AUTONOMOUS AND ELECTRIC VEHICLES

SWTTAP Summit
March 12-14, 2024

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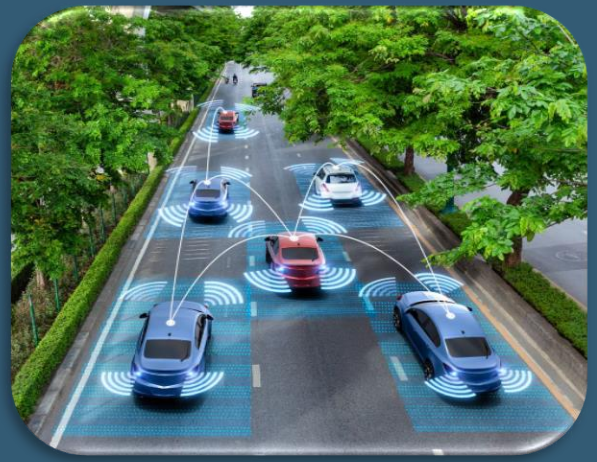
SRPMIC

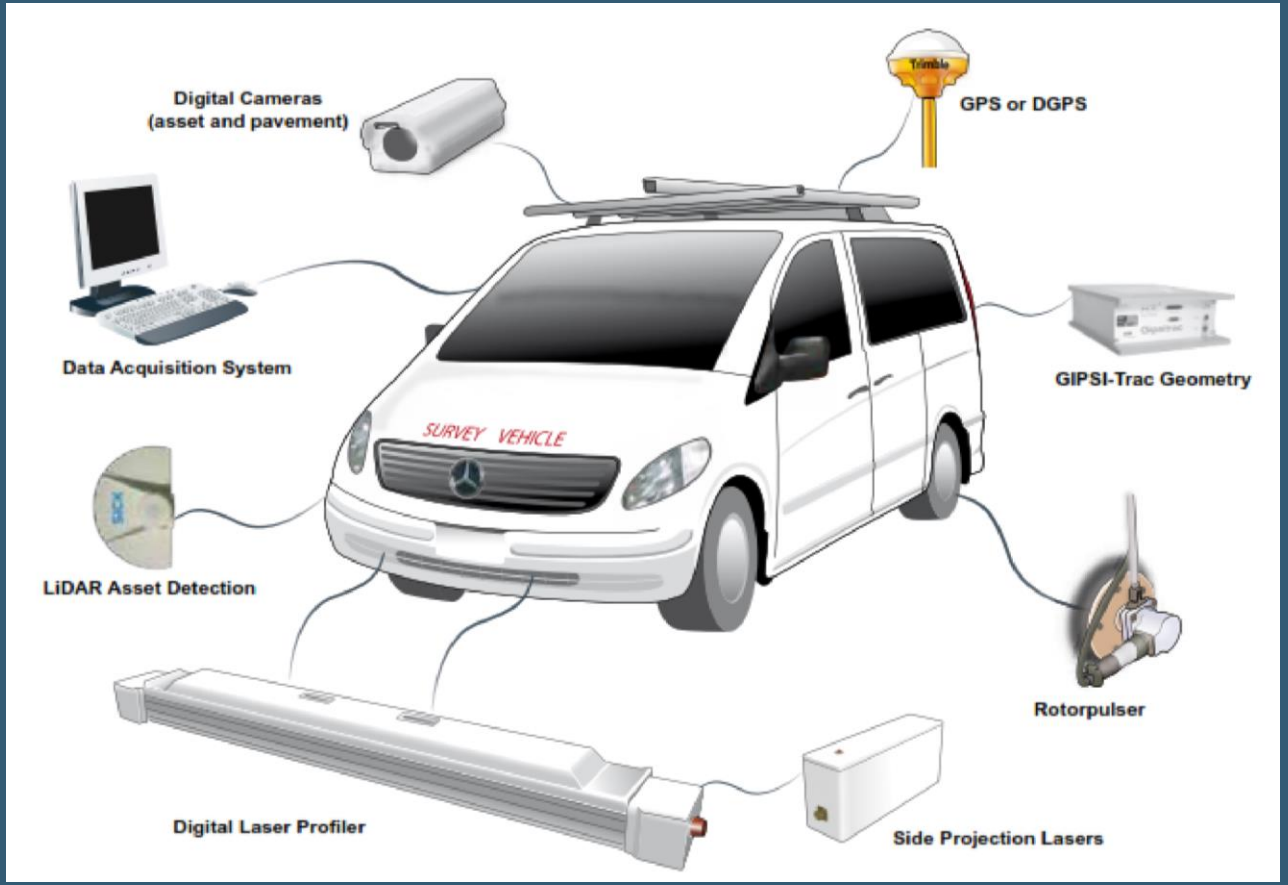
HOW DO YOU FEEL ABOUT NEW AND EMERGING TRANSPORTATION TECHNOLOGY?

