



**UC DAVIS**

**Mobility Science Automation  
and Inclusion Center**

Institute of Transportation Studies

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# UC Davis MoSAIC Research Portfolio

## Shared Mobility Research

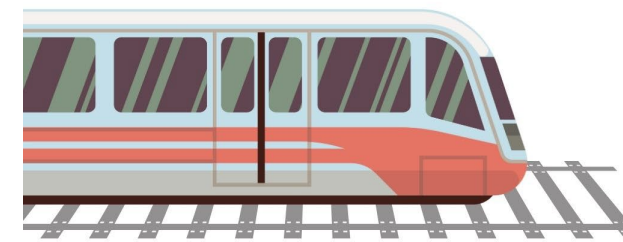
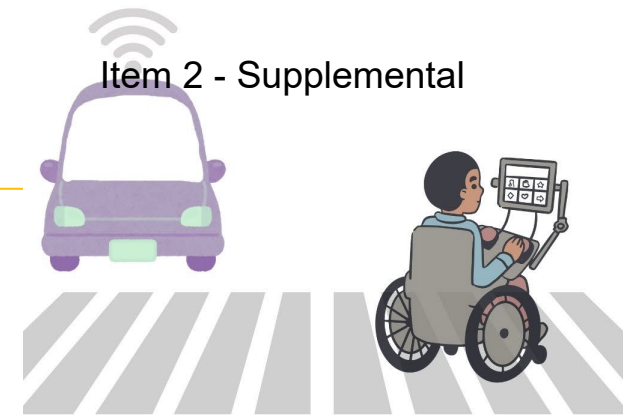
- Mobility Wallets
- First/last mile
- Curb Management

## Connected and Autonomous Vehicles

- Automated Vehicle (AV) Safety Policy Analysis
- Local Stakeholder Response and Prioritization
- How Automated Labor, Freight, and Safety Intersect
- Partial Automation
- Improving the Safety of Highway Travel
- Reimagining Intersection Safety with connected infrastructure

## MoSAIC leads on AI Foundational Research

- Deep reinforcement Learning Technique- Research to improve outcomes of deep learning algorithms in different settings



# Discussion: Top 5 Topics (and Top 3 Themes) in Transportation Tech for Marin

		Partnerships		
		Data		
Innovative and AI tools				
<p><b>1. Shared Mobility</b></p> <p>How can transit offerings be more seamless and multimodal?</p> <ul style="list-style-type: none"> <li>• payment innovation</li> <li>• mobility wallets</li> <li>• first/last mile</li> </ul>	<p><b>2. Automated</b></p> <p>How should public investments improve safety and access?</p> <ul style="list-style-type: none"> <li>• Improve infrastructure for conditional &amp; partially automated</li> <li>• Test connected infrastructure</li> </ul>	<p><b>3. Electrified</b></p> <p>How can public investments be maximized for climate benefits?</p> <ul style="list-style-type: none"> <li>• Who plans and leads different investments? (e.g. for cars, buses)</li> </ul>	<p><b>4. Advanced Air Mobility</b></p> <p>How can electric vertical take-off and landing (EVTOL) benefit Marin?</p> <ul style="list-style-type: none"> <li>• First responder applications</li> <li>• Improve rural community health outcomes</li> </ul>	<p><b>5. Demand Management</b></p> <p>How can new tools improve our ability to model and experiment?</p> <ul style="list-style-type: none"> <li>• Test curb and corridor productivity measures using on- and off-street tools</li> </ul>

# TAM Innovation Workshop – San Francisco Experience and Resources

Tilly Chang, SFCTA



San Francisco  
County Transportation  
Authority

October 23, 2025

# San Francisco's Transportation Goals

SFCTA is SF's county Congestion Management Agency.

We seek to manage innovative transportation technologies toward achievement of citywide goals:

- San Francisco Transit First Policy (1973)
- Safety (Vision Zero Policy, SFTP)
- Environmental Quality (Climate Action Plan, SFTP)
- Economic Vitality, Equitable Access and Accountability (San Francisco Transportation Plan)



# SF Technology-Enabled Transportation Services



# SF Principles for New Mobility



**Safety**



**Transit**



**Equitable  
Access**



**Disabled  
Access**



**Sustainability**



**Congestion**



**Accountability**



**Labor**



**Financial  
Impact**



**Collaboration**

# Balancing Innovation and the Public Trust

## Policy and Planning

- Define objectives, obtain authorities
- Plan and monitor activities over time

## Permit

- Regulate and recover costs
- Collect data and evaluate

## Price

- Establish fees, taxes, and penalties

## Pilot

- Improve safety, test technology
- Close equity/access gaps, engage stakeholders



