarters in CA
WAYMO LLC	October 30, 2018	Mountain View
NURO, INC.	April 7, 2020	Mountain View
AUTOX TECHNOLOGIES, INC.	July 17, 2020	San Jose
ZOOX, INC.	September 18, 2020	Foster City
CRUISE LLC	October 22, 2020	San Francisco
APOLLO USA LLC	January 27, 2021	Sunnyvale
WERIDE CORP.	April 12, 2021	San Jose

Deployment

Manufacturer Name	Date of Approval	Headquarters in CA
NURO, INC.	December 23, 2020	Mountain View
WAYMO LLC	September 30, 2021	Mountain View
CRUISE LLC	September 30, 2021	San Francisco
MERCEDES-BENZ	June 8, 2023	Long Beach, CA



REGULATIONS SUMMARY

Testing With a Driver

- \$5 million in insurance, bond, or self-insurance
- Test driver requirements:
 - No DUI, not an at-fault driver in collision resulting in injuries
 - Successful completion of test driver training program
 - Employee, contractor, or designee of manufacturer
- Report any collision within 10 days
- Annual Report of Disengagements
- Testing permit valid for two years
- Vehicles excluded from testing:
 - > 10,001 lbs. GVWR
 - Motorcycles



REGULATIONS SUMMARY

Testing Without a Driver

- Same requirements as testing with a driver apply and include...
 - Communication link with the remote operator
 - Process to display or communicate vehicle owner or operator information to a law enforcement officer
- Meets the description of level 4 or 5 automated driving system
- Law Enforcement Interaction Plan
- No charging of a fee or receiving other compensation for providing a ride to members of the public



REGULATIONS SUMMARY

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



2023 Jaguar I-PACE



2023 Mercedes-Maybach S680

CALIFORNIA AV PROGRAM AUTHORITY

§227.48 Reporting Collisions

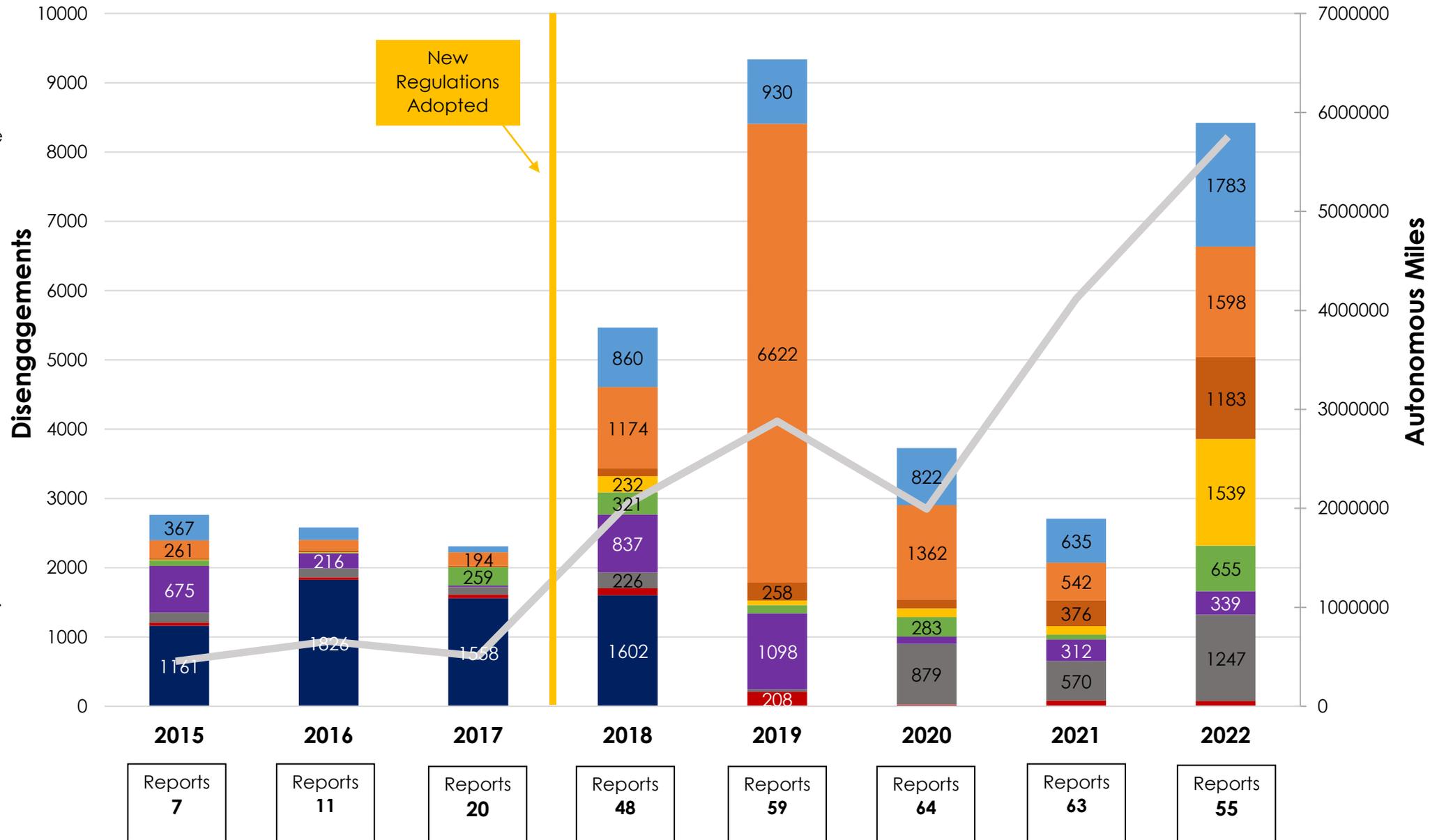
“A manufacturer whose autonomous vehicle...is in any manner involved in a collision...on a public road that resulted in the damage of property or in bodily injury or death shall report the collision to the department...”

