

# CPUC Status Conference: Safety Issues Regarding Driverless AV Interactions with First Responders

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# Outline of San Francisco Responses

## **Part 1.** Section 4.1: Questions 1-6

- Driverless AV Impacts on Emergency Response

## **Part 2.** Section 4.1: Questions 7-12

- Training Issues
- San Francisco Tools Supporting Solutions

## **Part 3.** Section 4.2

- How should AVs blocking first responders be cleared and how quickly?

## **Part 4.** Section 4.3

- Gaps in Passenger Services Plans

## **Part 5.** Section 4.3

- Solutions for gaps & role of Mobility Data Specification (MDS)

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**PART 1:** Driverless AVs stopping unexpectedly: impacts on safety of first responder operations

Q1: HOW MANY DRIVERLESS UNEXPECTED STOPS IN SF?

# SF doesn't know. Operators don't disclose this information

The following chart of VRE per 1,000 miles illustrates this month-over-month improvement. Of specific note, the ratio of VRE per 1,000 miles can be seen to improve even as total driverless miles continue to rise.



**REDACTED**

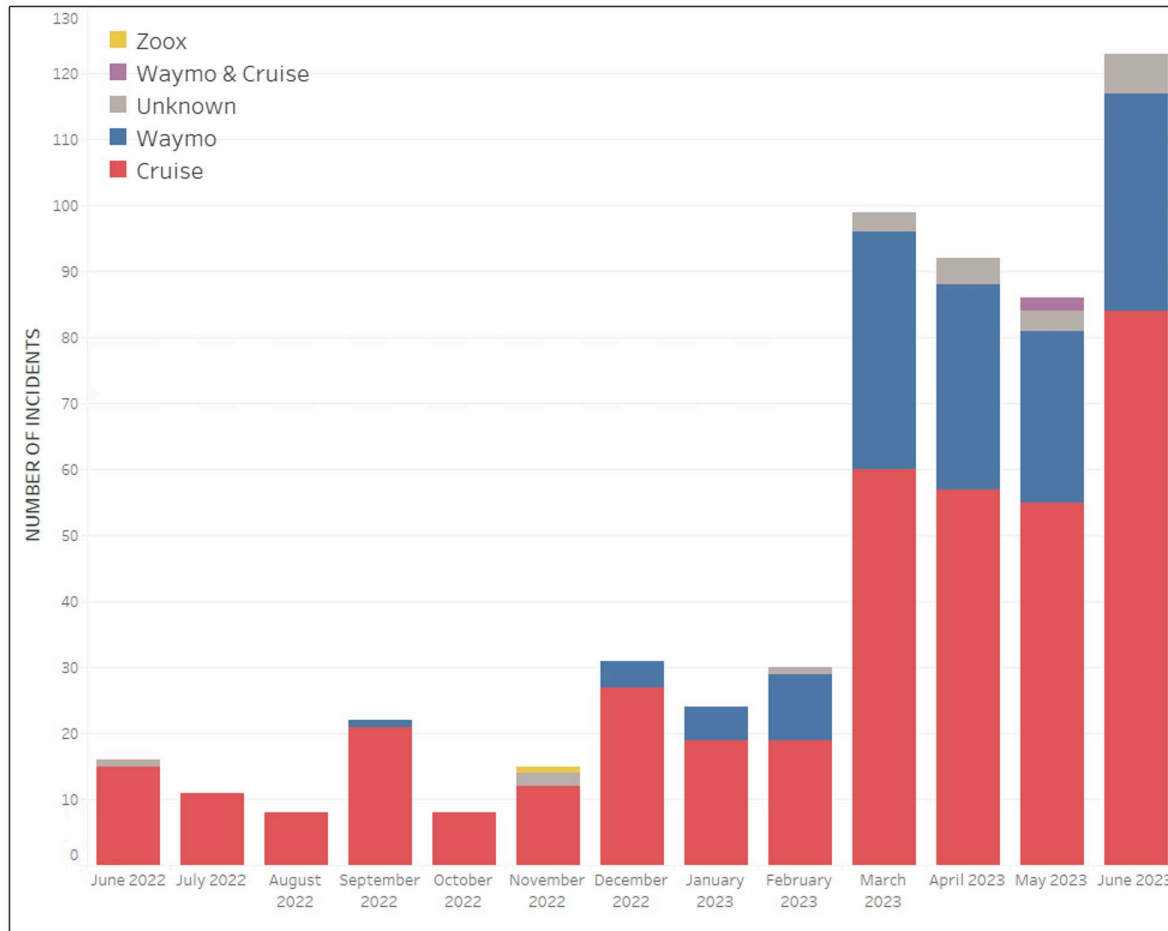
Figure 4: VRE per 1000 Miles

Source: PUBLIC GM-Cruise Responses to NHTSA Questions re Part 555 Petition for Temporary Exemption for the Cruise Origin. VRE = Vehicle Retrieval Event  
Available at <https://www.regulations.gov/document/NHTSA-2022-0067-0086>

