How Can States Protect the Public While Promoting Innovation?

- Moderator:
  - **Chan Lieu,** Senior Policy Advisor, Venable LLP
- Speakers:
  - **Bernard Soriano,** Deputy Director, California Department of Motor Vehicles
  - **Ian Adams,** Vice President of Policy, TechFreedom
  - **Ariel Gold,** Data Program Manager, U.S. DOT ITS Joint Program Office

NGA

Autonomous Vehicles in California

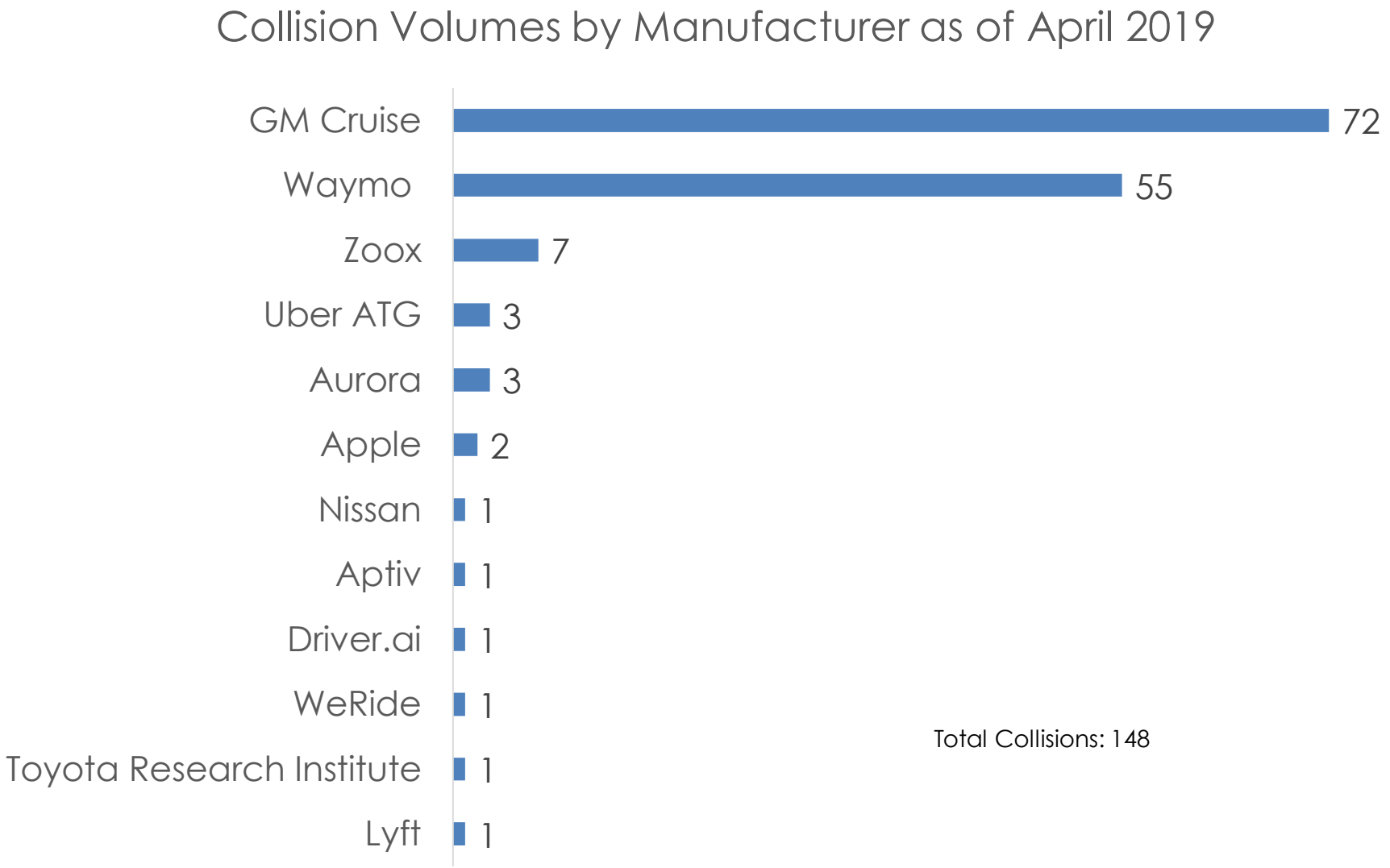
June 4, 2019

Bernard C. Soriano, Ph.D.
Deputy Director

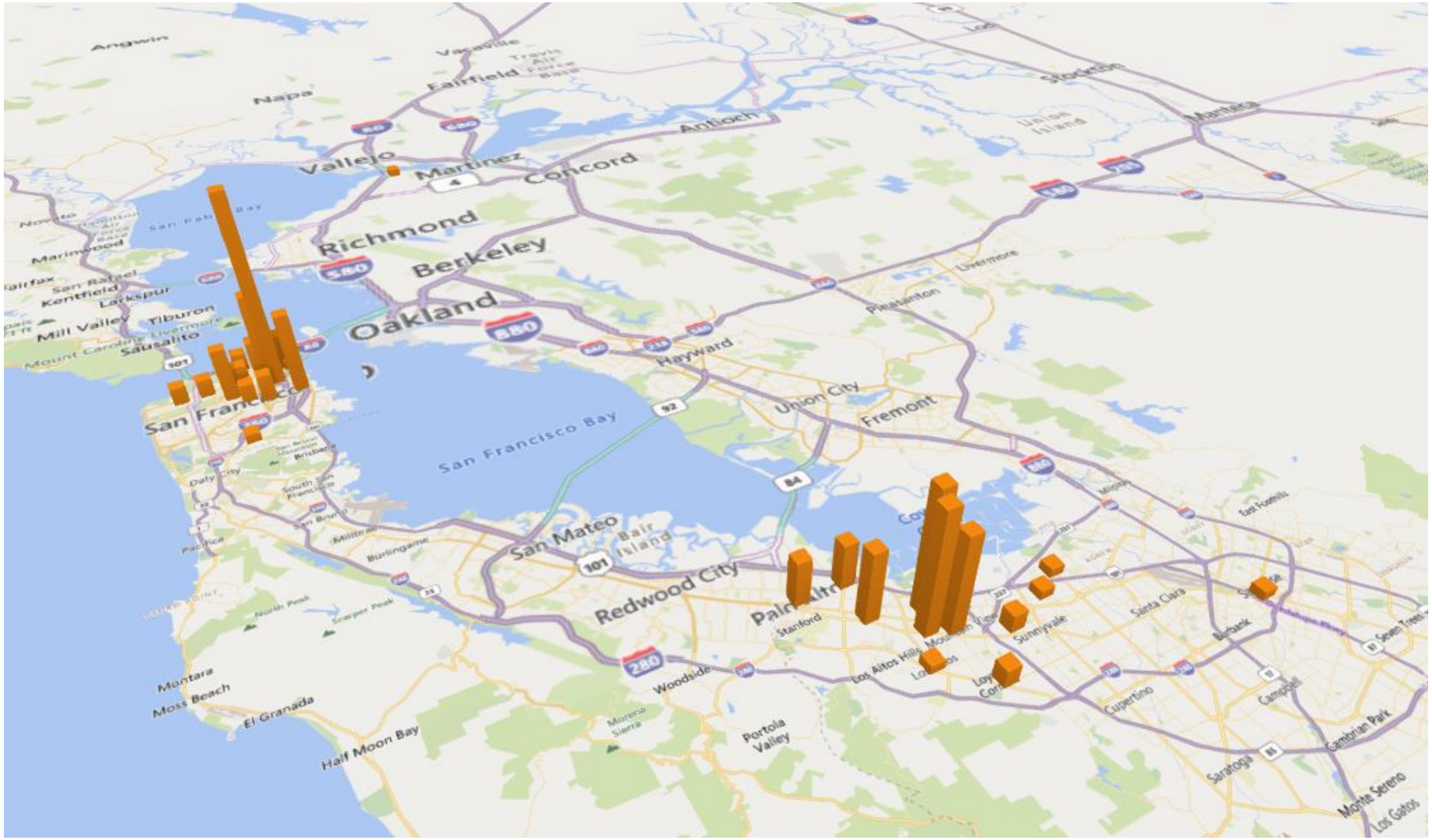
Approved Testing Permits

AVT001	Volkswagen Group of America	AVT034	WeRide Corp
AVT002	Mercedes Benz	AVT035	SAIC Innovation Center, LLC
AVT003	Waymo Auto LLC	AVT036	Aimotive Inc
AVT004	Aptive Solutions	AVT037	Aurora Innovation
AVT005	Tesla Motors	AVT038	Nullmax
AVT006	Bosch	AVT039	Samsung Electronics
AVT007	Nissan	AVT040	Continental
AVT008	GM Cruise LLC	AVT041	Voyage
AVT009	BMW	AVT042	CYNGN Inc
AVT010	Honda	AVT043	Roadstar.Ai
AVT011	Ford	AVT044	Changan Automobile
AVT012	Zoox Inc	AVT045	Lyft, Inc.
AVT013	Drive.Ai Inc	AVT046	Phantom AI
AVT014	Faraday & Future Inc	AVT047	Qualcomm Technologies Inc
AVT015	Baidu USA LLC	~~AVT048~~	~~aiPod, Inc.~~
~~AVT016~~	~~Wheego Electric Cars~~	AVT049	SF Motors Inc
AVT017	Valeo North America, Inc.	AVT050	Toyota Research Institute
AVT018	NIO USA Inc	AVT051	Apex.Ai
AVT019	Telenav	AVT052	Intel
AVT020	NVIDIA Corporation	AVT053	Ambarella
AVT021	AutoX Technologies	AVT054	Gatik AI Inc
AVT022	Subaru	AVT055	DiDi Research America LLC