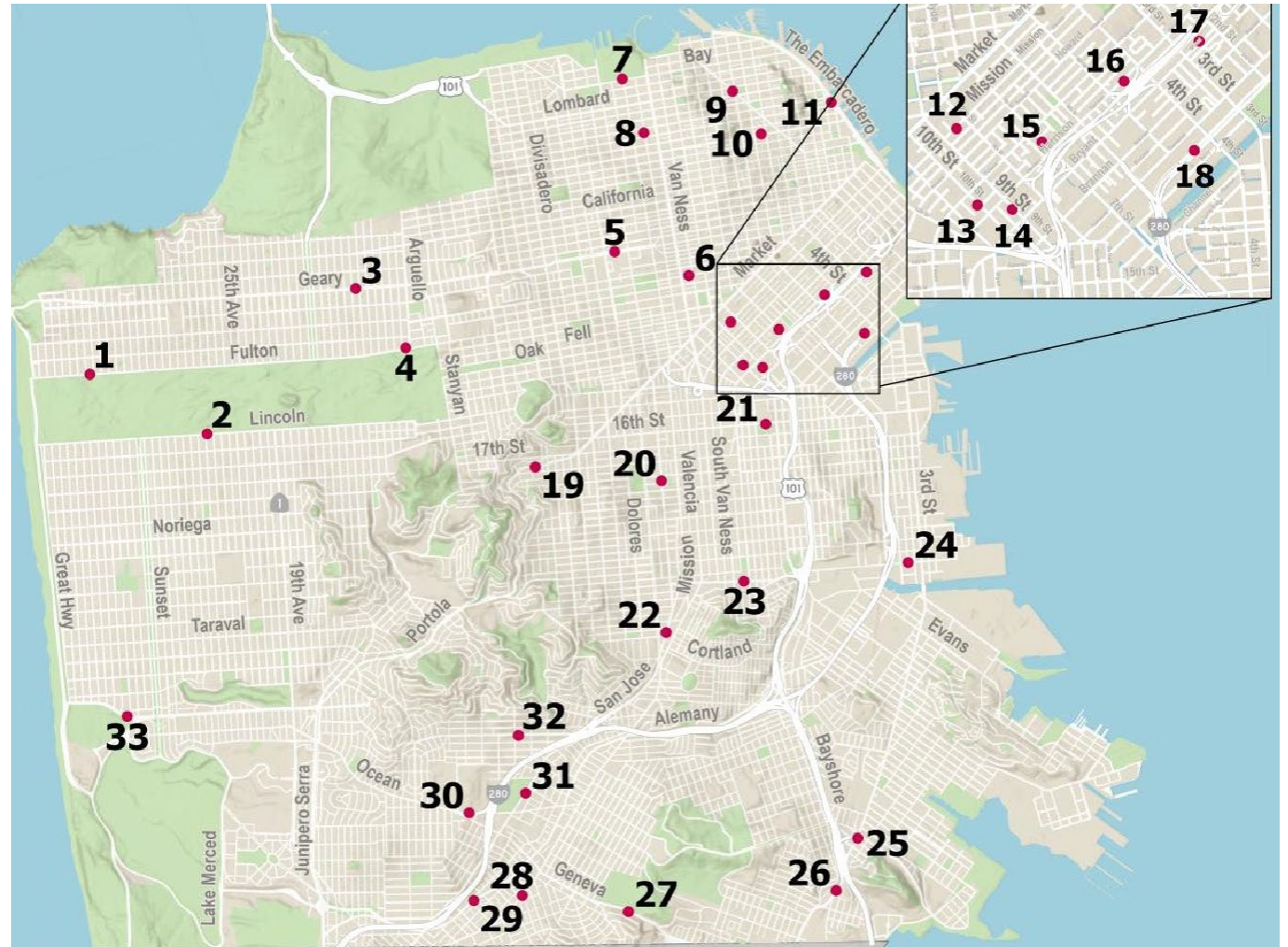
# Local Transportation Regulation and Management



- SFpark Parking Management Program
- Powered Scooter Share Permit Pilot Program
- Stationless Bikeshare Permit Pilot Program
- Corporate Shuttle Permit Program
- SF TNC Tax – 3.25% on solo trips
- Treasure Island AV Shuttle Pilot
- Automated Enforcement (No Right on Red, Speed Safety Cameras)
- AV/Ridehail Access to Market Street and SFO

# SF Speed Safety Camera Pilot Program

- AB645 passed 2023
- 33 intersections equipped with speed safety cameras
- 60 days of warnings followed by citations for speeding 11+ mph
- Penalties ranging from \$50-\$500, with low-income discounts
- Preliminary results: 72% reduction in speeding



Visit: [sfmta.com/projects/speed-safety-cameras](https://sfmta.com/projects/speed-safety-cameras)

# The “Loop” AV Shuttle on Treasure Island

- Operated in 2023 entirely on public roads 7 days/week, 9 am – 6 pm
- Fully electric, free autonomous shuttle with attendant on board
- Fixed route, wheelchair accessible
- Funded by US DOT, MTC and SFCTA
- Engaged CBOs, labor and SFUSD

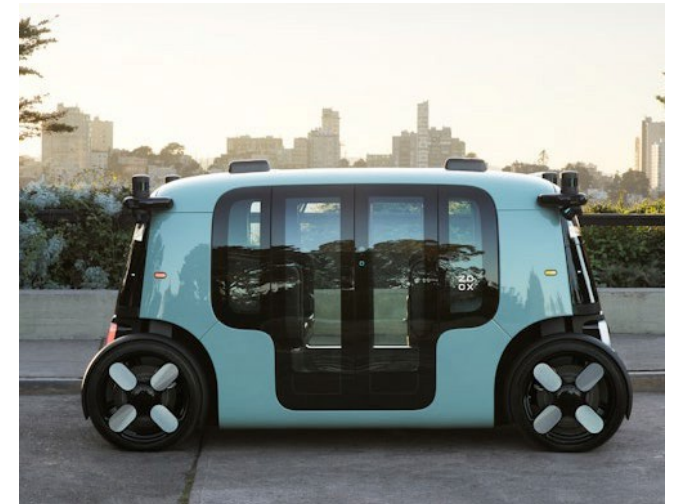


Visit: [TI-loop.com](https://ti-loop.com)

