

**Automated Vehicles &  
State Law Enforcement:  
Roles, Needs & Resources -  
National Guidance  
Documents**

**September 10, 2019**



# #1 Priority SAFETY

## Safety by the Numbers

- An estimated **39,141** people lost their lives on all modes of our transportation system in 2017. The vast majority—**37,133 deaths—were from motor vehicle crashes**<sup>A,B</sup>

- **Driver Factors:** Of all serious motor vehicle crashes, **94 percent** involve driver-related factors, such as impaired driving, distraction, and speeding or illegal maneuvers.

In 2017:

- Nearly **11,000** fatalities involved drinking and driving.<sup>B</sup>
- Speeding was a factor in nearly **10,000** highway fatalities.<sup>B</sup>
- Nearly **3,500** fatal crashes\* involved distracted drivers.<sup>B</sup>

- **Commercial Vehicles:** **13 percent** of annual roadway fatalities occur in crashes involving large trucks.<sup>B</sup>

- In 2017, **82 percent** of victims in fatal large truck crashes were road users who were not an occupant of the truck(s) involved.<sup>B</sup>

- **Professional Drivers:** Professional drivers are **ten times** more likely to be killed on the job, and nearly nine times more likely to be injured on the job compared to the average worker.<sup>C</sup>

- **Pedestrians:** **5,977** pedestrians were killed by motor vehicles in 2017, representing 16 percent of all motor vehicle fatalities.<sup>B</sup>

- **Highway-Rail Grade Crossings:** Over the past decade, highway rail grade crossing fatalities averaged **253** per year, representing about one-third of total railroad-related fatalities.<sup>A</sup>

### Sources:

<sup>A</sup> U.S. Department of Transportation, Bureau of Transportation Statistics, special tabulation, September 8, 2018

<sup>B</sup> NHTSA 2017 Fatal Motor Vehicle Crashes: Overview (DOT HS 812 603)

<sup>C</sup> Beede, David, Regina Powers, and Cassandra Ingram, *The Employment Impact of Autonomous Vehicles*, U.S. Department of Commerce, Washington, DC: [http://www.esa.doc.gov/sites/default/files/Employment%20Impact%20Autonomous%20Vehicles\\_0.pdf](http://www.esa.doc.gov/sites/default/files/Employment%20Impact%20Autonomous%20Vehicles_0.pdf)

\* This number is likely underreported.



# Current State of Technology Testing and Deployment

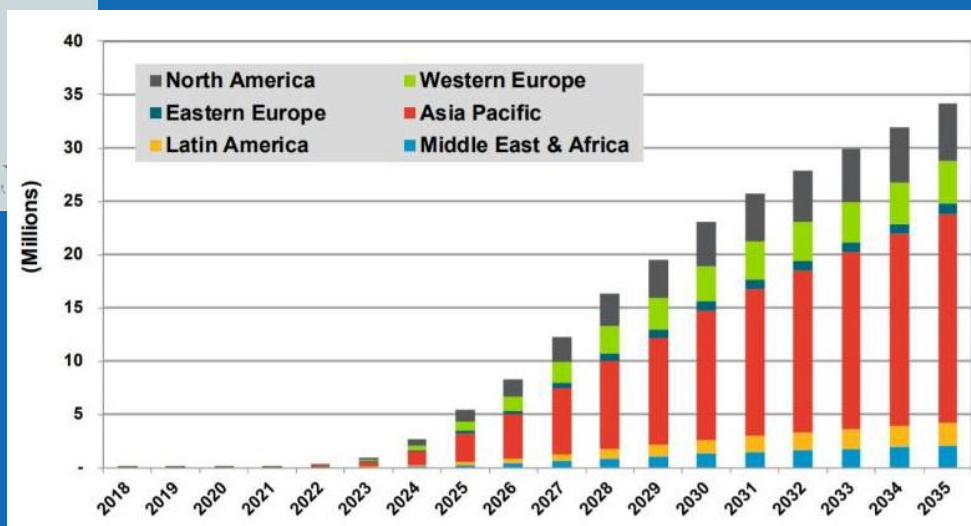
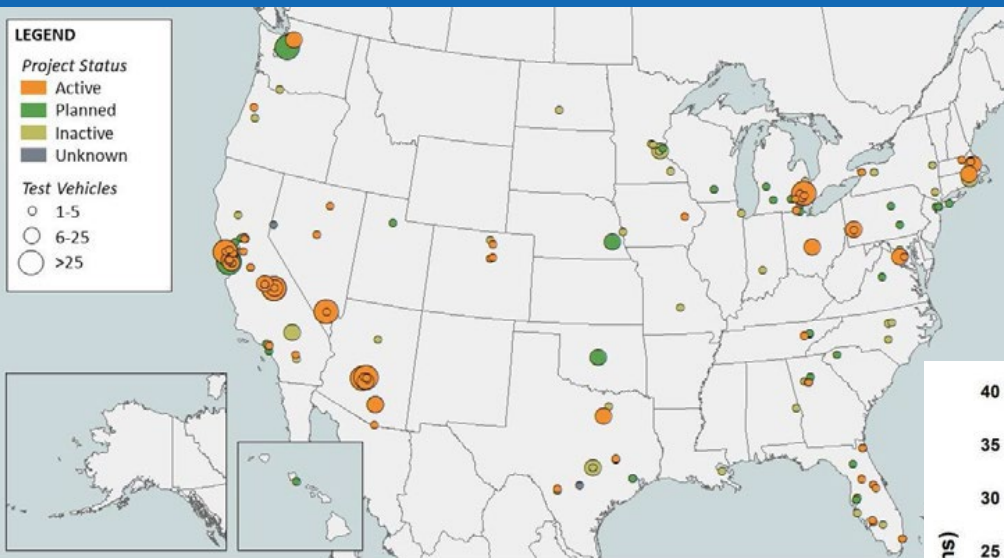
## LEGEND