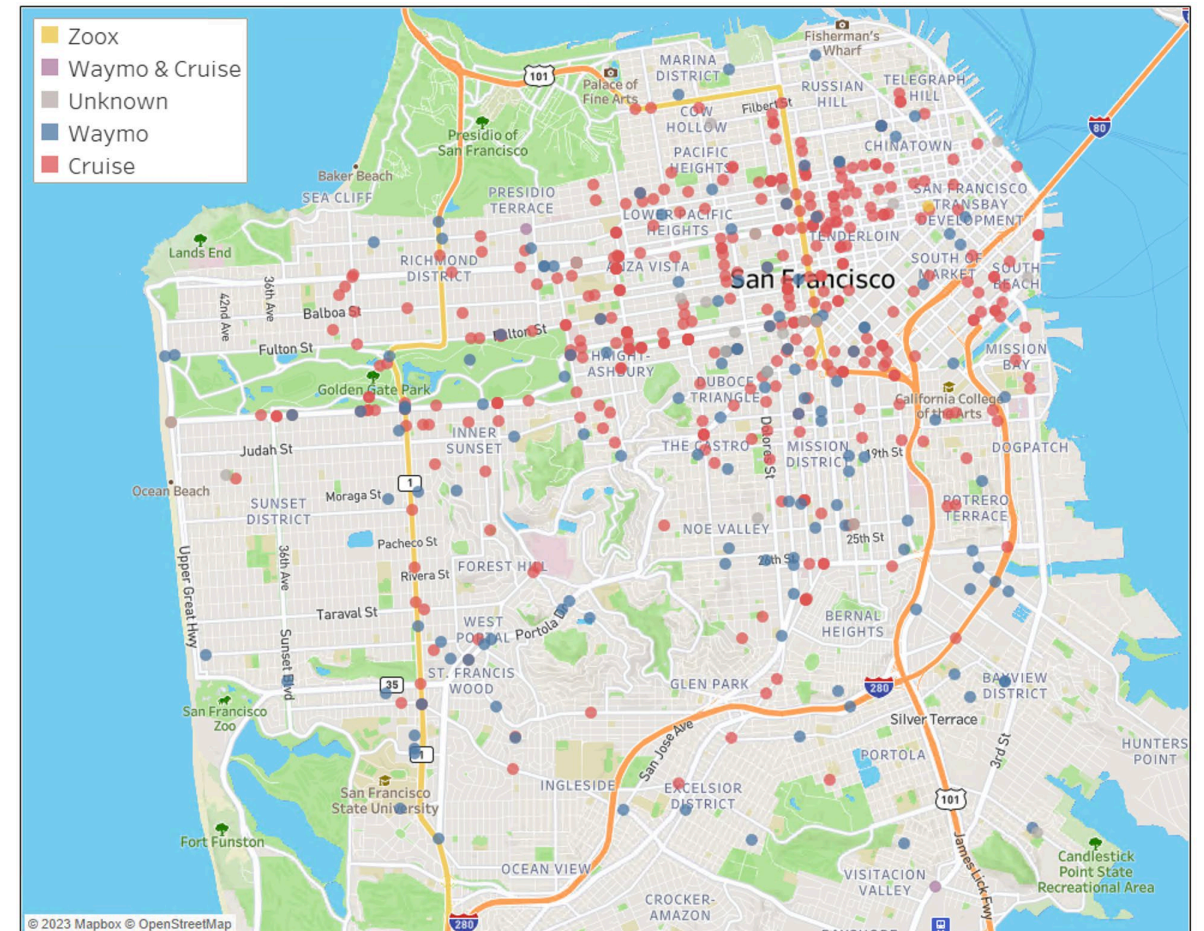
Q1: HOW MANY DRIVERLESS UNEXPECTED STOPS IN SF?

# What we know: Almost 600 incidents reported since launch of driverless operations – likely a fraction of actual incidents