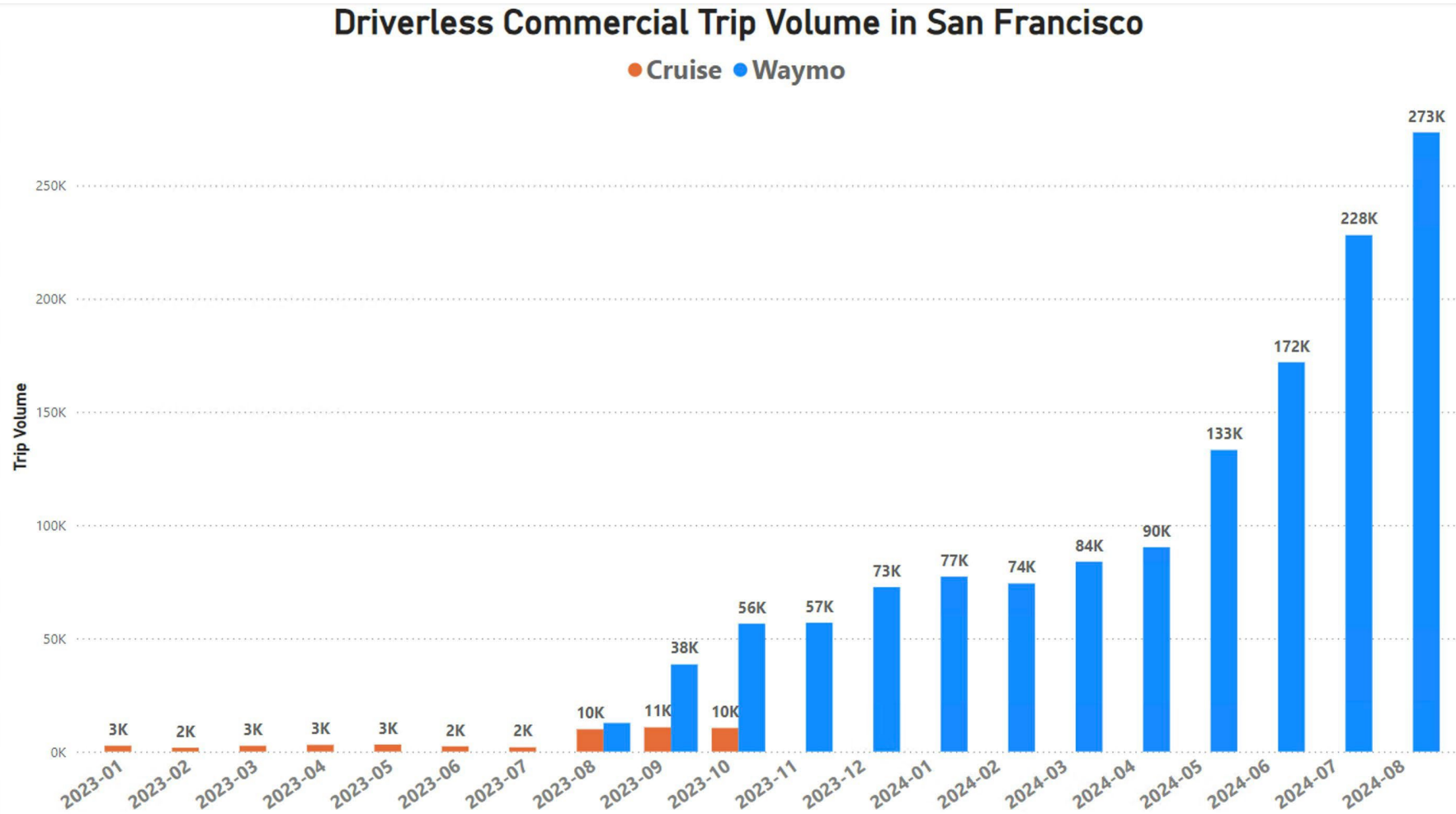
# SF AV Passenger Services

SF is the locus of Driverless AV Deployment

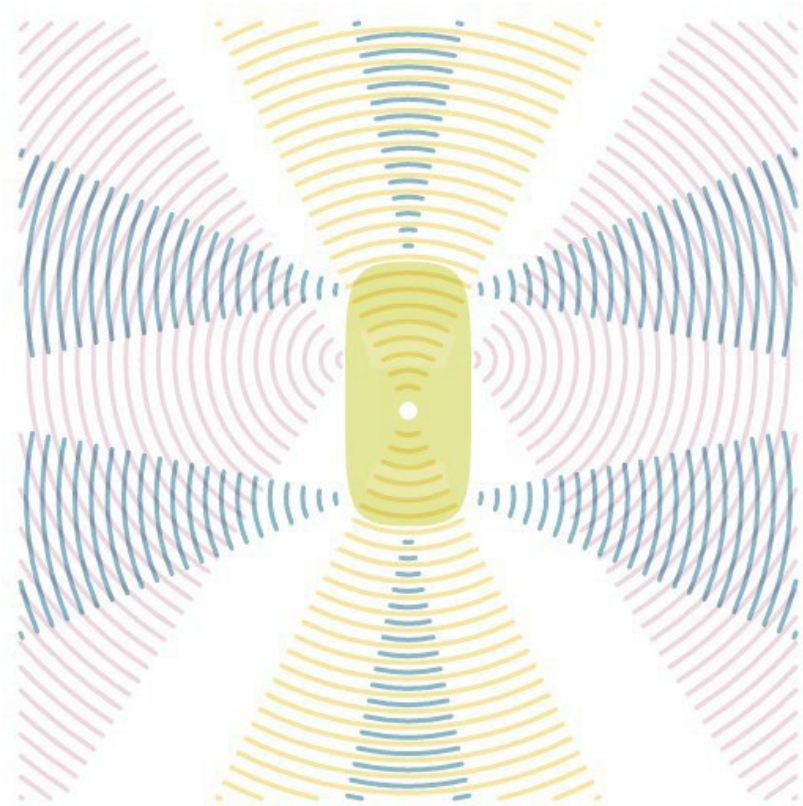
- Testing period: malfunctions, EV and transit conflicts
- 2 AV companies were approved for commercial deployment in SF in Aug 2023:
  - Cruise (permit suspended in Oct 2023)
  - Waymo
- Cruise shut down in 2024, Waymo continues to operate in SF and beyond
- Zoox testing driverless AV services in SoMA
- Waymo permitted to operate on Market Street and SFO Airport



# Driverless Operations in SF 2023-2024

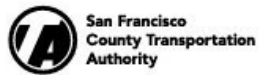


*Source:*  
*CPUC 2023-2024*  
*AV data*



## Conceptual Safety-Focused AV Permitting Framework

Toward an Incremental, Performance-based and Transparent Permitting Approach



Final Report: September 2025

- SF Board of Supervisors adopted Policy Resolution on AVs and requested AV Permitting Study in late 2023
- SFCTA's recently adopted study proposes a conceptual safety-focused permitting framework that:
  - Supports incremental, performance-based AV deployments
  - Aims to mitigate public exposure to risk
  - Strengthens transparency and accountability

Available at: [sfcta.org/policies/av](https://sfcta.org/policies/av)

## SFCTA New Mobility, Ridehail and AV Policy Resources

## SFMTA Permitting and Speed Safety Camera Resources

- Emerging Mobility
  - Emerging Mobility Principles and Evaluation Report
  - <https://www.sfcta.org/policies/emerging-mobility>
- San Francisco Prop D Ridehail Tax
  - <https://www.sfcta.org/funding/tnc-tax>
- Treasure Island “Loop” AV Shuttle Pilot
  - visit [www.ti-loop.org](http://www.ti-loop.org) for Evaluation Report
- SFCTA AV webpage – [www.sfcta.org/policies/av](http://www.sfcta.org/policies/av)
  - Input to federal, state regulators, SFCTA Board hearings
  - Conceptual Safety-focused AV Permitting Framework Study
- SFMTA Shared Mobility Dashboards
  - <https://www.sfmta.com/shared-mobility-dashboards>
- Speed Safety Camera
  - <https://www.sfmta.com/projects/speed-safety-cameras>

# Thank you. Questions?



San Francisco  
County Transportation  
Authority



[sfcta.org/stay-connected](https://sfcta.org/stay-connected)



# GETTING READY FOR AI

## A TRANSPORTATION CONSULTING FIRM PERSPECTIVE

**INNOVATION WORKSHOP: TRANSPORTATION AUTHORITY OF MARIN  
OCTOBER 23, 2025**

# ABOUT DKS



---

**1979**  
Year Founded

**45**  
Years in Business

**8**  
Offices

**170+**  
Employees Firmwide

**S Corp**  
Form of Organization

---

DKS Associates provides specialized transportation planning, design, and engineering services to public agencies throughout the West.