AVT023	Udacity Inc	AVT056	TORC Robotics Inc
~~AVT024~~	~~Navya Inc~~	AVT057	Box Bot Inc
AVT025	Renovo Motors Inc	AVT058	EasyMile
~~AVT026~~	~~UATC LLC (UBER)~~	AVT059	Mando America Corp
AVT027	PlusAi Inc	AVT060	Xmotors.ai
AVT028	Nuro, Inc	AVT061	Imagry Inc.
AVT029	CarOne LLC (Udelv)	AVT062	Ridecell
AVT030	Apple Inc	AVT063	AAA NCNU
~~AVT031~~	~~Bauer's Intelligent Transportation~~	AVT064	ThorDrive
AVT032	Pony.AI	AVT065	Helm.AI
AVT033	TuSimple	AVT066	Argo AI, LLC

Reported Collisions



Total Collisions: 148


Angwin
Napa
Vacaville
Fairfield
Travis Air Force Base
Vallejo
Martinez
Antioch
Concord
Stockton
Manteca
Union Island
Richmond
Berkeley
Oakland
Marinwood
San Rafael
Kentfield
Larkspur
Mill Valley
Tiburon
Sausalito
Mount Caroline Livermore
Pleasanton
Livermore
Hayward
Union City
Fremont
San Francisco Bay
Daly City
South San Francisco
San Bruno
Millbrae
Burlingame
San Mateo
Bair Island
Redwood City
Palo Alto
Stanford
Sunnyvale
Santa Clara
Burbank
Fremont
Los Altos Hills
Woodside
Cupertino
Campbell
Saratoga
Cambrian Park
Monte Sereno
Los Gatos
Montara
Moss Beach
El Granada
Half Moon Bay
Portola Valley
Morena Sierra
Pacifica
North Peak
Scraper Peak

Driverless Testing and Deployment Regulations

Theme: Necessary to ensure safe operation on public roads

- Leverage NHTSA's Federal Automated Policy
- Certify AV has been tested under controlled conditions and is safe to operate
- Notification to local authorities
- Communication link with a remote operator
- Law enforcement and first responders interaction plan