### AV Incidents Reported to SF by Month



### Known Locations of Reported AV Incidents

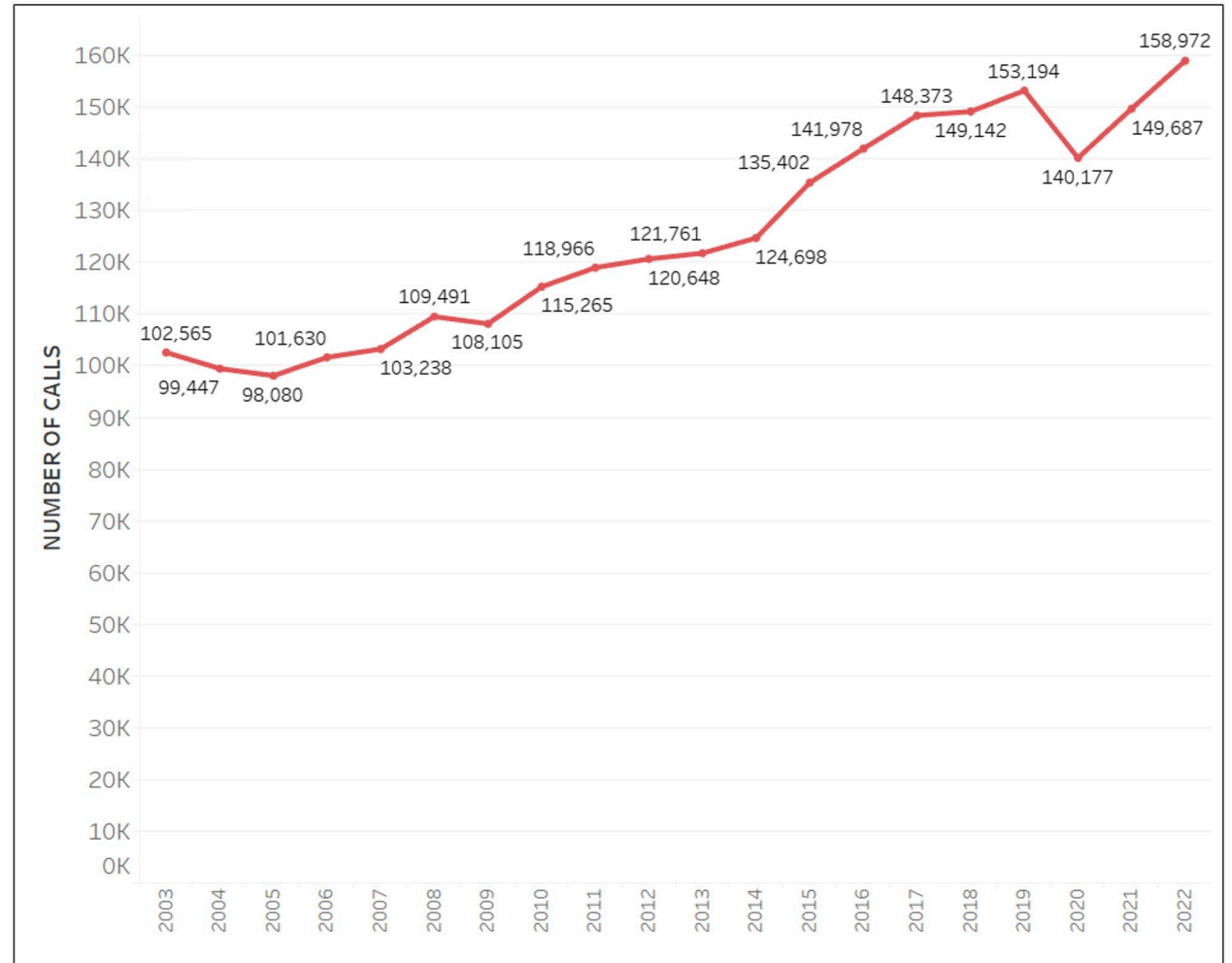


# What we know: SFFD is 9th busiest fire department in the U.S.

- Engine 3 is the busiest engine in the nation (~9,100 calls)
- Truck 3 is the third busiest truck in the nation (~5400)



SFFD Calls per Year (2003-2022)



# Cruise & Waymo do not disclose counts of unexpected stops or other incidents that impeded first responders

SFFD has logged  
~**50** written reports  
of interference in  
2023

- **Stops:** Obstructing station ingress/egress
- **Stops:** Obstructing travel to emergency
- **Driving:** Contact or near-miss with personnel or equipment
- **Driving:** Intrusion into SFFD operations
- **Driving:** Unpredictable operations near response zone

Q5: HOW DID INCIDENTS RESOLVE & HOW LONG DID IT TAKE?

# Human traffic control provided by SFPD & SFMTA is essential to SFFD operations



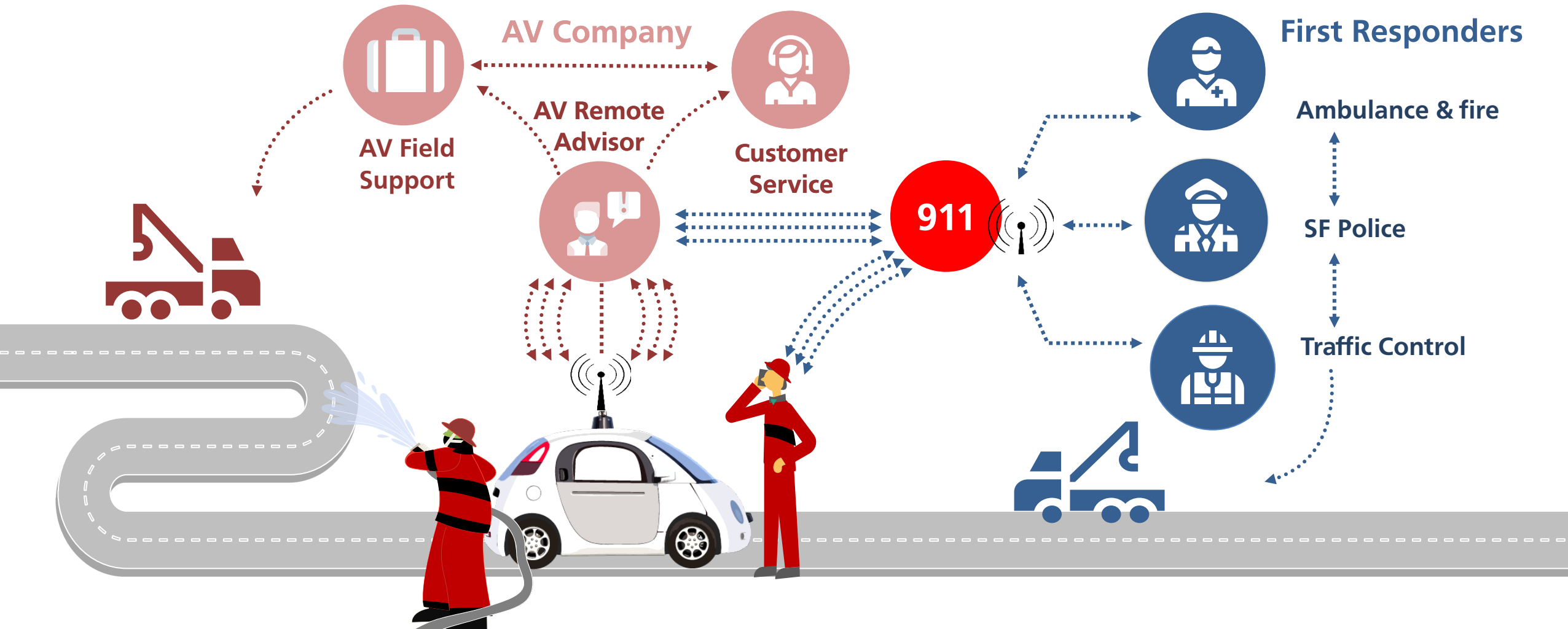
San Francisco Police Department (SFPD)



