



Washington State
Transportation Commission

Federal Guidance on Autonomous Vehicles



October 18, 2016

Technology in transportation is not new. In fact, the airplane, the automobile, the train and the horse-drawn carriage all introduced new opportunities and new complications to the safe movement of people and goods. -- Secretary of Transportation Anthony R. Foxx



Defining Autonomous Vehicles: NHTSA

National Highway Traffic Safety Administration (NHTSA) defines four levels of autonomy:

- Level 0 – No automation
- Level 1 – Function specific automation
- Level 2 – Combined function automation
- Level 3 – Limited self-driving automation
- Level 4 – Full self-driving automation

Society of Automotive Engineers (SAE) has similar definitions, although 5 levels.

Defining Autonomous Vehicles: SAE

At SAE Level 0, the human driver does everything

At SAE Level 1, an automated system on the vehicle can *sometimes assist* the human driver conduct *some parts of* the driving task;

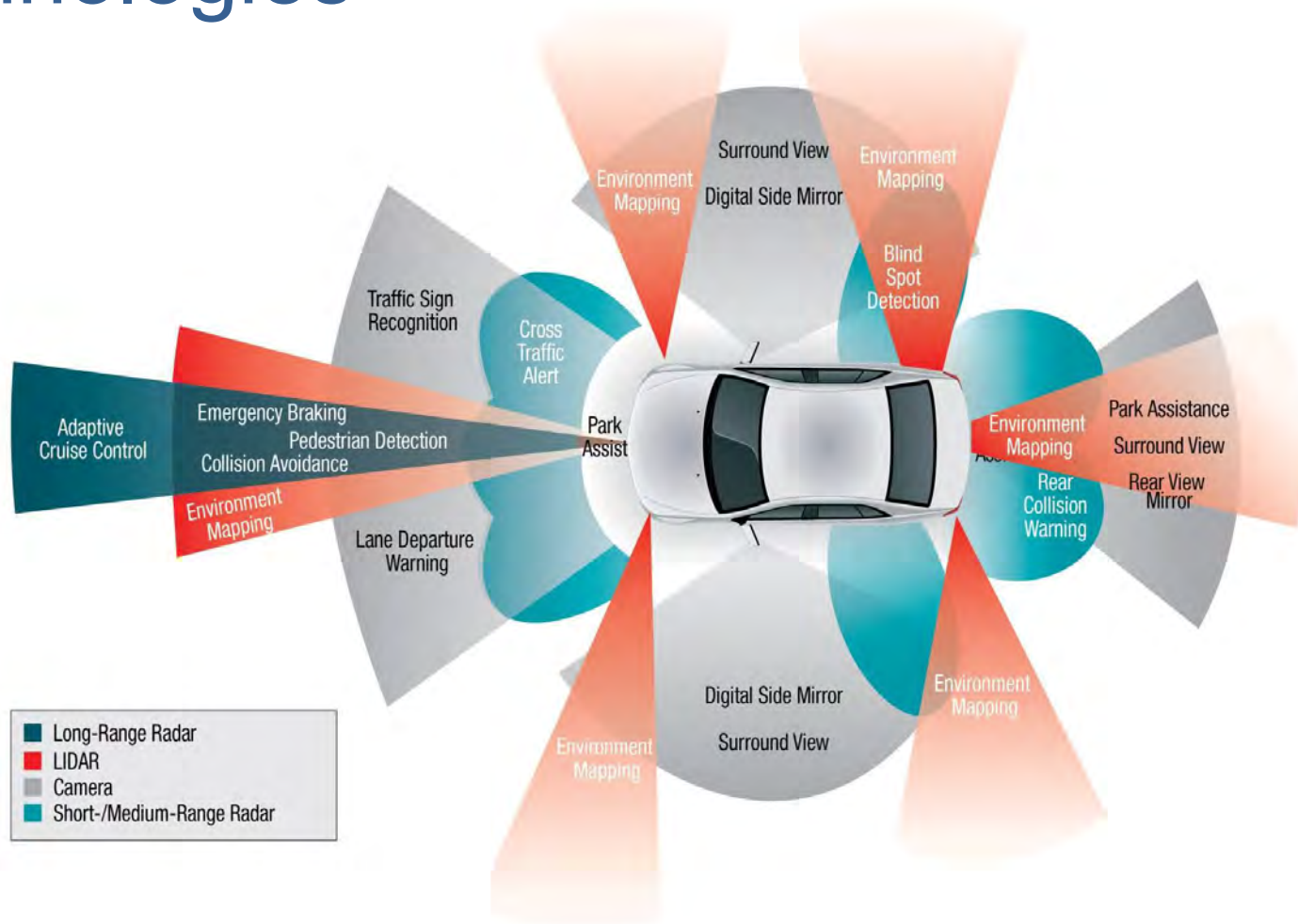
At SAE Level 2, an automated system on the vehicle can *actually conduct* some parts of the driving task, while the human continues to monitor the driving environment and performs the rest of the driving task;