NEW AND EMERGING TECHNOLOGY



ROAD MAPPING

- GIS mapping
- LiDAR
  - remote sensing method that uses light in the form of pulsed laser to measure varying distances to an infrastructure asset that is being surveyed
- Asset inventory
- Pavement condition assessment



SRPMIC EV PROJECTS
TRANSIT VEHICLE EV CONVERSION

- Converted 12 year old transit vehicle with 193,000 miles to all electric operation
  - Adds 10 years of usage to the transit vehicle
  - Saves approx. $7k in fuel cost annually
- Partners
  - ZEVx (Zero Electric Vehicles, Inc)
  - SRP
  - ICF
  - ASU

SRPMIC EV PROJECTS
EV MOTOR POOL

The SRPMIC Department of Transportation is taking a mindful approach to establishing a dynamic fleet electrical program
-Tonya Glass

- Purchased 4 EV vehicles
  - Ford Mustang Mach E
  - Ford F-150
  - Tesla
- Installed charging infrastructure
- Establishing EV training for employees that reserve EV vehicles
- Creating Safety SOP
- Investigating EV School Bus and EV Fire Apparatus

EV PLANNING

- Infrastructure
  - Preparing property
    - Bringing in conduit
    - Preparing future sites
  - Charging stations
  - Software
  - Weight restrictions
- Training and Work Force Development
  - Emergency Services
  - Fleet Mechanics

EV INITIATIVE FOR TRIBAL NATIONS

- BIL includes funding to secure an American EV supply chain and to build nationwide public EV charging network of 500,000 EV chargers
  - DOT
  - DOE
  - EPA
- EV Initiative for Tribal Nations
  - Mapping
  - Technical Assistance
  - Toolkits
  - Support

EV INFRASTRUCTURE PROJECT PLANNING CHECKLIST

PROJECT DEVELOPMENT AND SCOPING

- ☐ Establish overall project scale
- ☐ Determine site and installation type
- ☐ Identify project partners
- ☐ Decide on ownership model
- ☐ Assess EV charging needs
- ☐ Identify needs for permitting and regulatory compliance
- ☐ Ensure accessibility for people with disabilities

UTILITY PLANNING

- ☐ Assess local grid infrastructure
- ☐ Determine electricity rates and pricing structures

INSTALLATION PLANNING

- ☐ Determine procurement process
- ☐ Determine network connection needs
- ☐ Select equipment and network provider
- ☐ Assess installation needs and costs

OPERATIONAL PLANNING

- ☐ Assess operations and maintenance costs
- ☐ Determine pricing, payment, and access
- ☐ Consider additional needs