SFMTA Parking Control Officers (PCO)



# Human eye contact, simple gestures & on-site conversation are much faster than AV substitutes



# Cruise does not disclose the duration of unexpected stops; City records show incidents ranging from minutes to hours

## 7. Please provide information on Cruise's incident response timing between:

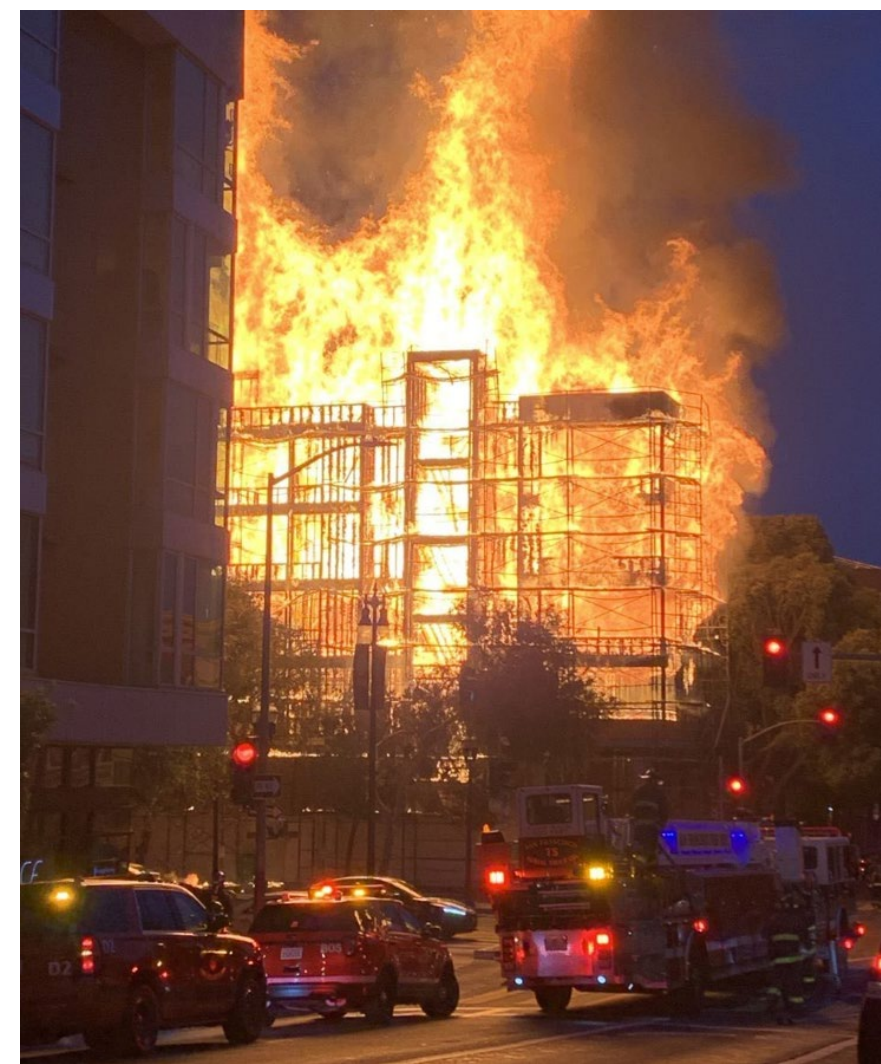
As noted, an MRC is a low-risk operating condition that the ADS automatically executes in certain non-nominal conditions. As Cruise uses the term, "MRC" refers to instances in which the vehicle can recover on its own or recover with remote assistance. That is, in-person human assistance is not required to recover from an MRC. As discussed in Question 5, in the event the AV cannot recover on its own or with remote assistance, the AV would need to be retrieved by a field service representative. We refer to such events as vehicle retrieval events (VREs).