We provide expert services in planning, traffic design, modeling and analysis, safety, electromobility, transit, resilience planning, TSMO and tolling, and community engagement.

## **TRANSPORTATION IS RAPIDLY EVOLVING.**

Advances in new technologies, evolving social and environmental needs in our communities, and changes in the economic landscape, means the transportation industry is quickly changing.

DKS's innovations help our clients make smart transportation planning and engineering decisions, and innovation is at the heart of what we do.

## **SO HOW CAN WE LEVERAGE AI IN:**

- Our Internal Practices
- Our Work with Clients
- Our Industry Contributions

# AI IN OUR INTERNAL PRACTICES

We formed an AI Committee. Our cross-functional team is guiding responsible and strategic AI adoption across the company. We drafted a plan.

We have developed custom GPTs to support our efforts in research, marketing, document review, code generation, testing, and data cleaning.

We provide internal support to our team members with questions, ideas, and help with our AI tools such as ChatGPT and Perplexity. We have monthly AI office hours.



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## ARTIFICIAL INTELLIGENCE FRAMEWORK AND INTERIM POLICY

DATE: November 21, 2024

TO: Executive Team

FROM: AI Committee

SUBJECT: Artificial Intelligence Framework and Interim Policy

#004-COR-011



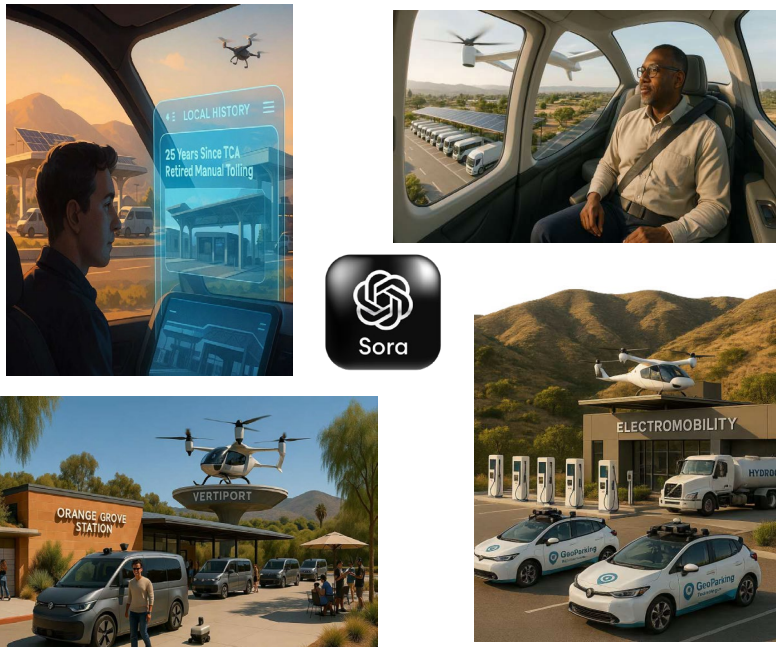
Marshawn,  
one of our  
custom GPTs



# AI IN OUR INTERNAL PRACTICES

We have used Sora for image and video generation to imagine new transportation solutions such as eVTOL stations for upcycling toll plazas.

We have trained custom GPTs for safety countermeasure analysis.



Preview Model 5 Thinking

Provide countermeasure for angle crashes at signalized intersections

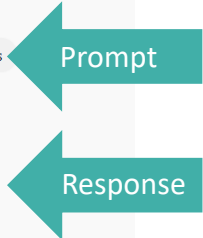
Thought for 1m 59s

Here are evidence-based countermeasures for **angle crashes at signalized intersections** (non-freeway facilities only). I filtered for CMF < 1 (or positive CRF), star quality ≥ ★★★, and removed interstate/ramps/expressways.

Countermeasure	CMF	CRF	Quality Rating	Comments
Replace permissive with protected left-turn phase	0.021	97.9%	★★★★	Urban; Signalized
Replace Night-Time Flash with steady operation	0.430	57.0%	★★★★	Signals previously in late-night flash; 3-leg/4-leg; All; Signalized
Implement transit signal priority	0.781	21.9%	★★★★	No TSP present; Urban; Signalized
Convert Pelican/farside ped signal → Puffin	0.840	16.0%	★★★	Mid-block or signalized intersections with ped signals; 3-leg/4-leg; Signalized
Install Box-Span signal (case A)	0.841	15.9%	★★★	Intersections with diagonal span signal configurations; 3-leg/4-leg; Signalized
Install Box-Span signal (case B)	0.876	12.4%	★★★★	Intersections with diagonal span signal configurations; 3-leg/4-leg; Signalized
Convert signal from span wire → mast arm (case A)	0.950		★★★	Signals mounted on span wire; 3-leg/4-leg; All; Signalized

Ask anything

+ Thinking



# AI IN OUR INTERNAL PRACTICES

We have developed internal guidance on effective use of AI in our work.

## WHEN IS AI LEAST/MOST EFFECTIVE FOR ANALYSIS?



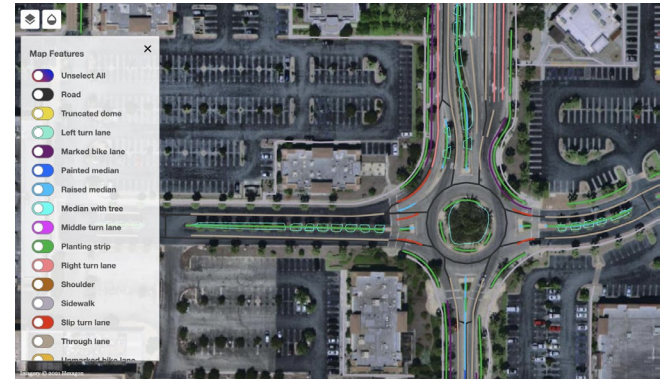
1. Project Definition (0-5%) - *Never*
2. Structure, Outlining, Research (5-20%) - *Very effective with oversight*
3. Primary Analysis and Results (20-60%) - *Rarely, lacking procedural rigor*
4. Draft Documentation (60-90%) - *Helpful with oversight*
5. Document Review and Polish (90-95%) - *Very effective*
6. Final Review and Approval (95-100%) - *Never*

## WE MAINTAIN OUR EDGE BY MAKING DEPTH VISIBLE AND TEACHING JUDGEMENT.

- ✓ AI can draft, but it can't defend.
- ✓ AI can gloss, but it can't wrestle with ambiguity.