### Project Status

- Active
- Planned
- Inactive
- Unknown

### Test Vehicles

- 1-5
- 6-25
- >25





# Preparing for the Future of Transportation (AV 3.0)



## • Released October 2018

- New multimodal safety guidance
- Clarifies policy and roles
- Outlines how to work with U.S. DOT as automation technology evolves

## Automation Principles and Implementation Strategies

### STRATEGIES

Stakeholder  
engagement

Best  
practices

Voluntary  
standards

Targeted  
research

Regulatory  
modernization

### PRINCIPLES





# U.S. DOT Automation Principles

U.S. DOT has established a clear and consistent Federal approach to shaping policy 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.



# Automated Driving Systems 2.0: A Vision for Safety

AUTOMATED DRIVING SYSTEMS

# 2.0

*A Vision for Safety*



U.S. Department of Transportation

NHTSA

## ADS 2.0 (incorporated into 3.0)

- Released September 2017.
- Voluntary guidance on design, testing, and safe deployment of ADS remains central to U.S. DOT's Approach.
- Encourages companies to consider and document their approach to 12 safety elements.

### Company VSSA Disclosures

- |  |                                     |
|--|-------------------------------------|
| 1. Vehicle Cybersecurity                   | 7. Human Machine Interface          |
| 2. System Safety                           | 8. Crashworthiness                  |
| 3. Operational Design Domain               | 9. Post-Crash ADS Behavior          |
| 4. Object and Event Detection and Response | 10. Data Recording                  |
| 5. Fallback (Minimal Risk Condition)       | 11. Consumer Education and Training |
| 6. Validation Methods                      | 12. Federal, State, and Local Laws  |

- |   |                                    |
|---|------------------------------------|
| • <a href="#">Apple</a>                     | • <a href="#">Nuro</a>             |
| • <a href="#">Aurora</a>                    | • <a href="#">Nvidia</a>           |
| • <a href="#">AutoX</a>                     | • <a href="#">Robomart</a>         |
| • <a href="#">Ford</a>                      | • <a href="#">Starsky Robotics</a> |
| • <a href="#">GM</a>                        | • <a href="#">TuSimple</a>         |
| • <a href="#">Mercedes-Benz/Bosch L4-L5</a> | • <a href="#">Uber</a>             |
| • <a href="#">Mercedes Benz L3</a>          | • <a href="#">Waymo</a>            |
| • <a href="#">Navya</a>                     | • <a href="#">Zoox</a>             |

*As of  
9/10/2019*

Published VSSAs can be viewed on NHTSA's Index at [\\*https://www.nhtsa.gov/automated-driving-systems/voluntary-safety-self-assessment](https://www.nhtsa.gov/automated-driving-systems/voluntary-safety-self-assessment)



# NHTSA Authorities and Key Policy Issues

## Motor vehicles and motor vehicle equipment:

- Subject to existing FMVSS
- Subject to the agency's authority related to safety defects
- Requires recall of vehicles or equipment containing defects that pose an unreasonable risk to safety
- Applies to current and emerging vehicle technologies including systems not covered by FMVSS