[ **REDACTED** ]

Q: WHERE AVs ARE BLOCKING SFFD, HOW AND HOW QUICKLY SHOULD SITUATION BE RESOLVED?

## AVs should respond to SFFD direction immediately

- Every second can make the difference between life or death
- A fire's size can double in one minute
- Larger fires lead to > displacement
- "Time is muscle" in response to heart attacks



# Driverless AVs are not ready to scale in San Francisco



- Fire personnel need to focus on our mission to save lives and protect property from catastrophic loss
- Current trends:
  - Increasing runs for both fire & medical response
  - Increasing interference from driverless operations will undermine already stretched resources
- Giving Cruise & Waymo authority to expand at their own discretion does not serve public safety

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**PART 2:** Training questions

# Cruise & Waymo training for SFFD & SFPD needs improvement

## Scheduling

- Included with scheduled in-service training

## Challenges

- **Separate** training with no industry standard for Cruise, Waymo (& soon Zoox) is burdensome
- **Content** of training does not address current problems

# AVs need to be better trained for emergency response and other interactions

- Faster placement of geofencing exclusion zones /avoidance areas around emergency sites to prevent intrusion
- Better perception of caution tape, cones & wires
- Easier & faster communication to and from first responders & other road users



# AVs need to be better trained to communicate more quickly and effectively in emergency response events

**Timely response to direction from human traffic control is essential**

Special Events

Motorcades

Traffic Signal Outages

Storm damage

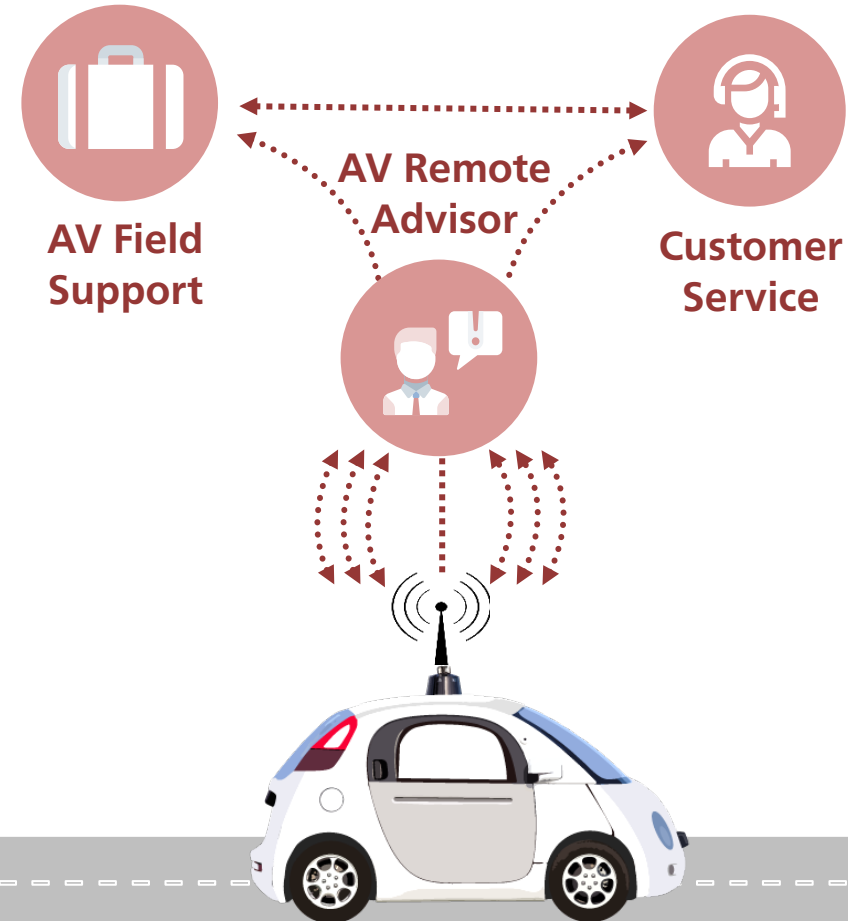
Human traffic control officers cannot safely leave intersection to talk with remote advisors about just one vehicle





# AV remote advisors need to be better trained for emergency responder interactions

- In review of sample incidents, companies both cited errors by remote advisors
- Interactions between AVs and remote advisors take too much time



# AV providers should be designing improvements with input & review from first responders

- Improvements should be workshopped with & evaluated by emergency responders:
  - Human traffic control
  - Response to lights & sirens
  - Avoiding areas marked with caution tape
  - Methods for communicating to first responders
- AV companies, not taxpayers, should cover City costs for this process
- Recent discussions between City and Cruise & Waymo show the potential value of closer collaboration in achieving better AV performance around emergency responders



Section 4.2 question: How quickly should AV disruptions be resolved?

# They should be avoided or resolved immediately.

## City tools that may support AV industry improvement.

Jul 25, 2023 5:41 PM

March 21, 2023 5:41 PM

ALERTSF: Extreme wind has caused major traffic and transit delays. Use caution while driving & prepare for power outages.