ITERATIVE PROCESS

Revisit and Refine Prior Steps as Needed

EV CHARGING BASICS

- EV average 200 miles on a full charge
- Level 1
  - 110-volt
  - Can be plugged in to a typical household outlet
  - Adds 2-5 miles of range per hour of charging
- Level 2
  - 240-volt
  - Similar outlet for appliances like dryers
  - Adds 10-30 miles of range per hour of charging
- Level 3
  - DC Fast Charge
  - Adds 100-200+ miles of range in as little as 30 minutes

Even if you don't have an electric vehicle fleet, you may have employees or visitors that own electric vehicles

Charging stations may be something to consider at tribal offices or destinations

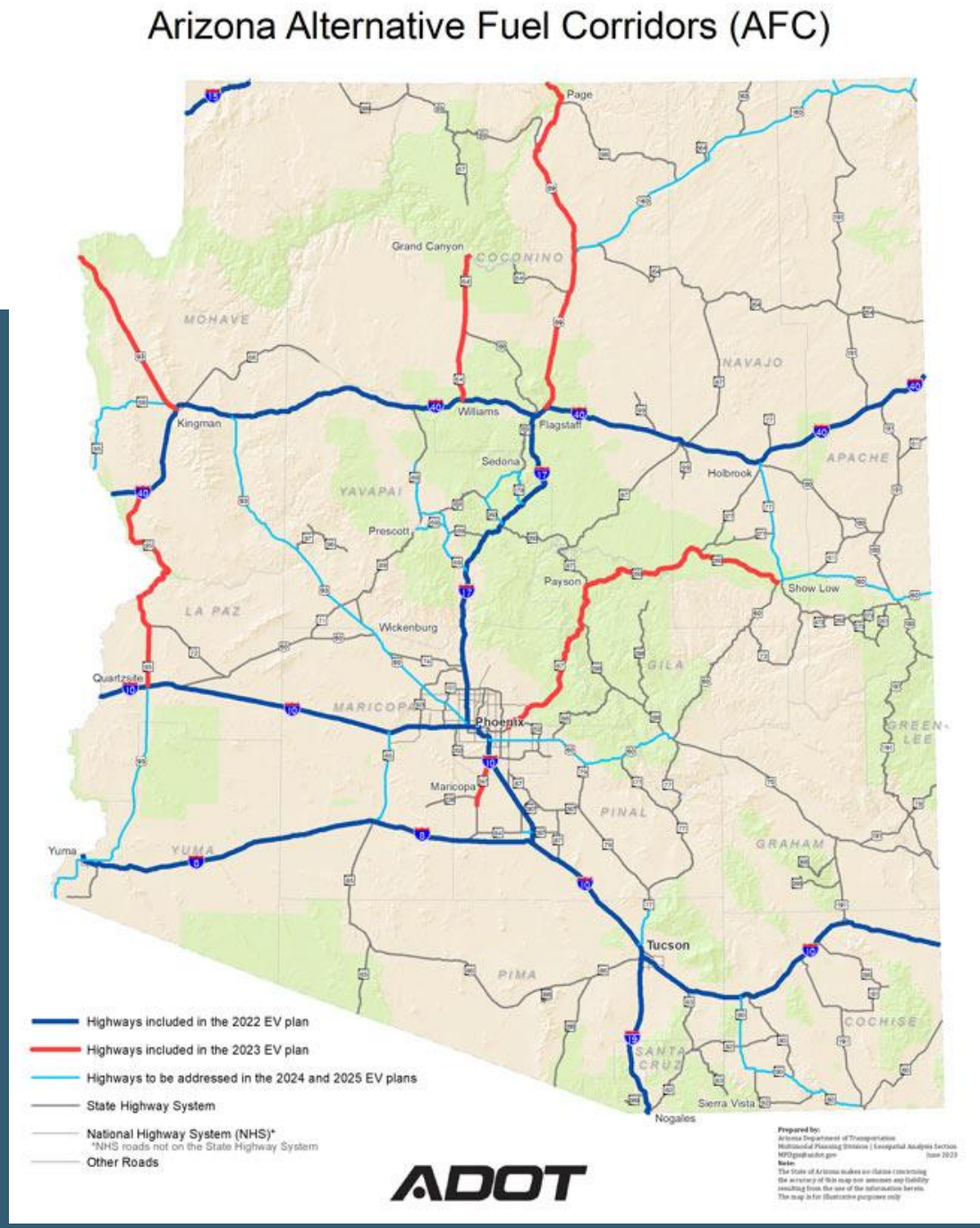
ADOT EV PLAN