Nat'l Highway Traffic Safety Admin., DOT		Pl. 571
apart around the circumference of the tire at the area of greatest wear.		(1) <i>Inspection procedure.</i> Check wheel retention for the conditions indicated.
(b) <i>Type.</i> Vehicles should be equipped with tires on the same axle that are matched in construction and tire size designation, and dual tires shall be matched for overall diameter within one-half inch.		
(1) <i>Inspection procedure.</i> Examine visually. A mismatch in size and construction between tires on the same axle, or a major deviation from the size recommended by the vehicle or tire manufacturer, is a cause for rejection. On a dual-tire arrangement the diameter of one of the duals must be within one-half inch of the other as measured by a gauge block inserted between the tire and a caliper.		
(c) <i>General condition.</i> Tires shall be free from chunking, bumps, knots, or bulges evidencing cord, ply or tread separation from the casing.		
(1) <i>Inspection procedure.</i> Examine visually for the conditions indicated.		
(d) <i>Damage.</i> Tire cords or belting materials shall not be exposed, either to the naked eye or when cuts on the tire are probed. Reinforcement repairs to the cord body are allowable on tires other than front-mounted tires.		
(1) <i>Inspection procedure.</i> Examine visually for the conditions indicated, using a blunt instrument if necessary to probe cuts and abrasions.		
(c) <i>Special purpose tires.</i> Tires marked "Not For Highway Use" or "Farm Use Only" or other such restrictions shall not be used on any motor vehicles operating on public highways.		
(1) <i>Inspection procedure.</i> Examine visually for tires labeled with specific restrictions.		
<b>§570.63 Wheel assemblies.</b>		
(a) <i>Wheel integrity.</i> A tire rim, wheel disc or spider shall have no visible cracks, elongated bolt holes, or indications of in-service repair by welding.		
(1) <i>Inspection procedure.</i> Examine visually for the conditions indicated.		
(b) <i>Cast wheels.</i> Cast wheels shall not be cracked or show evidence of excessive wear in the clamp area.		
(1) <i>Inspection procedure.</i> Examine visually for the conditions indicated.		
(c) <i>Mounting.</i> All wheel nuts shall be in place and tight.		
		Sec.
		571.3 Scope.
		571.4 Definitions.
		571.4 Explanation of usage.
		571.5 Matter incorporated by reference.
		571.7 Applicability.
		571.8 Effective date.
		571.9 Separability.
		571.10 Designation of seating positions.
		<b>Subpart B—Federal Motor Vehicle Safety Standards</b>
571.101 Standard No. 101: Controls and displays.		
571.102 Standard No. 102: Transmission shift position sequence, starter interlock, and transmission braking effect.		
571.103 Standard No. 103: Windshield defrosting and defogging systems.		
571.104 Standard No. 104: Windshield wiper and washing systems.		
571.105 Standard No. 105: Hydraulic and electric brake systems.		
571.106 Standard No. 106: Brake hoses.		
571.107 (Reserved)		
571.108 Standard No. 108: Lamps, reflective devices, and associated equipment.		
571.109 Standard No. 109: New pneumatic and certain specialty tires.		
571.110 Tire selection and rims and motor home/recreation vehicle trailer load carrying capacity information for motor vehicles with a GVWR of 4,536 kilograms (10,000 pounds) or less.		
571.111 Standard No. 111: Rearview mirrors.		
571.112 (Reserved)		
571.113 Standard No. 113: Hood latch system.		
571.114 Standard No. 114: Theft protection.		
571.115 (Reserved)		
571.116 Standard No. 116: Motor vehicle brake fluids.		
571.117 Standard No. 117: Retreaded pneumatic tires.		
571.118 Standard No. 118: Power-operated window, partition, and roof panel systems.		
571.119 Standard No. 119: New pneumatic tires for motor vehicles with a GVWR of more than 4,536 kilograms (10,000 pounds) and motorcycles.		
571.120 Tire selection and rims and motor home/recreation vehicle trailer load carrying capacity information for motor vehicles with a GVWR of more than 4,536 kilograms (10,000 pounds).		
571.121 Standard No. 121: Air brake systems.		





# Roles in Automation: State, Local, and Tribal

State, local, and Tribal governments hold clearly defined roles in ensuring the safety and mobility of road users in their jurisdictions and are encouraged to consider the following in preparation for automated vehicles:

- 1) Review laws and regulations
- 2) Adapt policies and procedures
- 3) Assess infrastructure elements
- 4) Provide guidance, information, and training





# Best Practices for State Legislatures

AV 3.0 identified new insights for State Legislatures in addition to the ones already identified in ADS 2.0: *A Vision for Safety*:

1. Engage U.S. DOT on legislative technical assistance.
2. Adopt terminology defined through voluntary technical standards.
3. Assess State roadway readiness.