ALERTSF: The incident in the area of Waller St. and Fillmore St. has been RESOLVED.

Aug 1, 2023 6:09 AM

ALERTSF: Avoid the area of Octavia St and Oak St due to fire activity. Emergency crews are on scene.

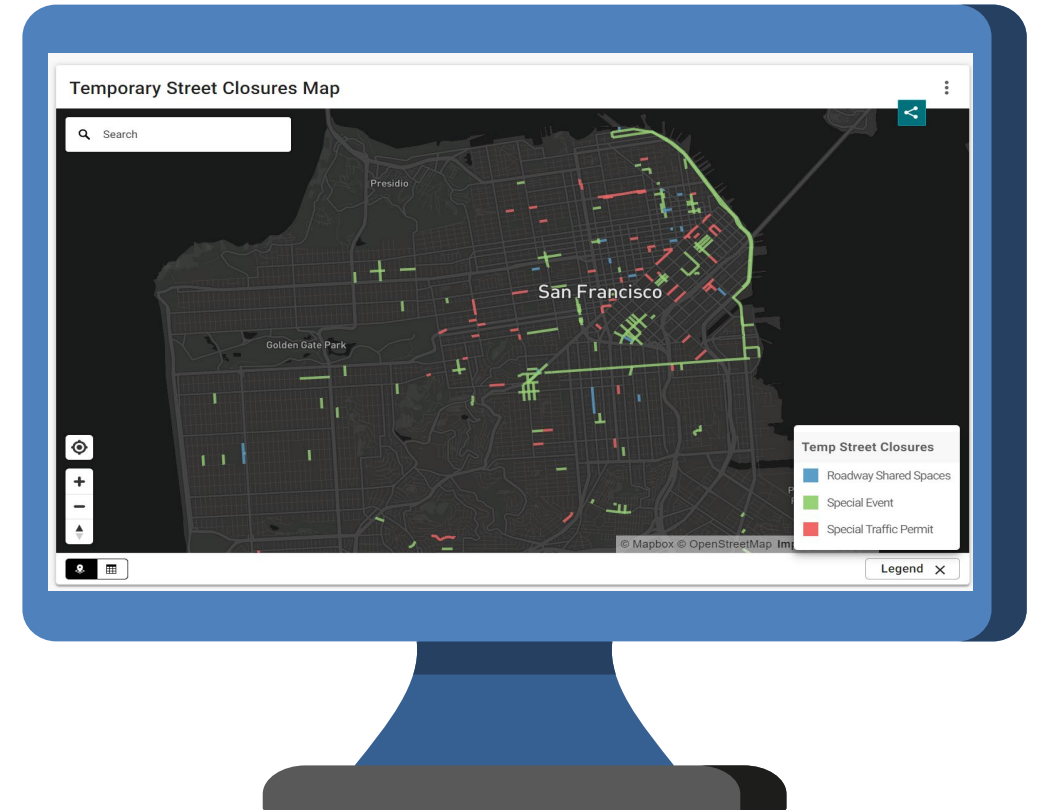
# City tools could support AV industry improvement

Work Zone Data Exchange (WZDx) Feed	Navigation Service Provider Support	Digital Curb Project
<ul style="list-style-type: none"><li>• Announces upcoming &amp; current permitted street closures due to the Shared Spaces program</li><li>• Announces some special event &amp; construction related permits issued by SFMTA</li><li>• Uses WZDx industry standard sponsored by USDOT</li></ul>	<ul style="list-style-type: none"><li>• Regular SFMTA emails announce major street changes to navigation &amp; transportation providers (e.g., Google &amp; Apple Maps, Uber, Lyft, Waymo, Cruise, &amp; Zoox)</li><li>• Real time transit updates @ <a href="https://twitter.com/sfmta_muni">https://twitter.com/sfmta_muni</a> &amp; <a href="https://sfmta.com/Updates">SFMTA.com/Updates</a></li><li>• Weekly press releases announce street closures for special events, supplemental transit services, additional passenger loading zones, construction updates</li></ul>	<ul style="list-style-type: none"><li>• SFMTA will create &amp; maintain a citywide dataset on all curb locations &amp; regulations</li><li>• Will make data available via the standard Curb Data Specification</li><li>• Funded by USDOT: 2023</li><li>• Expected completion: 2025</li><li>• Facilitated in coordination with other cities by Open Mobility Foundation</li></ul>

# City tools could support AV industry improvement

San Francisco's open data portal, [DataSF.org](https://data.sfgov.org/) contains numerous data sets about San Francisco streets

- 20+ datasets about SF streets
  - Temporary Street Closures
  - School crossing guard locations
  - Muni routes and stops
  - Bike lane network
  - High-injury network
- Data can be downloaded or obtained from the portal via an API
- Update frequency varies