- Focus on safety
  - Recognize motor vehicle safety responsibility rests with NHTSA
  - Manufacturers certify meet FMVSS
  - Certify vehicles are designed to comply with state traffic laws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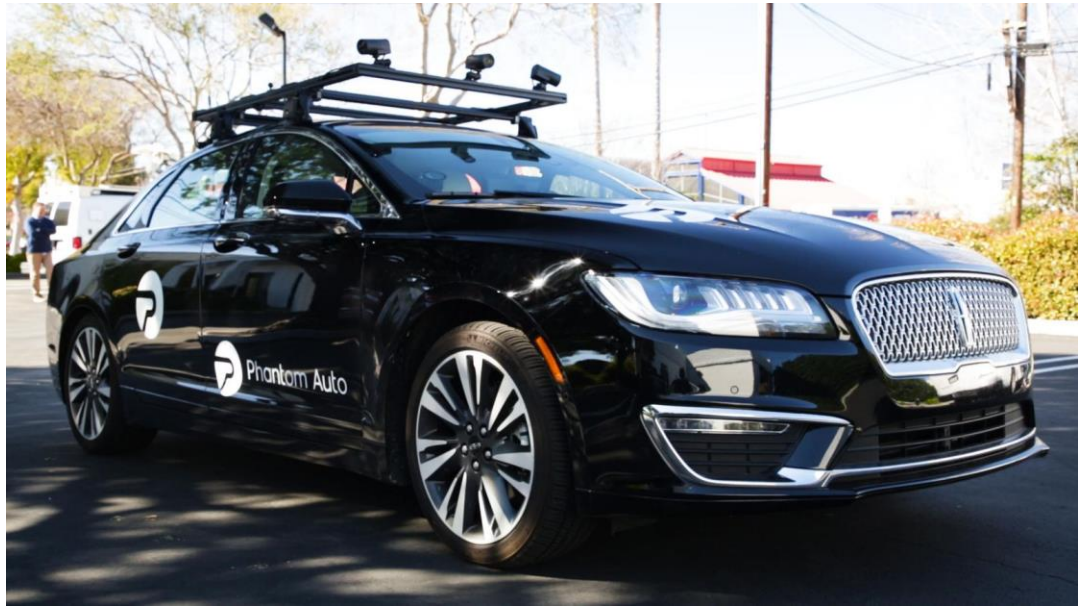
HASSETT
HARDWARE
NOW HIRING!
HASSETTHARDWARE.COM/APPLYNOW
Channing
ONE WAY
SELF-DRIVING DELIVERY VEHICLE
ThorDrive


EASY MILE
e2i0


nuro

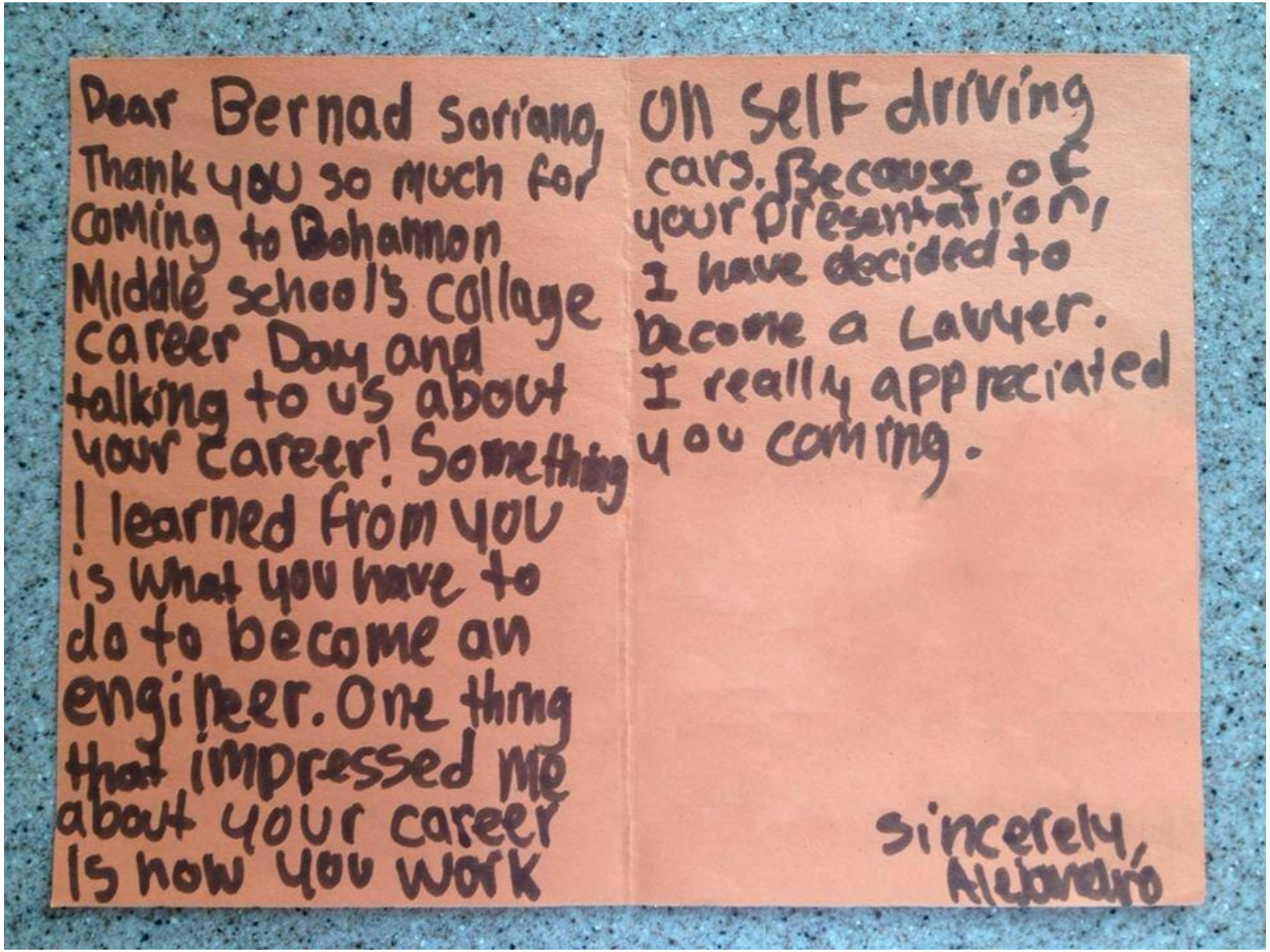

JUST EAT


boxbot


Phantom Auto

Federal and International

- American Association of Motor Vehicle Administrators (AAMVA)
  - Autonomous Vehicles Working Group
  - Seventeen states and two Canadian provinces
  - USDOT, NHTSA, FMCSA
  - Licensing, technology, law enforcement
  - California (chair) and Michigan (vice-chair)
- NHTSA funded
  - AAMVA to develop Model State Policy
  - Minimize risk of patchwork of regulations
- Delineation of Federal and State responsibilities
- Framework for states to follow as technology develops
- International interest



Dear Bernad Soriano,
Thank you so much for coming to Bohannon Middle school's College career Day and talking to us about your career! Something I learned from you is what you have to do to become an engineer. One thing that impressed me about your career is how you work on self driving cars. Because of your presentation, I have decided to become a Lawyer. I really appreciated you coming.