§227.50 Reporting Disengagement of Autonomous Mode

“Every manufacturer authorized under this article to test autonomous vehicles on public roads shall prepare...annual report...description of the facts causing disengagements...written in plain language with enough detail that a non-technical person can understand the circumstances triggering the disengagement.”

2015-2022 Disengagement Analysis

- Perception Failure
- Path or Planning Failure
- Localization or Mapping Failure
- Prediction Failure
- Hardware/Vehicle Motion Control Failure
- Supporting Software Fault
- Violation of Operation Design Domain (ODD) Limitation*
- Reckless Motion by Another Road User
- Unknown Disengagement (e.g. Driver Discomfort, System Limitation)
- Autonomous Miles Reported



*Note: Increased volume of ODD violations in 2022 come from Apple, Toyota, and other MFGs reporting data for the first time

Panel: Data Collection Principles and Goals

Facilitated by: Terra Curtis - Manager, Transportation Policy & Programs

Panelists



Mollie D'Agostino

*Executive Director - Mobility, Science,
Automation and Inclusion Center*

UC Davis Institute of Transportation
Studies



Dr. Billy Riggs

*Program Director / Associate
Professor*

University of San Francisco
School of Management



Dr. Steven Shladover

Research Engineer

UC Berkeley California Partners for
Advanced Transportation Technology
(PATH)

Questions/Discussion



Break

Please return by 2:45 pm

Restrooms available on left side of main lobby.

Presentations from Parties

- Cruise
- Waymo
- San Francisco



Cruise

CPUC Workshop

June 22, 2023

Jose Alvarado. Senior Manager of Government Affairs

cruise

Community Driven

Zero-Emission

- Using an all-electric fleet to expand green-mile access.

Engaged with our Community

- Deeply engaged in the community, including through Cruise for Good.

Accessible

- Expanding access to transportation for more communities of people.

American-Made

- Manufactured by union workers in the USA.



cruise

Focused on Safety

Safety is our top priority, always.

In our first million driverless miles, when benchmarked against human drivers in a comparable driving environment, Cruise AVs were involved in:

- 54% fewer collisions overall
- 92% fewer collisions as the primary contributor
- 73% fewer collisions with meaningful risk of injury

Cruise actively supports San Francisco's Vision Zero goals.



Minimal Risk Condition

A low-risk operating condition to which an autonomous vehicle automatically resorts either when the automated driving system fails or if it encounters a condition outside of its intended operational design domain, even temporarily.

(13 CCR § 227.02(i)).