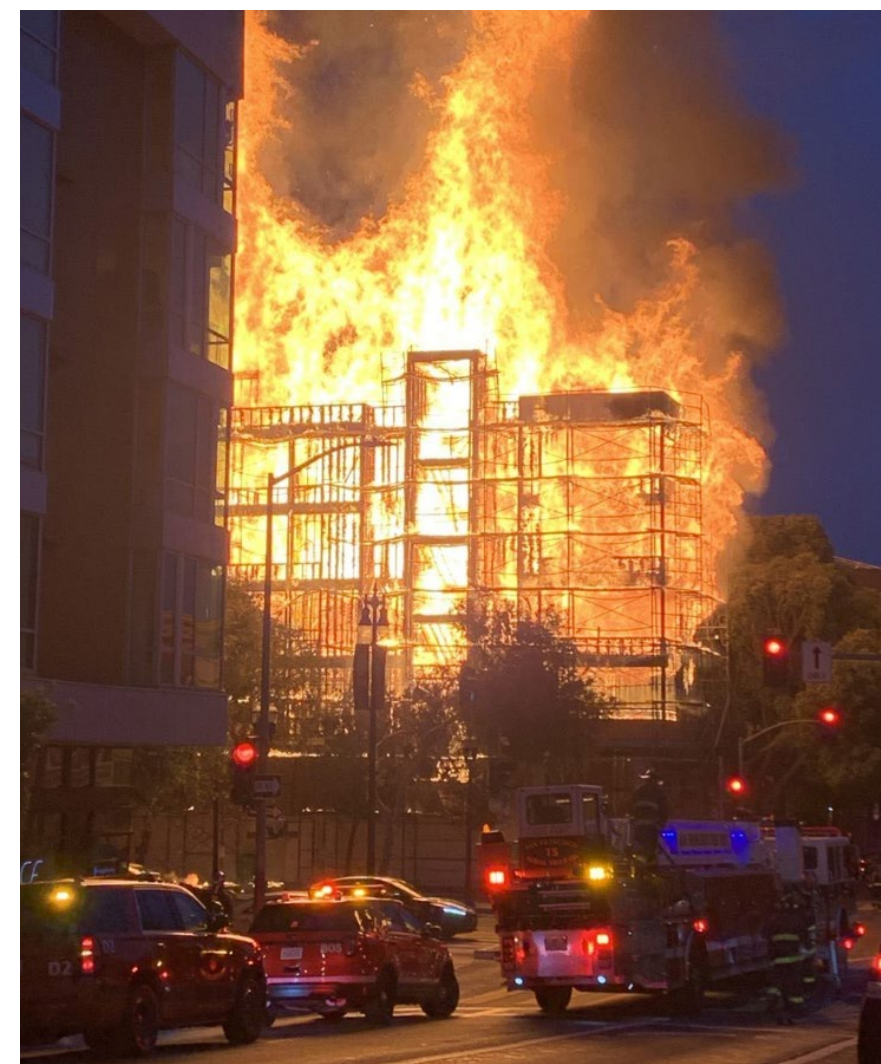
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**PART 3:** How should AV interference be resolved and how quickly?

Q: WHERE AVs ARE BLOCKING SFFD, HOW AND HOW QUICKLY SHOULD SITUATION BE RESOLVED?

## AVs should respond to SFFD direction immediately

- Every second can make the difference between life or death
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# AV should respond to Fire Department, SFPD, or MTA traffic control direction immediately

- CVC = California Vehicle Code
- CVC Section 21806 requires a motor vehicle to yield the right of way to an emergency vehicle approaching with lights & sirens
  - Human driver must pay \$490 fine and receives a point on their license
  - Violations should also affect AV permittee privilege of operating
- CVC Section 22500 prohibits stopping, parking or leaving standing any vehicle, attended or unattended in an intersection, on a crosswalk and within 15 feet of a fire station driveway
- CVC Section 21708 prohibits driving on, over or across or in any manner damaging any fire hose under the supervision of a fire department



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**PART 4:** Gaps in passenger safety plans (4.2)