Sincerely,
Alejandro

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Automated Vehicles 3.0

PREPARING FOR THE FUTURE OF TRANSPORTATION

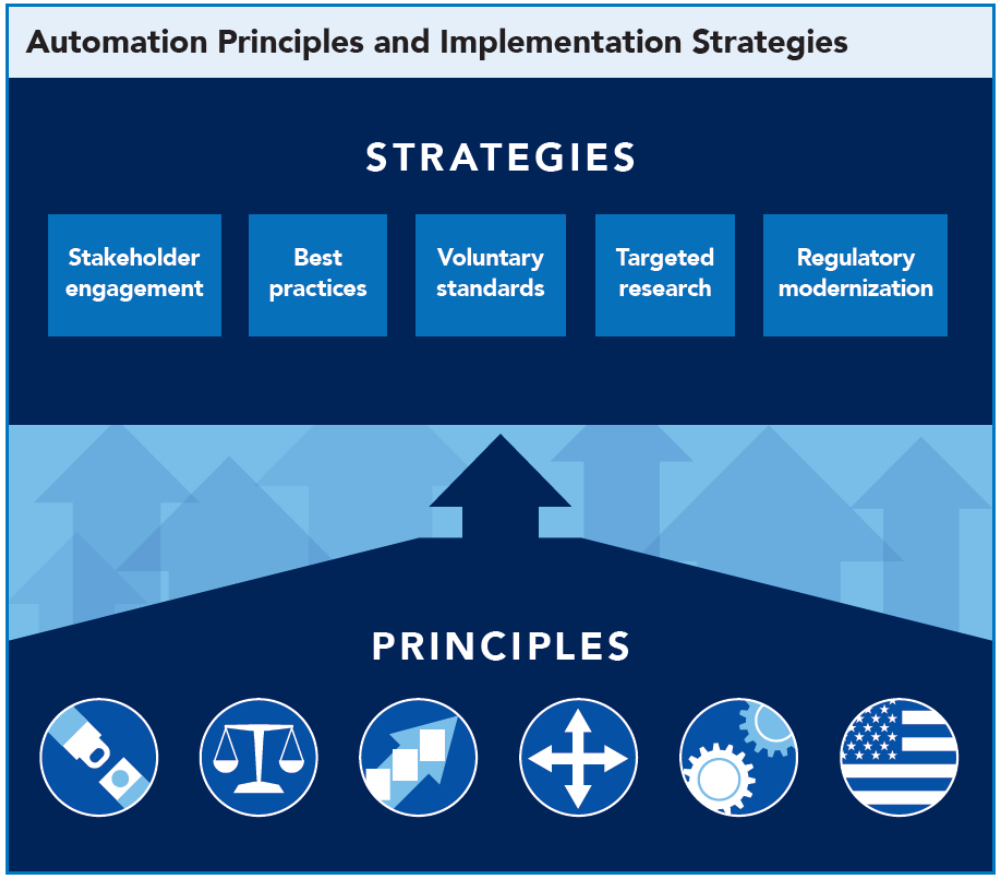
U.S. Department of Transportation

www.transportation.gov/av

AV 3.0: Preparing for the Future of Transportation

- **Automation technologies are new**
  - The right approach to achieving safety improvements begins with a focus on removing unnecessary barriers and issuing voluntary guidance, rather than regulations that might stifle innovation.

- **AV 3.0 provides value to stakeholders by:**
  - -Providing new multi-modal safety guidance
  - -Reducing policy uncertainty
  - -Outlining a process for working with DOT as the technology evolves



AV 3.0 overview

U.S. DOT Automation Principles

U.S. DOT has established a clear and consistent Federal approach to shaping policy for automated vehicles, based on the following six principles.

1. We will prioritize safety.

2. We will remain technology neutral.

3. We will modernize regulations.

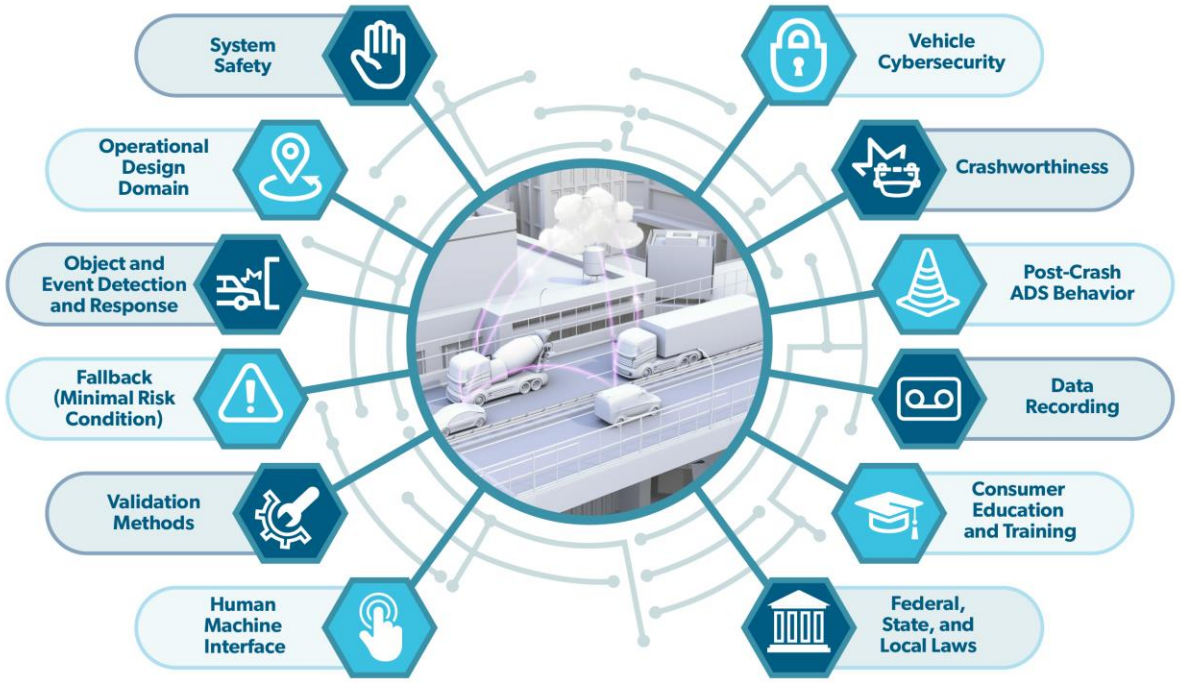
4. We will encourage a consistent regulatory and operational environment.