At SAE Level 3, an automated system can both actually conduct some parts of the driving task and monitor the driving environment *in some instances*, but the human driver must be ready to take back control when the automated system requests;

At SAE Level 4, an automated system can conduct the driving task and monitor the driving environment, and the human need not take back control, but the automated system can operate only in certain environments and under certain conditions; and

At SAE Level 5, the automated system can perform all driving tasks, under all conditions that a human driver could perform them.

Visualizing Autonomous Vehicle Technologies



Fundamentals of Autonomous Vehicles

Philosophical differences

- Driver is essential to vehicle operations
- Design systems to maintain situational awareness
- Adequate notification time (Human machine interface – HMI)
- Human is the backup system
- Vehicle operations fully autonomous
- No need for steering or braking controls
- Redundancy and fail-safe built into system

Technological differences

- Self-contained processing
- Map dependency and cloud computing
- Vehicle to vehicle communication (v2v)
- NHTSA decision on DSRC capability
- Vehicle to infrastructure communication (v2i)

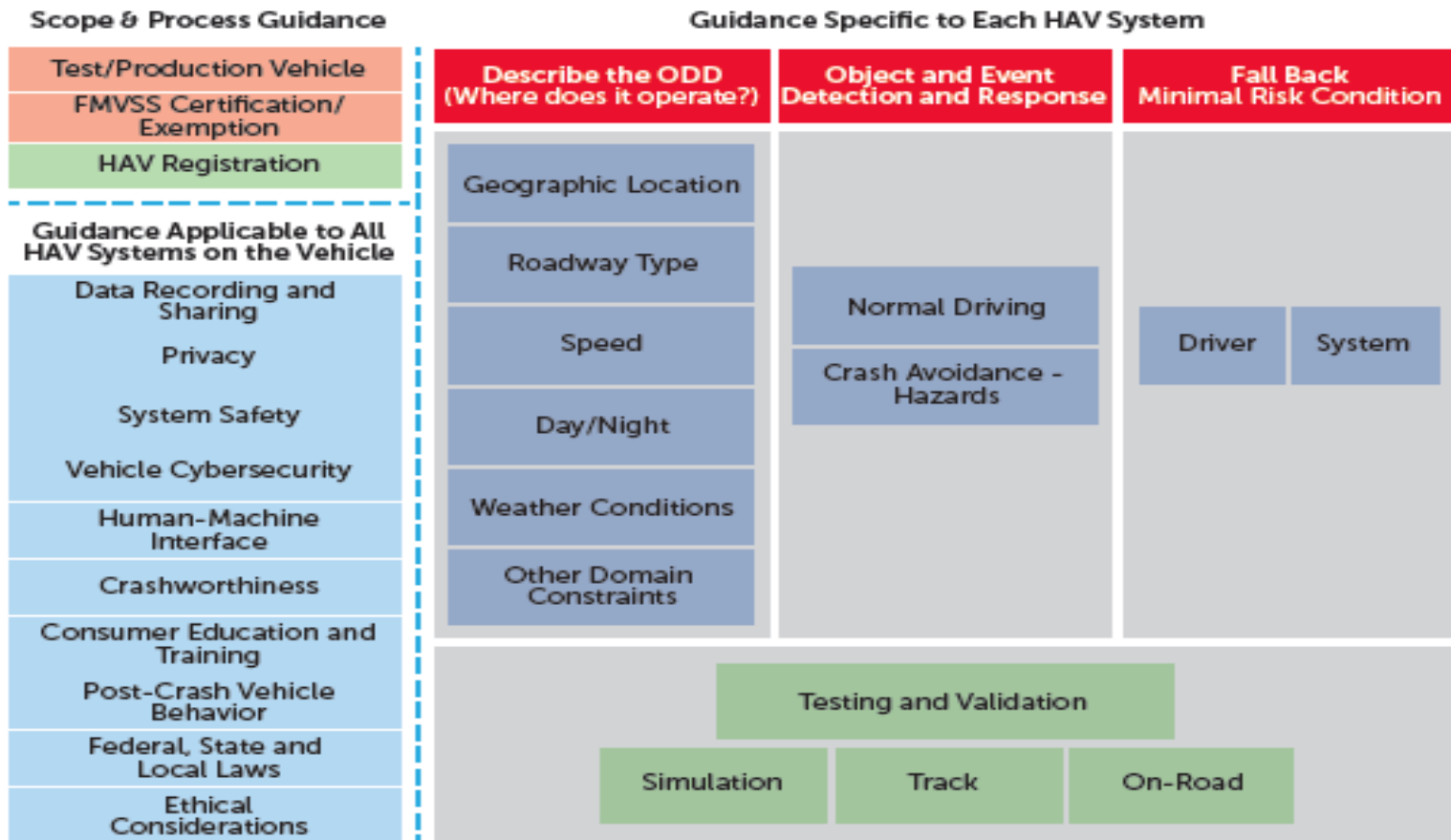
NHTSA Guidance

First, the rise of new technology is inevitable. Second, we will achieve more significant safety improvements by establishing an approach that translates our knowledge and aspirations into early guidance. Third, as this area evolves, the “unknowns” of today will become “knowns” tomorrow. We do not intend to write the final word on highly automated vehicles (HAVs) here. Rather, we intend to establish a foundation and a framework upon which future Agency action will occur.