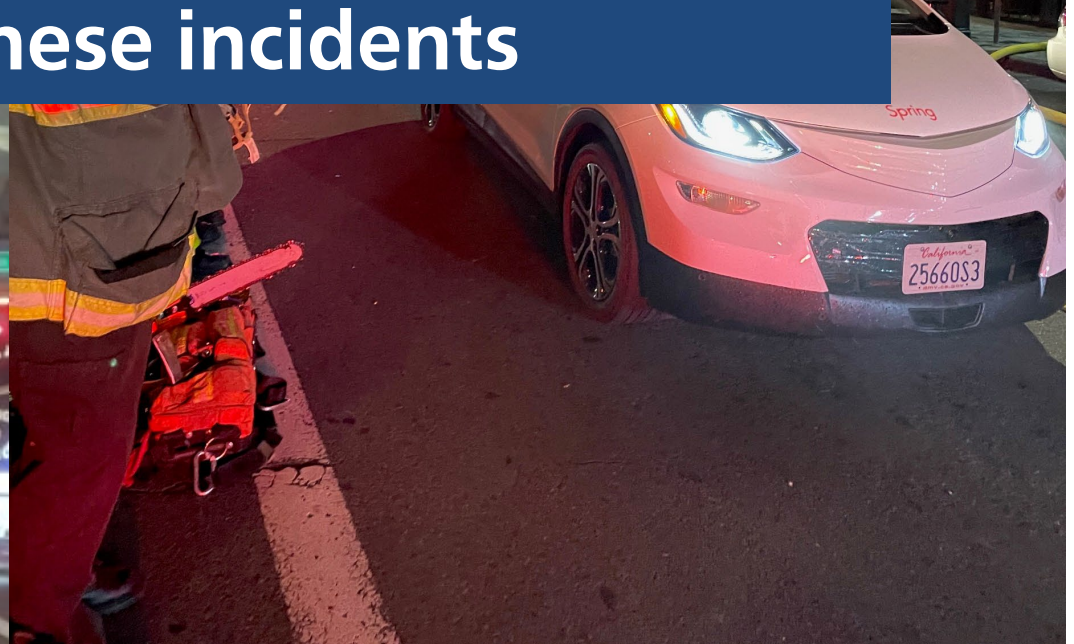
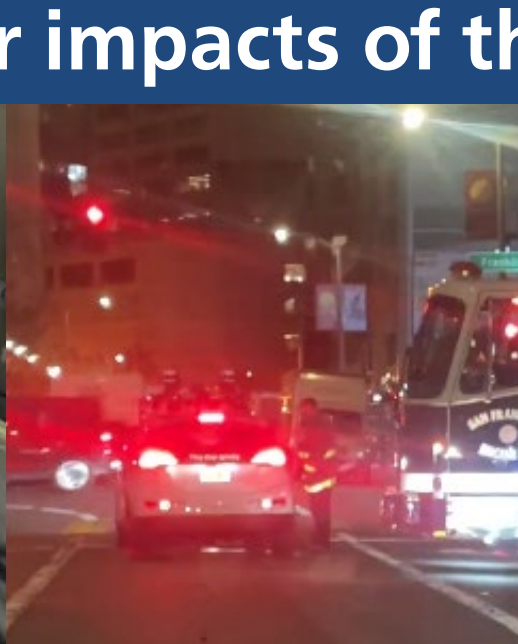
# Gaps of greatest concern are those between aspirational statements in plans & actual performance on the street



- These gaps require stronger regulation
- Commission should
  - measure performance
  - authorize expansion incrementally
  - Based on applicant performance



California regulators collect no data documenting the frequency or impacts of these incidents



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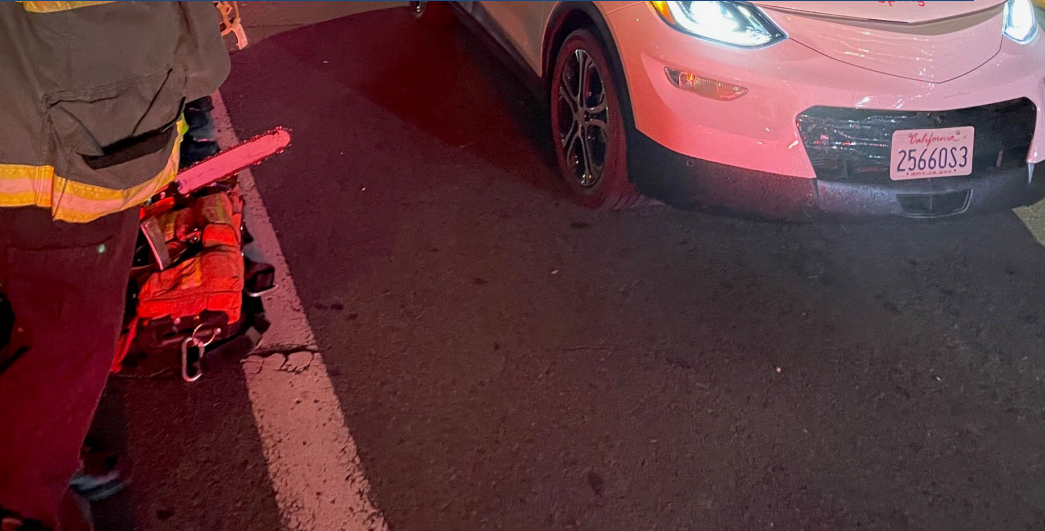
**PART 5:** Solutions for gaps; use of Mobility Data  
Specification (MDS)

## Role for Mobility Data Specification (MDS)

- **Background:** MDS created by LA & other cities to define data fields & data transmission to manage transportation services in the public right of way
  - **Open Mobility Foundation** manages MDS for public & private users
  - **Use:** Some cities use for real time device management; others for routine reporting
  - **MDS 2.0** recently added data fields for motor vehicle passenger services
  - **MDS 3.0** could incorporate new data fields for AV passenger services
- **Purpose:** facilitates data exchange for right of way management that provide standard data collection so that companies offering shared mobility in many markets can use standard approaches
- **SF Position:** San Francisco supports using data standards jointly developed by public & private sectors to facilitate safe street operations



California regulations set no standards to limit these incidents or reduce their impacts on safety & first responders



# Conclusion

- Current impacts of driverless operations on first responders should preclude unlimited expansion:
  - of fleet size
  - of hours of service into peak travel hours
- Commission actions should create level playing field on which operators compete to improve impacts on public, not just convenience for users
- Cruise & Waymo should demonstrate, through data available to the public, ability to avoid or minimize interference with emergency responders before expansion approval

**Thank you**