A Safe, Precautionary Approach

- Cruise designs the AVs to achieve a MRC, even if it could continue safely – a precautionary approach
- Many MRCs do not implicate passenger or public safety
- Monthly reporting of every instance of MRC would be overly broad and unduly burdensome and do not target the types of incidents that impact passenger and public safety.





Thank you.

Questions/Discussion



Presentations from Parties

- Cruise
- **Waymo**
- San Francisco

Waymo

Questions/Discussion



Presentations from Parties

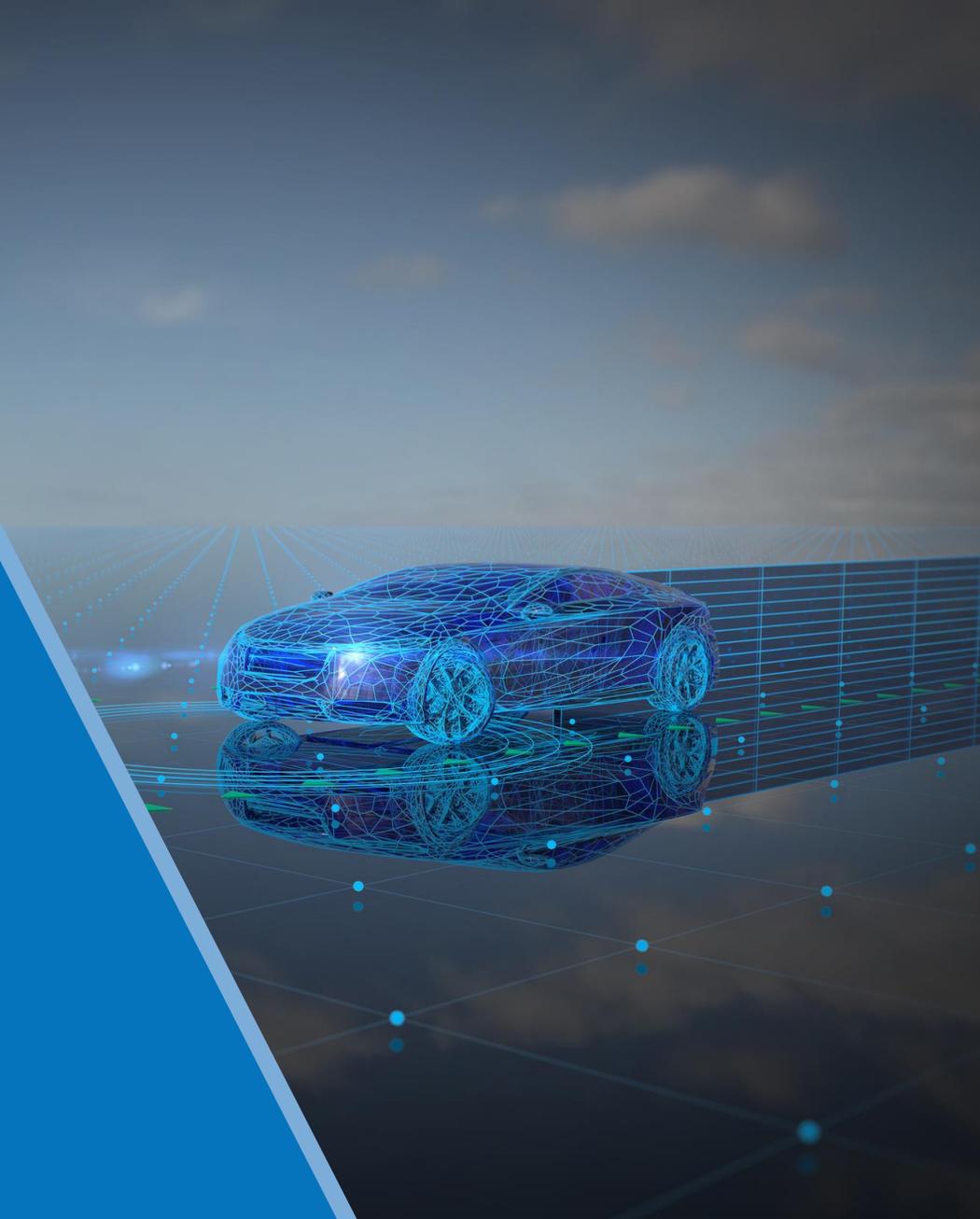
- Cruise
- Waymo
- **San Francisco**

San Francisco Near Term Priority Metrics & Data Uses

CPUC New AV Data Workshop:

Julia Friedlander
San Francisco Municipal Transportation Agency

June 22, 2023



Why Collect New AV data?