Introductory Message of Secretary Anthony R. Foxx

NHTSA Guidance

Figure I: Framework for Vehicle Performance Guidance



NHTSA Guidance: Federal Role

USDOT strongly encourages States to allow USDOT alone to regulate the performance of HAV technology and vehicles. If a State does pursue AV performance-related regulations, that State should consult with NHTSA and base its efforts on the Vehicle Performance Guidance provided in this Policy.

NHTSA is prepared to assist with challenges that States face with regard to AVs both now and in the future. For example, NHTSA recognizes the need for driver education and training regarding AV systems, and is prepared to partner with States to address this need. NHTSA has already begun research to evaluate the ability of drivers to stay engaged while AVs are performing part (or all) of the driving task.

NHTSA Guidance: Federal Role

The division of regulatory responsibility for motor vehicle operation between Federal and State authorities is clear.

NHTSA responsibilities include:

- Setting Federal Motor Vehicle Safety Standards (FMVSS) for new motor vehicles and motor vehicle equipment (to which manufacturers must certify compliance before they sell their vehicles);
- Enforcing compliance with the FMVSS;
- Investigating and managing the recall and remedy of non-compliances and safety-related motor vehicle defects and recalls on a nationwide basis;
- Communicating with and educating the public about motor vehicle safety issues; and
- Issuing guidance for vehicle and equipment manufacturers to follow, such as the Vehicle Performance Guidance for AVs.