ADS 2.0 included:

1. Provide a “technology-neutral” environment
2. Provide licensing and registration procedures
3. Provide reporting and communications methods for Public Safety Officials
4. Review traffic laws and regulations that may serve as barriers to operation of ADSs



# Best Practices for State Highway Safety Officials

AV 3.0 identified new insights for State Highway Safety Officials in addition to the ones already identified in the A Vision for Safety 2.0:

1. Consider test driver training and licensing procedures for test vehicles
2. Recognize issues unique to entities offering automated mobility as a service

## ADS 2.0 included:

1. Administrative (establishment of lead agency for ADS oversight)
2. Application for Entities to Test ADSs on Public Roadways
3. Permission for Entities to Test ADS on Public Roadways
4. Specific Considerations for ADS Test Drivers and Operations
5. Considerations for Registration and Titling
6. Working with Public Safety Officials
7. Liability and Insurance



# Considerations for Local Governments

AV 3.0 suggests that local governments may wish to consider the following topics as they formulate local policies.

1. Facilitate safe testing and operation of automated vehicles on local streets.
2. Understand the near-term opportunities that automation may provide.
3. Consider how land use, including curb space, will be affected.
4. Consider the potential for increased congestion, and how it might be managed.
5. Engage with citizens





# Roles in Automation: Private

Critical areas where the private sector's role will be significant:

1. Demonstrate the safety of ADS for public acceptance and adoption. Voluntary Safety Self-Assessments disclosures continue to be encouraged.
2. Engage Public Safety Officials
3. Consider Surface Transportation Conditions and Infrastructure
4. Contribute in Development of Voluntary Technical Standards





# The Road Ahead - Implementation Strategies

The Department and NHTSA have put its six automation principles into action through these five automation implementation strategies. Stakeholders will be engaged throughout the process.

1. Engage stakeholders and the public
2. Provide best practices and policy considerations to support stakeholders
3. Support voluntary technical standards
4. Conduct targeted technical research
5. Modernize regulations



# Research Focus Areas

U.S. DOT's Automation research focuses on three key areas:

1. Removing barriers to innovation
2. Evaluating impacts of technology, particularly with regard to safety
3. Addressing market failures and other compelling public needs







# NHTSA Vehicle and Equipment Safety Research

- Support Updating and Modernizing Regulations (removing assumption of a driver from current regs)
- Vehicle Safety Evaluation Framework (tests, test methods, safety performance metrics)
- Functional Safety Analyses and ADS Component Testing
- Human Factors (signaling, telltales, disabled user needs)
- Occupant Protection (alternative cabin configurations)







# Safety without Regulatory Barriers - Rulemaking

- Update Exemption Process
- Removing Barriers & Assuring Safety
  - ANPRM, comment period ended August 28<sup>th</sup>
- Safety Principles for ADSs: New (2019 Spring Agenda)
- Passenger Safety for ADSs: New (2019 Spring Agenda)
- Considerations for Telltales and Indicators: New (2019 Spring Agenda)
- Automated Driving Systems Pilot

See <https://www.transportation.gov/regulations/report-on-significant-rulemakings>



# Public Awareness and Communication

- Public Awareness and Confidence
- Understanding Roles
- Safe Road Users Education



# Public Notification of Petitions

RFCs on 2 petitions for exemption  
(closed May 20, 2019)

- GM
- Nuro





## Public Safety Panel: July 18, 2019

### “Steps Toward Putting Public Safety Community at Ease with Advanced Vehicle Technologies”

#### Key Discussion Topics Included:

- Discussion with the public safety community (Fire, EMS, Law Enforcement) regarding safe testing and operation of advanced vehicle technologies, specifically related to the safety of on-scene first-responders.
- Speakers included ADS technology companies and local public safety representatives.
- Explored what processes are needed and what lessons can be learned from current and past experiences.

See <https://www.nhtsa.gov/technology-innovation/automated-vehicles-safety>



# Upcoming Event – MassDOT & City of Boston

MassDOT and the City of Boston (Mayor's Office of New Urban Mechanics), in collaboration with [Optimus Ride](#) and [nuTonomy](#) (an Aptiv company), will facilitate workshops about advanced driver assistance systems and Automated Driving Systems (i.e. "autonomous vehicles") on September 25<sup>th</sup> and 26<sup>th</sup>, 2019.

- The 4-5 hour workshop is intended for representatives of police, fire, and emergency medical services, in addition to lead/supporting staff within the participating municipalities, and other relevant parties.
- Its purpose is to introduce staff to connected and automated vehicle technologies, share information about autonomous vehicle testing in Massachusetts and across the US, and walk through the Commonwealth's application and permitting process.
- Additionally, nuTonomy and Optimus Ride will share information about their respective vehicles and testing programs, including the first responder interaction plan, a component of the Commonwealth's application package.



# Thank you!

## For More Information:

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