# AI IN OUR WORK WITH CLIENTS

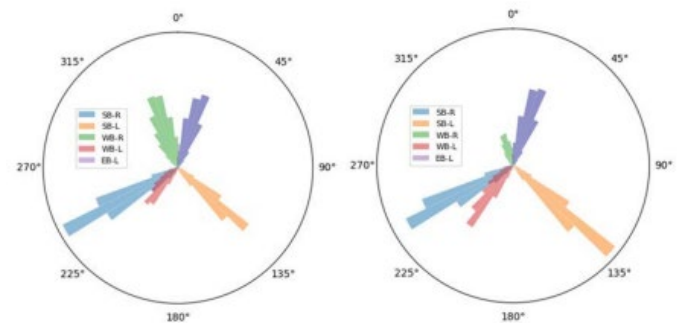
For Oregon DOT, 48 cities, and 11 counties in 8 MPOs, we are building a multimodal transportation inventory for data-driven TSP planning using AI-powered image analysis to build ped and bike routes and crossings from aerial imagery.



For the City of Kirkland, WA, our team used AI-powered near-miss analysis to improve intersection safety in the community.



We partnered with UW, the City of Bellevue, WA, and others, on *NCHRP Report Leveraging Artificial Intelligence and Big Data to Enhance Safety Analysis* using AI/ML detected vehicle movement data.

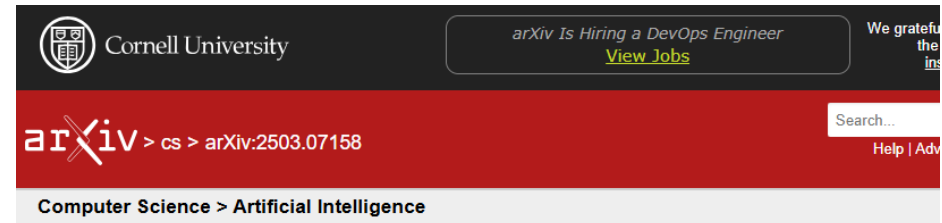


# AI IN OUR INDUSTRY CONTRIBUTIONS

With Arizona State University and others, we co-authored a comprehensive survey paper on new uses for Generative AI in transportation planning.

We are working with LYT and TriMet on best practices and regional implementation plans for implementing cloud-based transit signal priority to estimate bus ETAs based on ML/AI methods.

We are working with PTV to advance VISSIM, the leading traffic simulation tool to better simulate cloud-based TSP.



[Submitted on 10 Mar 2025 (v1), last revised 21 May 2025 (this version, v6)]

## Generative AI in Transportation Planning: A Survey

Longchao Da, Tiejun Chen, Zhuoheng Li, Shreyas Bachiraju, Huaiyuan Yao, Li Li, Yushun Dong, Xiyang Hu, Zhengzhong Tu, Dongjie Wang, Yue Zhao, Ben Zhou, Ram Pendyala, Benjamin Stabler, Yezhou Yang, Xuesong Zhou, Hua Wei



# SOME Q AND A

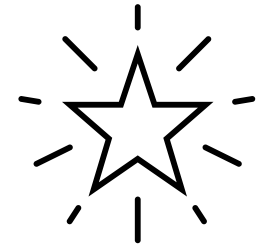
What's an example of a successful Data and/or AI initiative in your organization?

*Our AI committee: monthly cross-function team meetings; corporate plan and policy; corporate ChatGPT license; office hours; draft proposal and image development and review; showcasing work at companywide meetings; etc.*



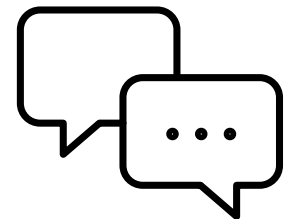
Risk - How can organizations balance innovation with operational risk when adopting AI?

*Make a plan, pilot and scale, involve legal/IT, start with helping not replacing. Good places to start: QA, summarizing/reviewing, advice-oriented thinking.*



What's one piece of advice you have for an agency wanting to do more with Data and AI?

*Focus on places where automation would help.*



# THANK YOU

## SHAPING A SMARTER TRANSPORTATION EXPERIENCE



**BENJAMIN STABLER, GISP**

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# Advancing Road Safety with Technology

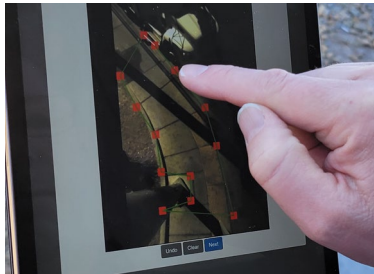
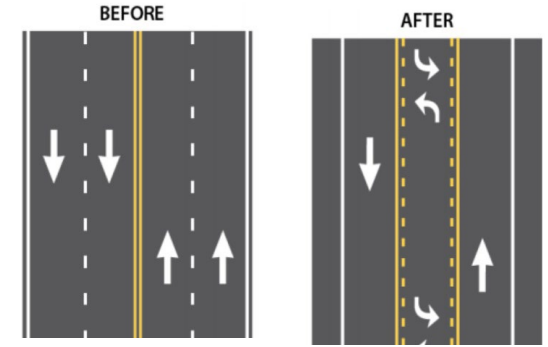
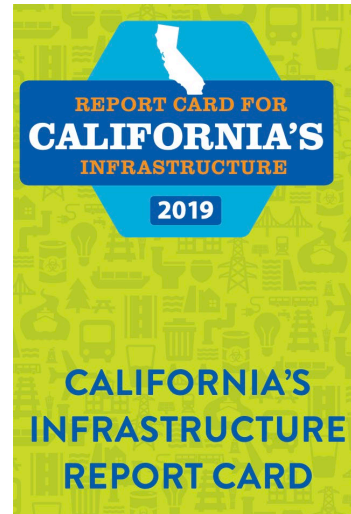
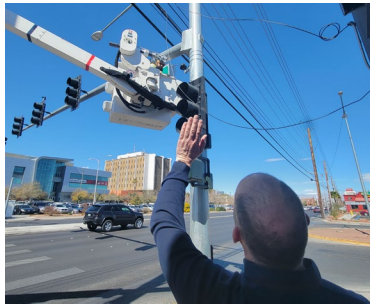
## From Data → Decision