5. We will prepare proactively for automation.

6. We will protect and enhance the freedoms enjoyed by Americans.

Automation and Safety

- AVs that accurately detect, recognize, anticipate, and respond to the movements of all transportation system users could lead to breakthrough gains in transportation safety.
- The voluntary guidance outlined in A Vision for Safety ADS 2.0 on the design, testing, and safe deployment of ADS remains central to U.S. DOT's approach.
- AV 3.0 maintains U.S. DOT's primary focus on safety, while expanding the discussion to other aspects and modes of surface transportation.



Safety elements from ADS 2.0

AV 3.0 provides new multimodal safety guidance

- Encourages ADS developers for **all types** of vehicles to make their Voluntary Safety Self-Assessments public to increase confidence in the technology. Affirms the approach outlined in *A Vision for Safety.*
- Provides considerations and best practices for state and local government seeking to facilitate the safe and effective testing and operation of automation technologies.
- Supports the development of voluntary technical consensus standards as an effective non-regulatory means to advance the integration of automation technologies into the transportation system.

AV 3.0 reduces policy uncertainty

- Emphasizes that self-certification, instead of type approval, more appropriately balances and promotes safety and innovation.
- Highlights areas for States and localities to work to remove barriers, such as unnecessary and incompatible regulations to automated vehicle technologies.
- Discusses DOT's legal authorities for all modes impacted by automation, including NHTSA's approach to safety standards for application to automated vehicles.

AV 3.0 outlines how to work with USDOT as technology evolves

- Discusses a framework for the safety risk management stages along the path to full commercial integration, and vision for promoting safety, managing risk, and encouraging the benefits possible from the adoption of automated vehicle technologies.
- Defines a targeted Federal role in automation research.
- Identifies 23 automation-related voluntary consensus-based standards that are currently being developed through standards development organizations and associations.

Preparing for

THE FUTURE OF TRANSPORTATION

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October 2018

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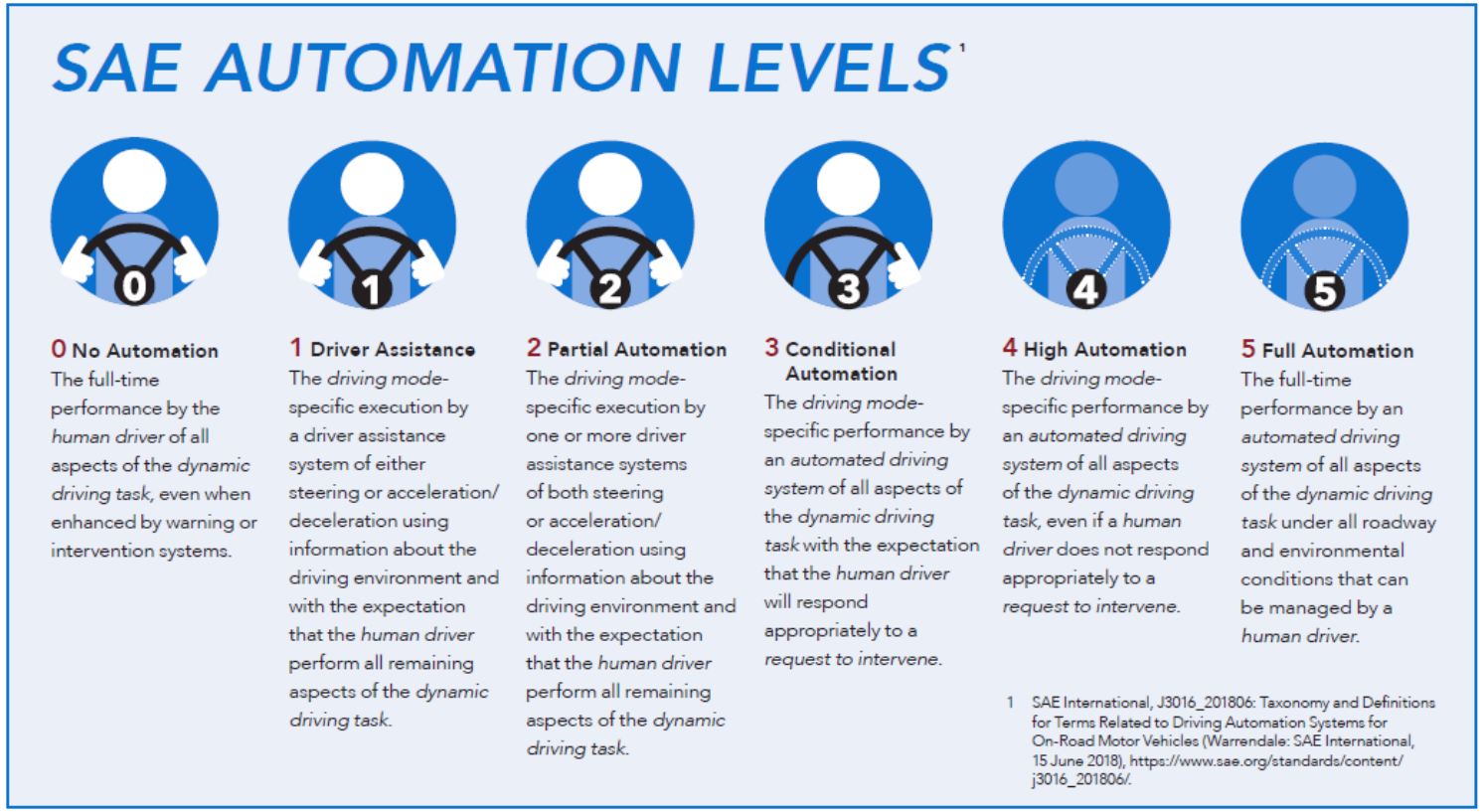
On-road Transportation Automation Terminology

U.S. DOT will use “automation” and “automated vehicles” as general terms to broadly describe the topic, with more specific language, such as “Automated Driving System” (SAE J3016) or “ADS” used when appropriate.