The purpose of existing and new data collection -- and associated metrics -- should be to:

- Create a performance evaluation framework across all CPUC goals for AV Passenger Services, and to
- Support evaluation of incremental permit expansions

New data collection is needed because existing requirements do not support evaluation of the number, rate and impacts of hazards that have arisen from driverless operation

New Priority Metrics & Their Use

San Francisco Supports CPED Proposals for new safety data collection *with some additions*

WAYMO & CRUISE ADVICE LETTER APPROVALS SHOULD FOLLOW:

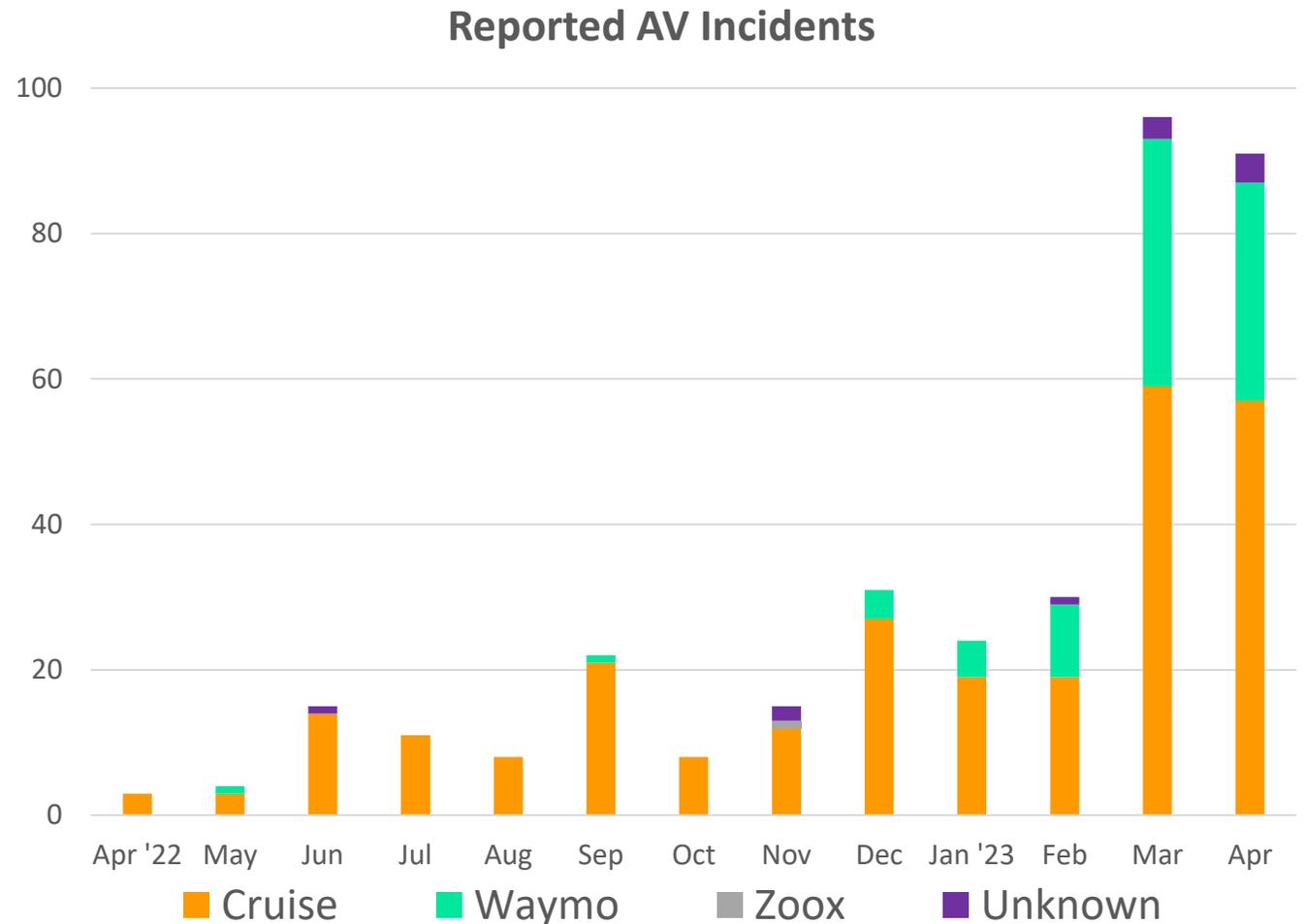
- More time to develop post-workshop comments
- Additional workshop(s) with chance for discussion
- Approval of operational safety metrics
- Collection & evaluation of operational safety data