- ADOT is taking advantage of new federal funding sources to plan for and implement a statewide network of electric vehicle charging stations
- National Electric Vehicle Infrastructure (NEVI) Formula Program
  - Deploy convenient, affordable, reliable, and equitable network of EV fast chargers along the nation's highways
  - $5B available for publicly accessible EV chargers nationwide along roads that states select as alternative fuel corridors (AFC)

AZEVPLAN

ADOT EV PLAN

- ADOT 2023 EV Plan
  - approved Sept 2023
- EV charging station projects
  - bidding 21 rapid charging stations along interstate highways
  - ready for use by late 2025



AUTONOMOUS VEHICLES

SAE J3016™ LEVELS OF DRIVING AUTOMATION™

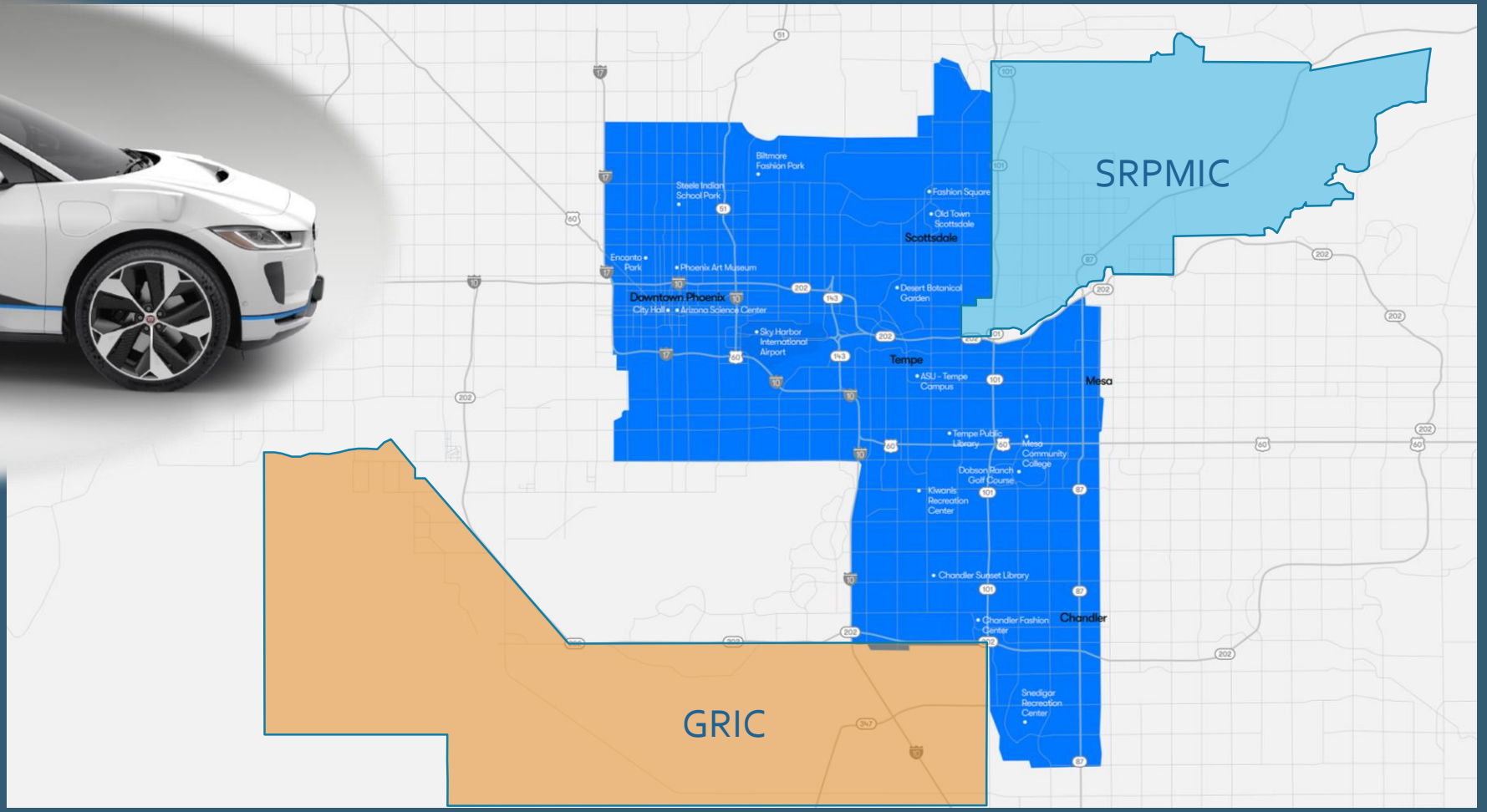
Learn more here: sae.org/standards/content/j3016_202104