*How Can We Get There?*

By: Linda Lim  
Partners for Advance Transportation Technology (PATH) Researcher  
Data Scientist  
[lindalim478@berkeley.edu](mailto:lindalim478@berkeley.edu)

# Background in Transportation Systems

Item 2 Supplemental



Countermeasure: Road diet (Convert 4-lane undivided road to 2-lanes plus turning lane)

CMF	CRFD%	Quality	Crash Type	Crash Severity
0.62	38	★★★★★	All	All
0.36	64	★★★★★	All	K,A,B,C
0.65	35	★★★★★	All	All
0.54	46	★★★★★	All	K,A,B,C
0.53	47	★★★★★	All	All
0.41	59	★★★★★	All	K,A,B,C

Setting Advance Signal Detection Technology on the Las Vegas Strip

Crash Modification Factors for Road Diets

# 5 Pillars For Safer Roadways



## Predictive Analytics & Risk Assessment

Leveraging machine learning to analyze historical data, identify high-risk locations, and predict potential crashes before they occur.



## Real-Time Traffic Intelligence

AI-powered monitoring systems process live traffic data to provide adaptive responses, optimize flow, and prevent congestion-related incidents.



## Connected Vehicle Networks Vehicle-to-Everything (V2X), Vehicle-to-Infrastructure (V2I)

Facilitating V2X communication and coordinating autonomous vehicles to reduce human error and improve overall road safety.



## Computer Vision & Detection

Advance camera detection and sensors, that are effective and reliable to monitor traffic patterns, identify erratic driving, and track vulnerable road users in real-time.



## Intelligent Emergency Response

AI-optimized dispatch systems and traffic incident management tools ensure rapid response and efficient allocation of resources post-crash.

# REAL-TIME TRAFFIC INTELLIGENCE



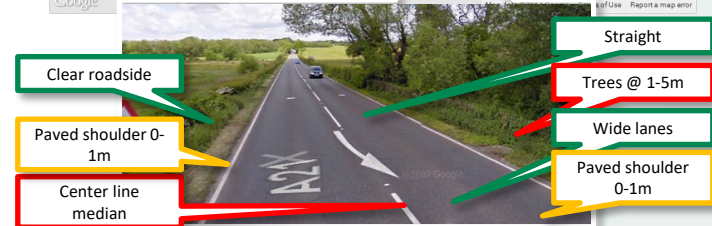
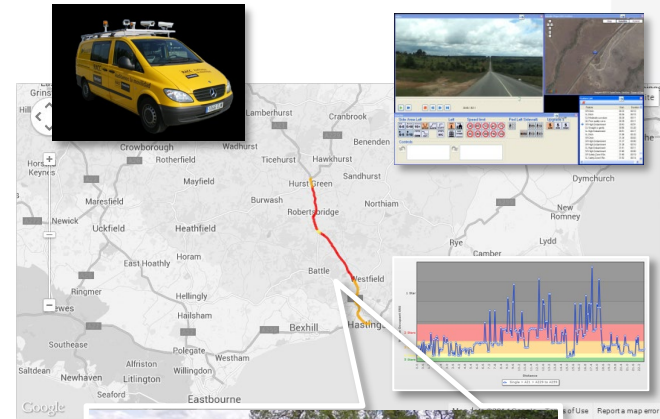
# Measuring Road Risk



Risk Mapping - Reactive  
Measuring crashes per km travelled

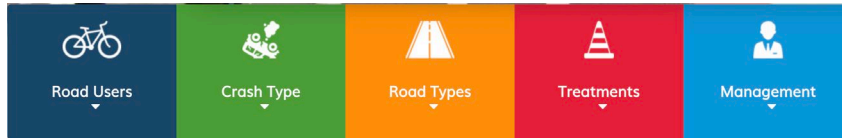
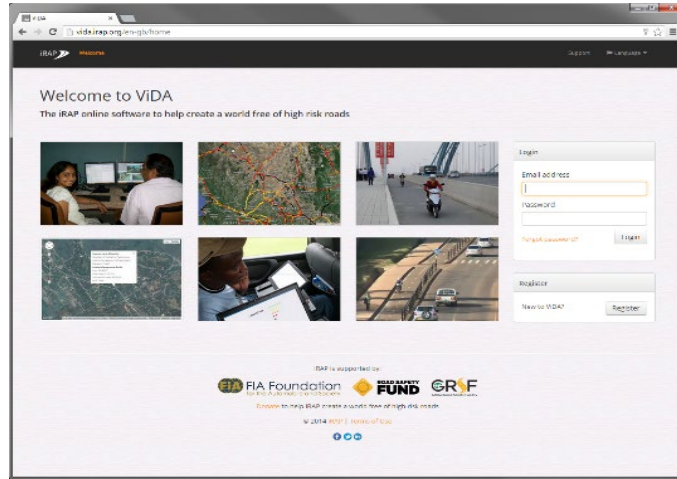


Star Rating – Pro-active  
Measuring infrastructure risk

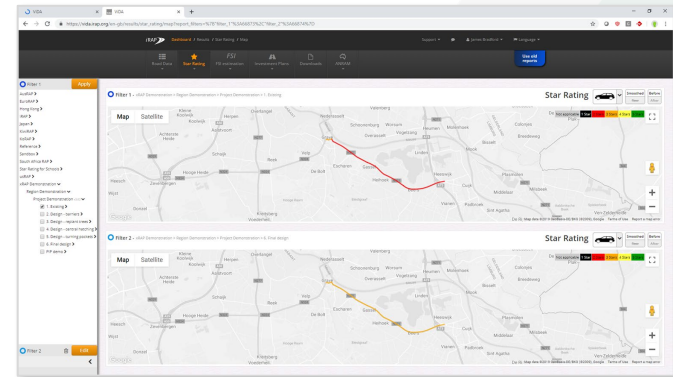
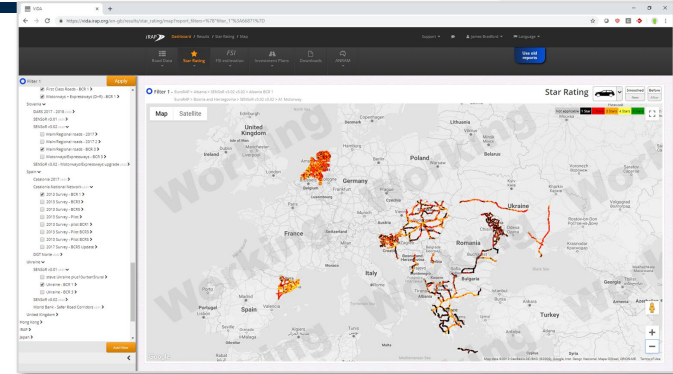