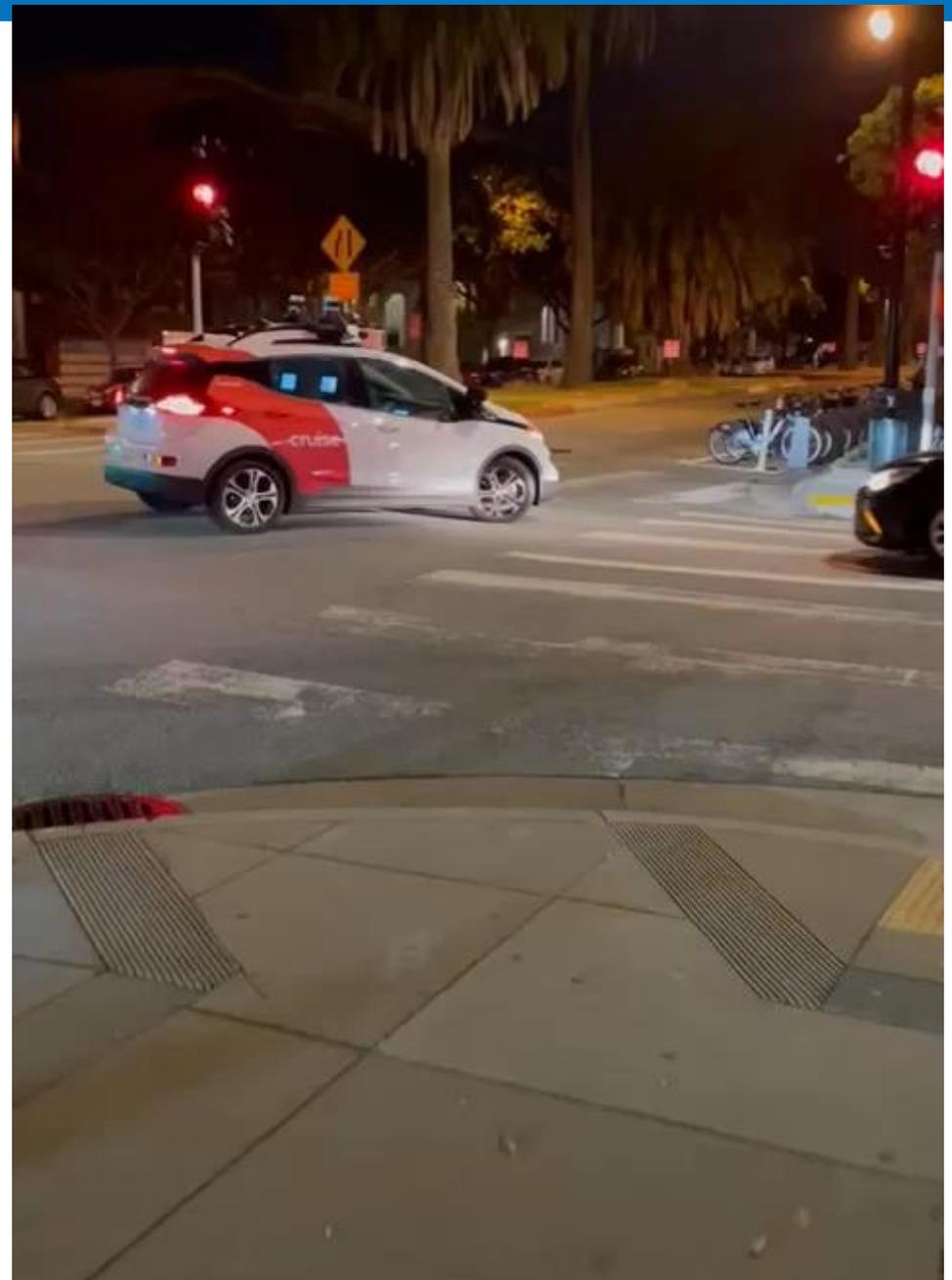
None of these incidents are captured by required DMV or CPUC data collection