	SAE LEVEL 0™	SAE LEVEL 1™	SAE LEVEL 2™	SAE LEVEL 3™	SAE LEVEL 4™	SAE LEVEL 5™
What does the human in the driver's seat have to do?	**You are driving** whenever these driver support features are engaged – even if your feet are off the pedals and you are not steering			**You are not driving** when these automated driving features are engaged – even if you are seated in "the driver's seat"		
	You must constantly supervise these support features; you must steer, brake or accelerate as needed to maintain safety			When the feature requests, you must drive	These automated driving features will not require you to take over driving	
	These are driver support features			**These are automated driving features**		
What do these features do?	These features are limited to providing warnings and momentary assistance	These features provide steering **OR** brake/ acceleration support to the driver	These features provide steering **AND** brake/ acceleration support to the driver	These features can drive the vehicle under limited conditions and will not operate unless all required conditions are met		This feature can drive the vehicle under all conditions
Example Features	• automatic emergency braking • blind spot warning • lane departure warning	• lane centering **OR** • adaptive cruise control	• lane centering **AND** • adaptive cruise control at the same time	• traffic jam chauffeur	• local driverless taxi • pedals/ steering wheel may or may not be installed	• same as level 4, but feature can drive everywhere in all conditions

AV PLANNING

- Pavement Markings
  - Uniform
  - State of good repair
  - Visible
- Traffic signs
  - Standardize
  - Clear and Visible
- Traffic signs
  - Modernize
  - Standardize
- Clear zones
- Rutting – self healing asphalt
- Roadway charging technology
- Challenges
  - Dirt roads
  - Weather conditions
  - Addressing
- Geo fencing