SAE J3016

Operating Administrations

U.S. Department of Transportation

FHWA

Federal Highway Administration

NHTSA

National Highway Traffic Safety Administration

FTA

Federal Transit Administration

FMCSA

Federal Motor Carrier Safety Administration

MARAD

Maritime Administration

FRA

Federal Railroad Administration

PHMSA

Pipeline and Hazardous Materials Safety Administration

FAA

Federal Aviation Administration

NHTSA Authorities and Key Policy Issues

1. Automated Driving System Pilot
   a) How to design a national pilot research program that would facilitate the efforts of all developers of vehicles with ADS to test them safely on public road?
2. Modernizing Petition Process for Exemption from Federal Motor Vehicle Safety Standards (FMVSS)
   a) Benefits of improving and streamlining existing requirements for the submission and review of petitions for exemption from the FMVSS.

FMCSA Authorities and Key Policy Issues

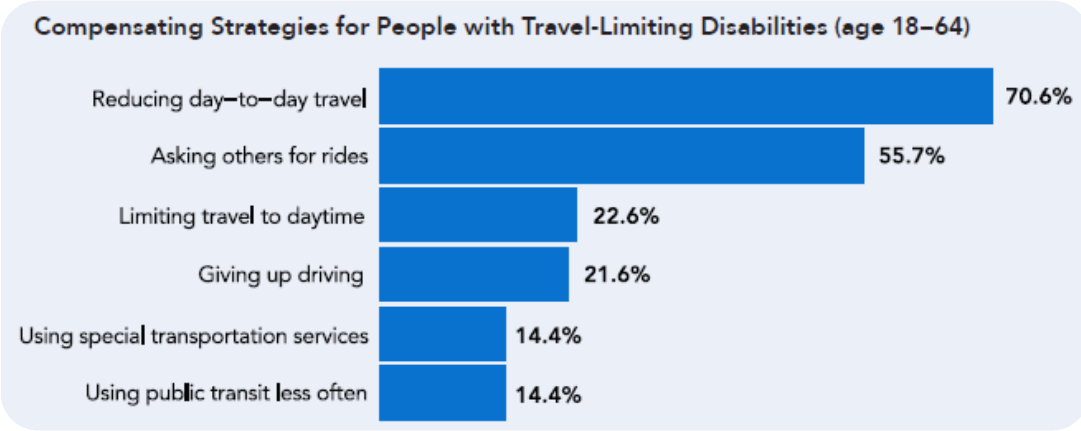
Considering Changes to Existing Regulations

1. FMCSA is in the process of broadly considering whether and how to amend its existing regulations to accommodate the introduction of ADS in commercial motor vehicles safely.
2. FMCSA will seek to make targeted rule changes and interpretations, and will supplement its rules as needed to account for significant differences between human operators and computer operators.
3. FMCSA will also consider whether there is a reasonable basis to adapt its CDL regulations for an environment in which the qualified commercial driver may be an ADS.

Key Cross-Cutting Issues

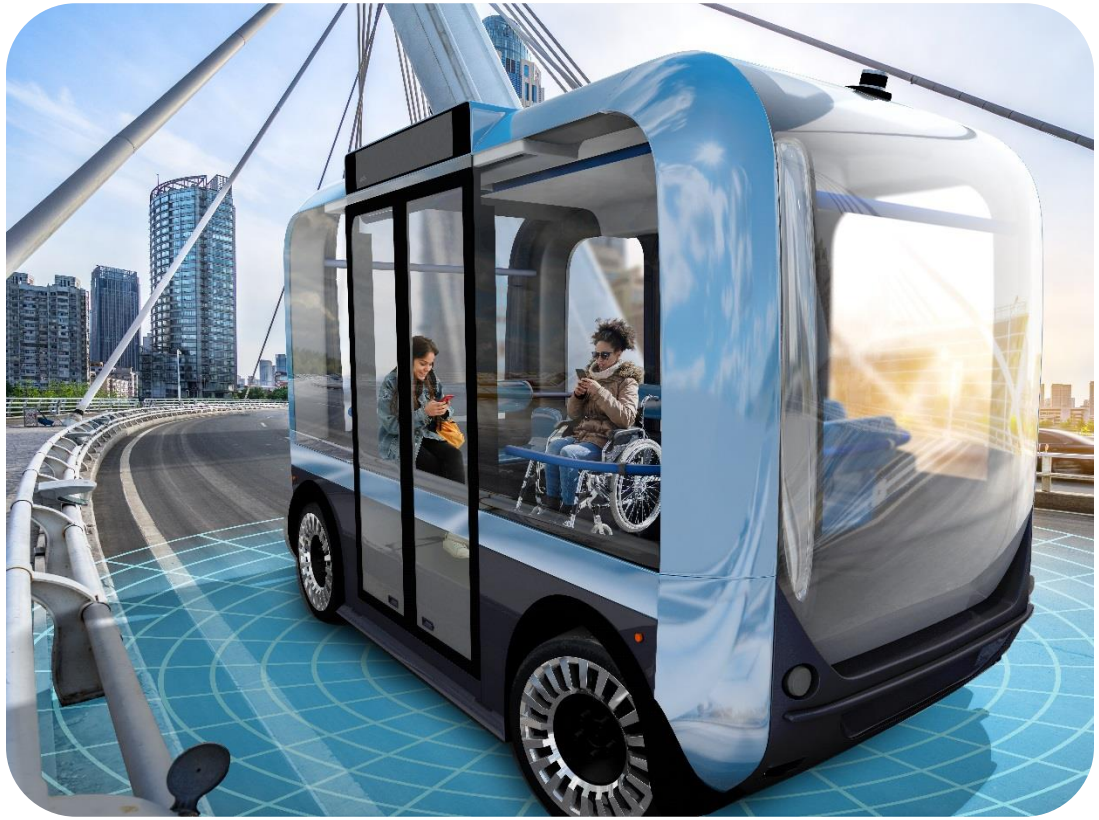
Travel Patterns of American Adults with Disabilities

- An estimated 25.5 million Americans have disabilities that make traveling outside the home difficult.
- AVs and other assistive technologies may provide substantial mobility benefits to people with disabilities who cannot drive.