Reported AV incidents from driverless operations have increased steadily since start of driverless operations with increase in number, variety, & intensity in 2023



Reported incidents frequently reflect violations of the California Vehicle Code 'Rules of the Road'



You asked us to prioritize metrics

- Safety is our most important goal!
- Safety should be viewed from a system perspective
 - Considering crashes AND hazardous incidents
 - Considering passenger safety AND public safety
- Developing safety metrics is our top priority

Priority Metric: Safety - Crashes



- SF supports CPED proposal for disaggregate reports & recommends:
 - Align with existing crash reporting framework
 - Require crash reporting under all permits
 - Require each report to identify permit(s) authorizing driving at time of event
- Analysis must recognize that all reports are self-reports written by permittees (not 3rd party evaluations)
- Role of crash reports in permitting process warrants workshop focused solely on this topic

Priority Metric: Safety - Unplanned Stops

- Hazardous unplanned stops are not all 'minimal risk condition' events; data collection must be broader to capture:
- Number, Duration & Impact of Unplanned Stops
 - Affecting Fire Suppression
 - Affecting Rail Transit
 - Affecting Other Transit
 - Affecting Roadway Workers
- Rate of Unplanned Stops
 - per VMT, by permit, by month, by county



Priority Metric: Safety - Planned AV Stops



- Hazard: Loading in travel lane can be especially dangerous for people with disabilities, cyclists & pedestrians and can create a service barrier for people with disabilities
- % planned stops for passenger loading within 18" of curb or off street (driveway, parking lot, etc.)

Other Commission Goals & Related Metrics

Environment: Emissions (GHG & PM2.5) per passenger mile traveled

Disability Access

- Availability of WAV service
- Equivalency of WAV service to non-WAV
 - % of requested trips completed
 - response time

Equity

- Fair distribution of access to service & quality of service
- Fair distribution of negative impacts of AVPS

Essential Data Features

Data quality is essential for useful metrics & reliable evaluation

Comprehensive	Disaggregate	Complete and non-duplicative	Timely	Public
<ul style="list-style-type: none">• Reports should include all data elements required to calculate all metrics• Each CPUC goal requires various metrics for proper assessment of performance	<ul style="list-style-type: none">• Reports should describe individual trips, collisions, incidents, or other events• Aggregation may preclude various types of analysis	<ul style="list-style-type: none">• Permittees should submit complete reports, providing ALL required elements• Data should be reported under all permits	<ul style="list-style-type: none">• Data should be reported & produced monthly to monitor & evaluate progress & to respond timely to issues affecting the public	<ul style="list-style-type: none">• Data should be public to support transparency & public trust in the industry & its regulation

Use: Most Data Should be Available to Public

New AV Data rulemaking should conclude with adoption of confidentiality matrix that:

- Protects privacy of AV users & incident 3rd parties
- Presumes data is public unless confidential treatment is justified (consistent with CPUC TNC rulings)
- Prevents continuous re-litigation of previously rejected trade secret claims
- Addresses all data fields (including new fields not addressed in TNC rulings)
- Does not allow confidential treatment for TNC fields redacted based on *driver privacy*

Conclusion

- Commission agenda for June 29 proposes to approve Advice Letters submitted by both Cruise & Waymo
- Commission proposes to adopt safety metrics *after* approvals & has not identified timeline for setting minimum standards on these or other metrics
- This process is backwards
- Development of operational safety metrics should not be rushed
- Commission should take the time needed to develop operational safety metrics & minimum standards before approving 24/7 service with unlimited fleets

Thank you!

Questions/Discussion



Public Comment

Closing Remarks

Thank you!

Post-workshop comments should be filed in R.12-12-011
and served on the service list by **June 27**



California Public Utilities Commission

Josh Huneycutt, Transportation Policy Supervisor
Ashlyn Kong, Lead Analyst

AVPrograms@cpuc.ca.gov