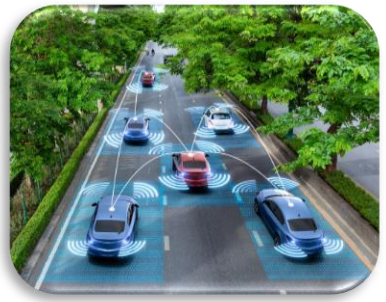
WAYMO BOUNDARIES METRO PHOENIX



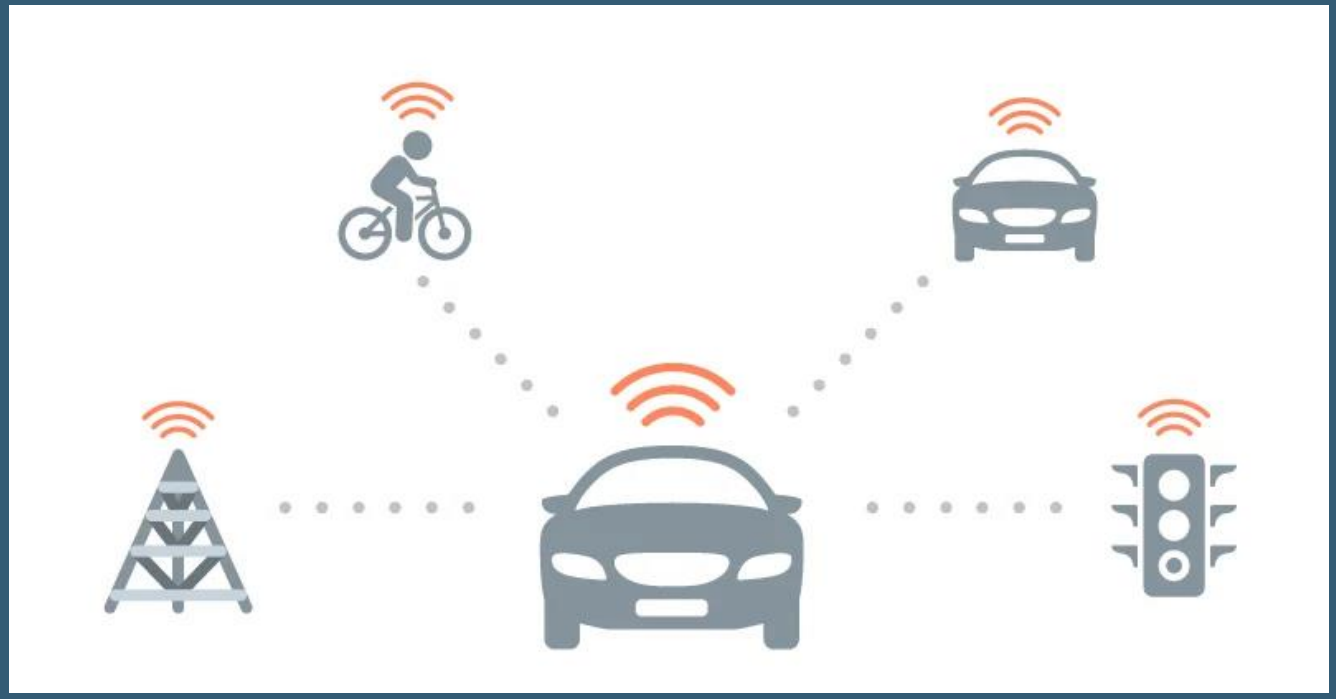
CRUISE WALMART PARTNERSHIP SRPMIC

- Cruise is an all-electric self-driving technology company founded in 2013
- Mission to build the world's most advanced AVs to safely connect people to the places, things and experiences they care about in a more sustainable way.
- In 2021, launched pilot program to deliver from a Walmart on SRPMIC lands to customers within the City of Scottsdale.

CONNECTED VEHICLES (V2X)



- V2X = vehicle to everything communication
- Connected vehicles communicate wirelessly with one another and with elements of the highway infrastructure
- USDOT grant for Saving Lives with Connectivity: Accelerating V2X Deployments