Disability, Accessibility, and Universal Design

1. Automation presents enormous potential for improving the mobility and safety of travelers with disabilities.
2. Through the Accessible Transportation Technologies Research Initiative (ATTRI), the Department is initiating efforts with Federal partners, and the broader disability community to focus research efforts and initiatives on areas where market incentives may otherwise lead to underinvestment.



Workforce and Labor

1. U.S. DOT recognizes emerging concerns and uncertainty around potential impacts of ADS on the existing workforce.
2. U.S. DOT is working with other cabinet agencies on a comprehensive analysis of the employment and workforce impacts of automated vehicles.
3. ADS developers and deployers may want to consider how to assess potential workforce effects, future needs for new skills and capabilities, and how the workforce will transition into new roles over time.

Learning from the History of Automation in the Aviation Workforce

1. The aviation industry developed technological solutions to help airline pilots manage factors such as high workload, distractions, and abnormal situations.
2. Automation has undeniably made flying safer by supporting pilots. The characteristics that have improved trust in and effectiveness of these systems include:
   a) Reliable, robust systems that minimize false or missed alarms/reports
   b) Pilot interfaces that are easy to understand and enhance awareness.
   c) Training to understand how the systems work (and how to operate them).
   d) Avoidance of skill degradation by encouraging pilots to practice manual flight and basic skills.

Cooperative Automation and Connectivity

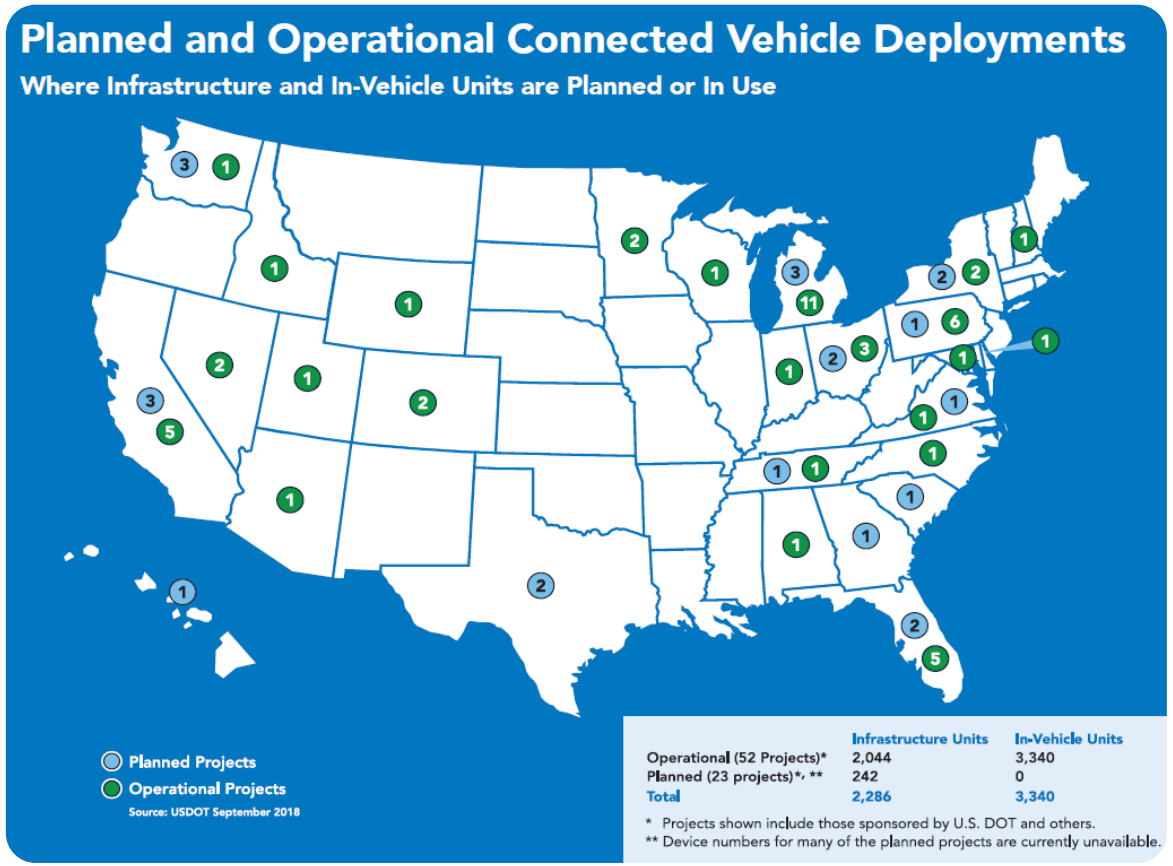


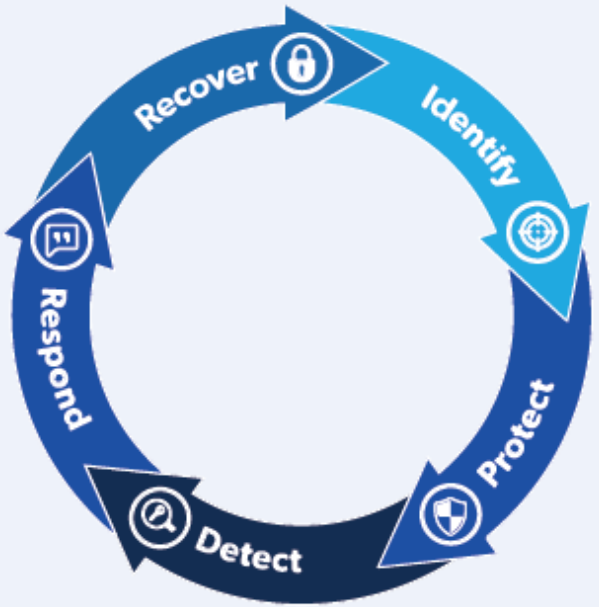
Figure 2

1. Throughout the Nation there are over 70 active deployments of V2X communications utilizing the 5.9 GHz band (Figure 2).
2. Over the past 20 years, the U.S. DOT has invested over $700 million in research and development of V2X through partnerships with industry and state/local governments.
3. U.S. DOT is continuing its work to preserve the ability for transportation safety applications to function in the 5.9 GHz spectrum.