# ViDA – Available Online Analysis Tools

Item 2 - Supplemental



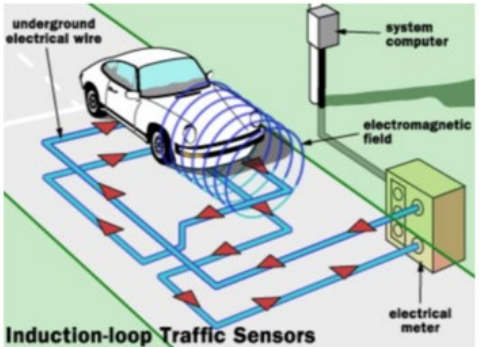
<http://vida.irap.org>



# COMPUTER VISION & DETECTION



# Smarter Planning Starts with Smarter Data



U.S. is still using technology for the 1960s...



The heart of intersection control, but are we truly using it intelligently?

# Existing Camera Detection Systems and Their Challenges

Item 2 - Supplemental



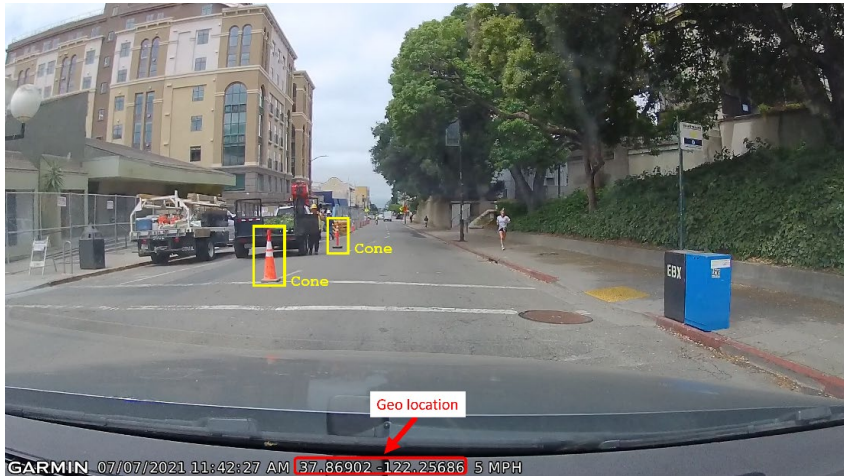
# Work Zone Data and Applications

Item 2 - Supplemental



<https://www.youtube.com/watch?v=IGiUUA7yI14>

- GPS Trace
- Using Neural Networks on Object Identification
  - Cones-barriers, fences, Work Zone workers