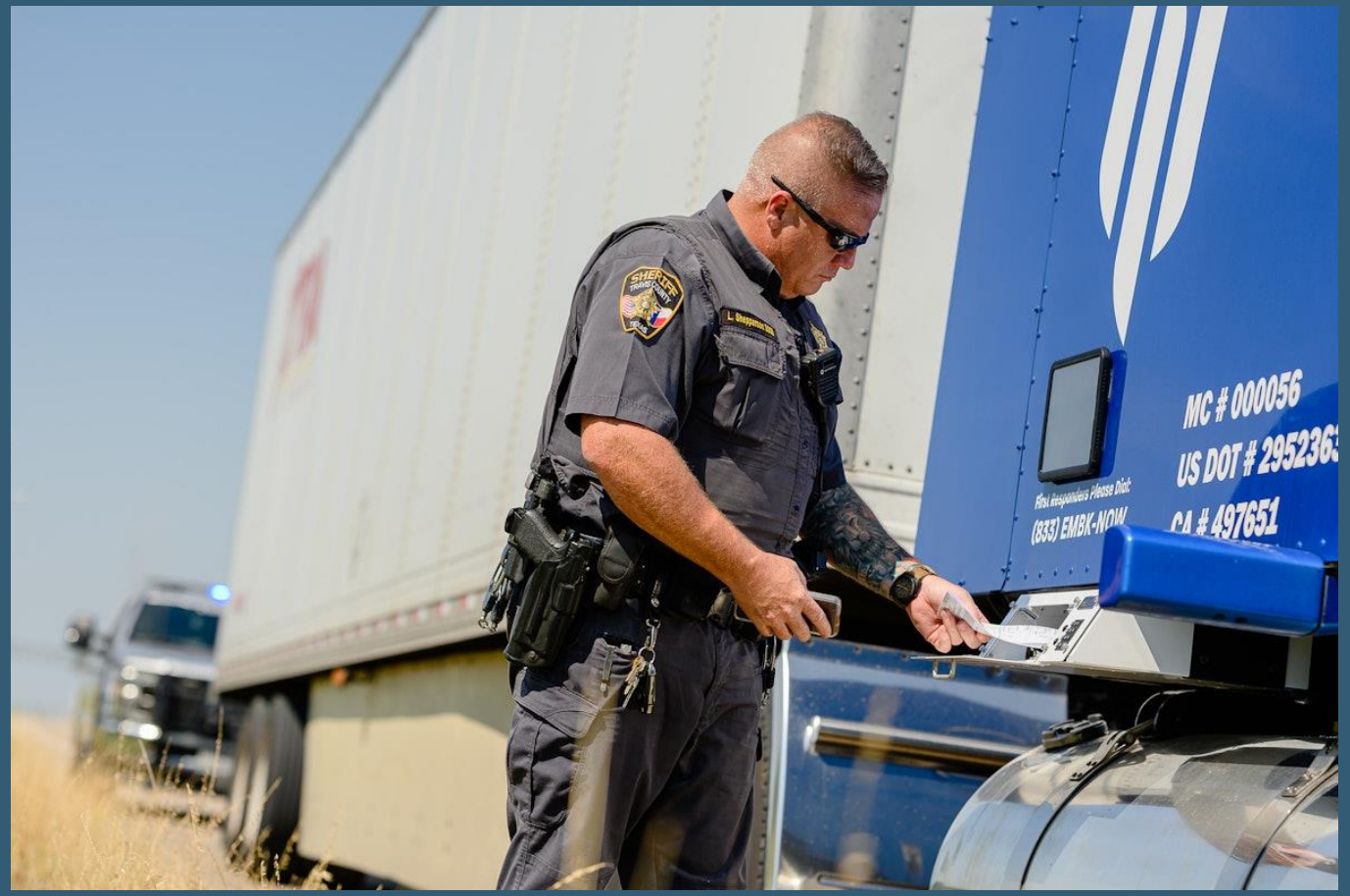


REGULATORY FRAMEWORK

- Arizona State Law
  - State certification
  - Law enforcement interaction protocols
  - Autonomous Vehicles Testing and Operating in the State of Arizona | Department of Transportation (azdot.gov)
- Tribal Ordinance
- Policies and procedures
- Fee impacts
- Release of Liability to relieve the Community of any risks from permitting the operation of AVs on the Community

EMERGENCY RESPONSE

- Enforcement Plan
- Public Safety briefing/training
  - Fire suppression
  - Access and intervention
- Grant for EMS training



QUESTIONS DISCUSSION

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