Cybersecurity

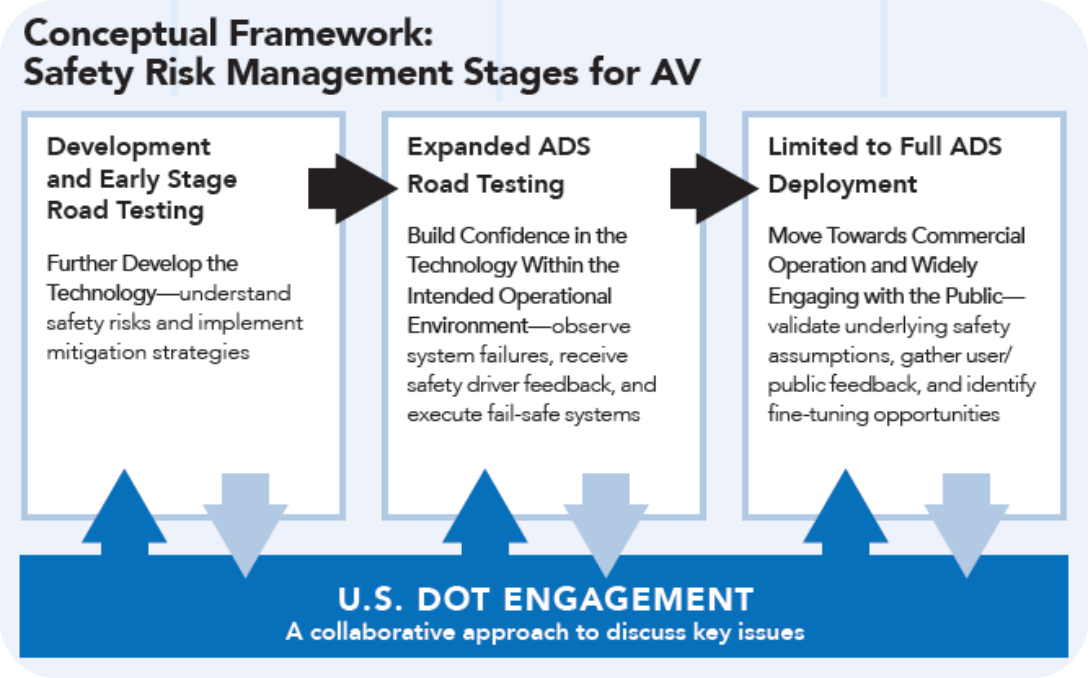
1. Transportation-related cyber vulnerabilities and exploits can be shared with Government partners anonymously through various Information Sharing and Analysis Centers (ISACs).
2. DHS's National Cybersecurity and Communications Integration Center (NCCIC) is a 24x7 cyber situational awareness, incident response, and management center that is a national nexus of cyber and communications integration for the Federal Government, intelligence community, and law enforcement.
3. U.S. DOT encourages States, local, Tribal, and Territorial governments to fully utilize the resources provided by United States Computer Emergency Readiness Team (US-CERT)
4. It is the responsibility of ADS developers, vehicle manufacturers, parts suppliers, and all stakeholders who support transportation to follow best practices, and industry standards, for managing cyber risks in the design, integration, testing, and deployment of ADS.

NIST Cybersecurity Framework



See www.nist.gov/cyberframework

Safety Risk Management Stages along the Path to Full Commercial Integration



1. This conceptual framework provides an opportunity for discussion around one potential vision for promoting safety, managing risk, and encouraging the benefits possible from the adoption of automated vehicle technologies.
2. This framework is in no way intended to imply that there is only one path for ADS development.
   a) Development and Early Stage Road Testing
   b) Expanded ADS Road Testing
   c) Limited to Full ADS Deployment
3. Engaging With U.S. DOT along the way

Demonstrate Safety through Voluntary Safety Self-Assessments (VSSA) – Private Sector

1. Demonstrating the safety of ADS is critical for facilitating public acceptance and adoption.
2. Entities are encouraged to demonstrate how they address the safety elements contained in A Vision for Safety 2.0 by publishing a VSSA, as it is an important tool for companies to showcase their approach to safety, without needing to reveal proprietary intellectual property.
3. U.S. DOT encourages entities to make their VSSA available publicly as a way to promote transparency and strengthen public confidence in ADS technologies.

Contribute to the Development of Voluntary Technical Standards – Private Sector

1. Voluntary standards offer flexibility and responsiveness to the rapid pace of innovation
2. Areas where industry can support standards development include—but are not limited to—topics such as definitions, taxonomy, testing, interoperability, and performance characteristic definitions.
3. The Department supports the development and continuing evolution of stakeholder-driven voluntary standards.
4. Appendix C, in AV 3.0, provides more information on key topic areas and work underway in standards development for automation.

Anticipate Human Factors and Driver Engagement Issues – Private Sector

1. Consider human factors design for surface transportation—at all levels of automation—for all road users.
2. Entities could consider methods that ensure driver awareness and engagement during ADS-equipped vehicle testing, to mitigate the potential for distraction, fatigue, and other possible risks.
3. Safe testing on public roadways is necessary for vehicle automation development and deployment.

Identify Opportunities for Voluntary Data Exchanges – Private Sector

1. Voluntary data exchanges can help improve the safety and operations of ADS and lead to the development of industry best practices, voluntary standards, and other useful tools.
2. U.S. DOT's Guiding Principles on Data for Automated Vehicle Safety, these principles include:
   a) Promote proactive, data-driven safety, cybersecurity, and privacy-protection practices.
   b) Act as a facilitator to inspire and enable voluntary data exchanges.
   c) Start small to demonstrate value, and scale what works toward a larger vision.
   d) Coordinate across modes to reduce costs, reduce industry burden, and accelerate action.

Conclusion

- With AV 3.0, U.S. DOT acknowledges the need to modernize existing regulations and think about new ways to deliver on our mission.
- The Department will work with partners and stakeholders in government, industry, and the public to provide direction, while also remaining open to learning from their experiences and needs.
- The Department supports an environment where innovation can thrive and the American public can be excited and confident about the future of transportation.

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