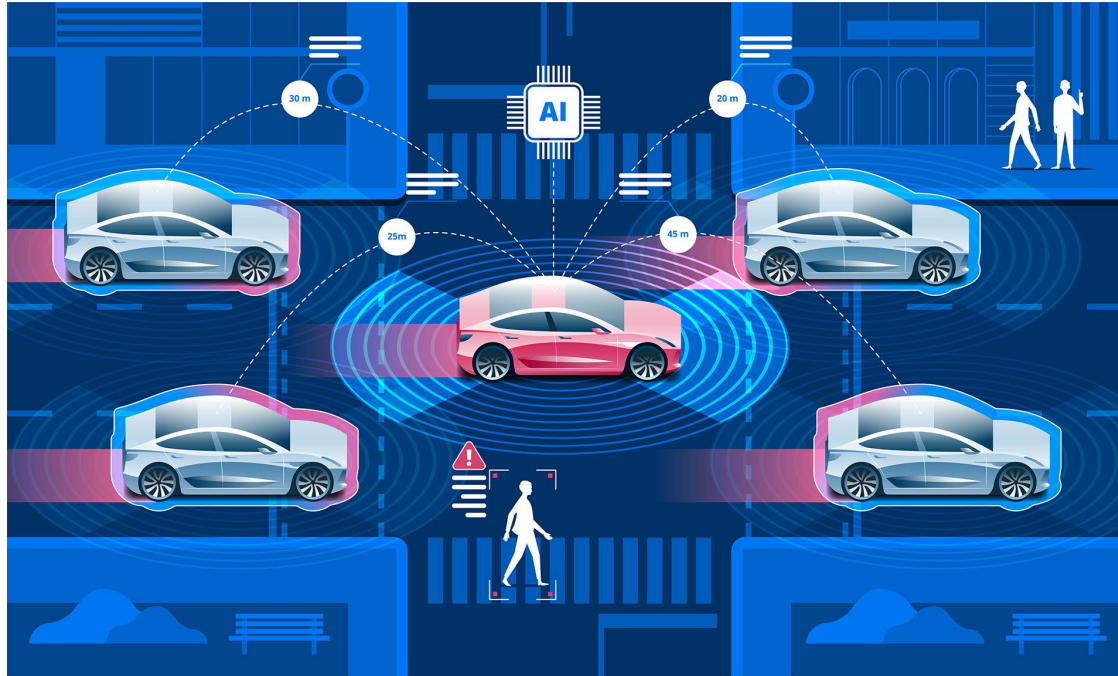


# CONNECTED VEHICLE NETWORKS (V2X, V2V, V2I)



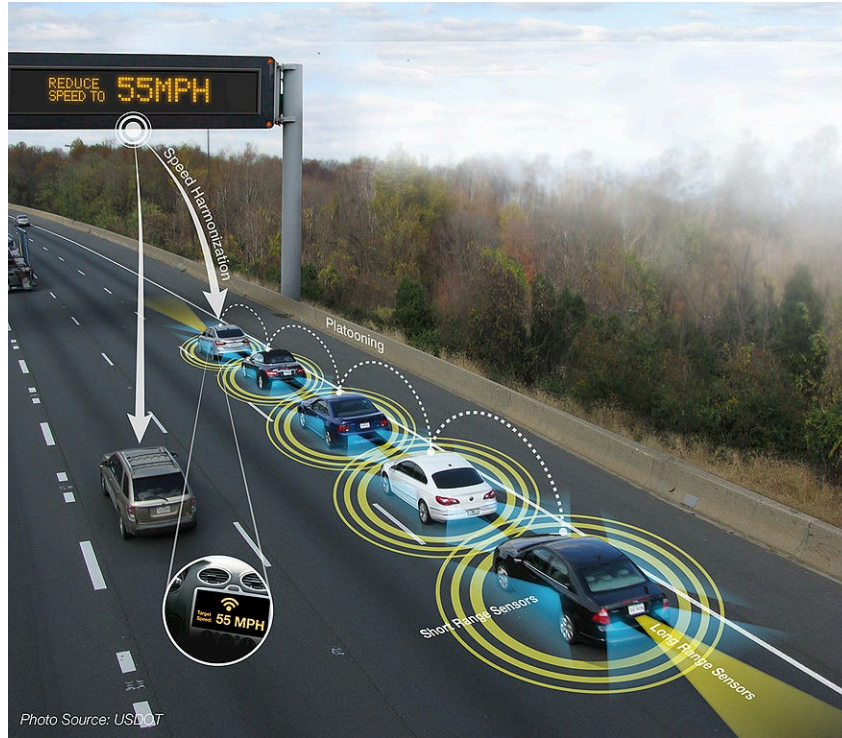
# Vehicle-to-Everything (V2X) Connectivity: Transforming Awareness

Item 2 - Supplemental



# Vehicle-to-Everything (V2I) Communication

Item 2 Supplemental



# Vehicle-to-Everything (V2X) Communication

Item 2 Supplemental



# Standards for Uniform C-V2X Deployments



## The 3 main standards put out by SAE International to maintain operability

1

### SAE J3161 C-V2X Deployment Profiles

Defines the reference system architecture for C-V2X, guiding application developers on how to prioritize and deliver V2V and V2I messages on a 5.9 GHz radio channel.

2

### SAE J3161/1 On-Board System Requirements

Specifies minimum radio performance, interoperability, and data integrity for the exchange of Basic Safety Messages (BSM) among V2V applications.

3

### SAE J3161/1A Vehicle-Level Validation Test Procedures

Provides guidelines for verifying compliance with J3161/1 requirements, used by organizations like OmniAir Consortium for device certification and interoperability testing.

[https://www.sae.org/standards/j3161\\_202204-lte-vehicle-everything-lte-v2x-deployment-profiles-radio-parameters-single-radio-channel-multi-service-coexistence](https://www.sae.org/standards/j3161_202204-lte-vehicle-everything-lte-v2x-deployment-profiles-radio-parameters-single-radio-channel-multi-service-coexistence)

# INTELLIGENT EMERGENCY RESPONSE



How can we better prepare?

# Emergency Response

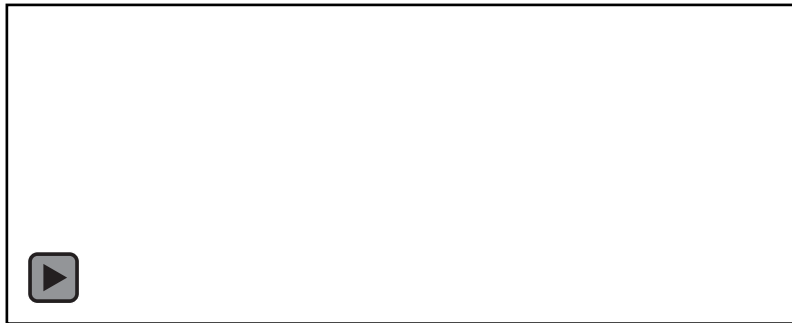
Item 2 - Supplemental



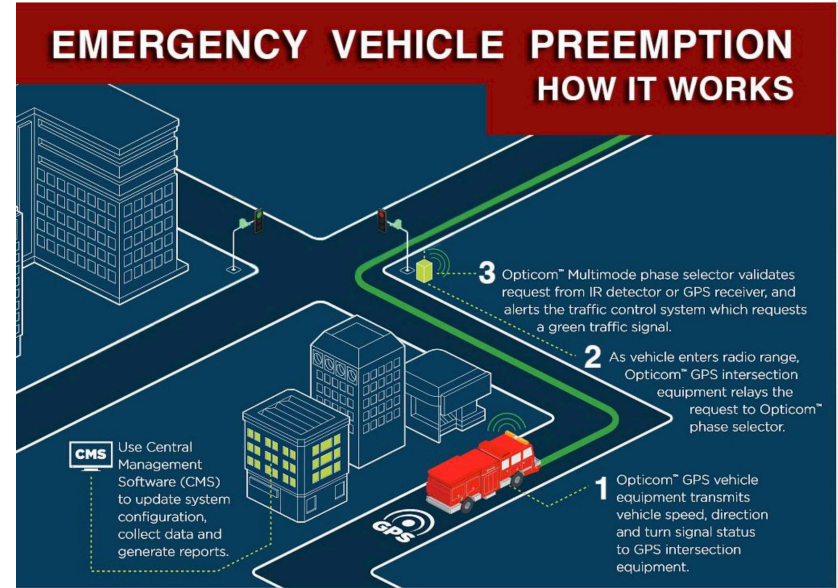
GTT Opticom



AV/Responder collisions



FlockSafety – Drones as First Responders



Emergency Preemption

# Road Safety Technology Roadmap: Next Steps

Item 2 Supplemental



## Enhanced Detection Systems

Deploy advanced detection systems for comprehensive data collection, ensuring that our AI-powered ITS have high-quality inputs for accurate insights and effective traffic management.



## V2X Pilot Programs

Launch pilot programs at high-priority intersections and equip school buses with V2X technology to protect our most vulnerable travelers and demonstrate real-world benefits



## AI Traffic Signals

Expand AI-driven adaptive traffic signal systems countywide, starting with corridors with the highest collision rates and congestion levels



## Partnership Development

Collaborate with state and federal partners including Caltrans and USDOT to secure funding, share data, and coordinate regional technology deployment



## Enhancing Work Zone Situational Awareness

Improve safety for workers and drivers in construction zones through better visibility, communication, and awareness systems.



## Consistent Training Programs

Collaborate with state and federal partners including Caltrans and USDOT to secure funding, share data, and coordinate regional technology deployment

# THANK YOU



Together, We Can Save Lives and  
Build Safer Roads

**Berkeley** Civil & Environmental  
Engineering