NHTSA Guidance: State Role

States' responsibilities include other aspects of motor vehicle regulations:

- Licensing (human) drivers and registering motor vehicles;
- Enacting and enforcing traffic laws and regulations;
- Conducting safety inspections, where States choose to do so; and
- Regulating motor vehicle insurance and liability.

These general areas of responsibility should remain largely unchanged. USDOT and the federal government are responsible for regulating motor vehicles and motor vehicle equipment, and states are responsible for regulating the human driver and most other aspects of motor vehicle operation.

As motor vehicle equipment increasingly performs “driving” tasks, USDOT’s exercise of its authority and responsibility to regulate the safety of such equipment will increasingly encompass tasks similar to “licensing” of the non-human “driver.” The Vehicle Safety Act expressly preempts States from issuing any standard that regulates performance if that standard is not identical to an existing FMVSS regulating that same aspect of performance.

NHTSA Guidance: What States Should Do

States should evaluate current laws and regulations to address unnecessary impediments to the safe testing, deployment, and operation of AVs, and update references to a human driver.

- States may wish to **experiment** with different policies and approaches to consistent standards, and in that way contribute to the development of the best approaches and policies to achieve consistent regulatory objectives. The goal of state policies in this realm should be **sufficient consistency** of laws and policies to avoid a patchwork of inconsistent state laws that could impede innovation and the expeditious and widespread distribution of safety enhancing automated vehicle technologies.
- States are also encouraged to **work together** to standardize and maintain road infrastructure including signs, traffic signals and lights, and pavement markings. This will support the safe operation of AVs and ensure the safety of human drivers, who will continue to operate vehicles on the roads for years to come.

NHTSA Guidance: What States Should Do

Administrative

- Identify a lead agency responsible for consideration of any testing of HAVs.
- Create a jurisdictional automated safety technology committee which includes representatives from the governor's office, the motor vehicle administration, the state department of transportation, the state law enforcement agency, the state highway safety office, office of information technology, state insurance regulator, the state office representing the aging and disabled communities, toll authorities, and transit authorities.
- Consult other stakeholders, such as transportation research centers located in the state, the vehicle manufacturing industry, and groups representing pedestrians, bicyclists, consumers and other interested parties, as appropriate.
- The lead agency should keep its state automated safety technology committee informed of the requests from manufacturers to test in their jurisdiction and the status of the designated agency's response to the manufacturers.

NHTSA Guidance: What States Should Do

Administrative (continued)

The lead agency should take steps to use or establish statutory authority to implement a regulatory framework, including examining the laws and regulations in the areas of: (1) licensing/registration; (2) driver education/training; (3) insurance and liability; (4) enforcement of traffic laws/regulations; and (5) administration of motor vehicle inspections, in order to address unnecessary barriers to safe testing, deployment, and operation of AVs.

Develop an internal process that includes an application for manufacturers to test.

Establish an internal process for issuing test vehicle permits.

Review state statutes to identify any legal issues that need to be addressed prior to the deployment and operation of automated vehicles.

Jurisdictional Permission to Test.

The lead agency should involve the jurisdictional law enforcement agency before allowing testing. Authorization to test may include restrictions, and/or may prohibit testing in certain areas or locations, such as school zones, construction zones, or other safety-sensitive areas.

NHTSA Guidance: What States Should Do

Deployed Vehicles.

To make the transition from human-driven motor vehicles equipped with automated safety technologies to fully automated vehicles, gaps in current regulations should be identified and addressed by the states (with the assistance of NHTSA). Some examples are:

- Law enforcement/emergency response
- Occupant safety
- Motor vehicle insurance
- Crash investigations/crash reporting
- Liability (tort, criminal, etc.)
- Motor vehicle safety inspections
- Education and training
- Vehicle modifications and maintenance
- Environmental impacts

NHTSA Guidance: What States Should Do

Liability and Insurance

States are responsible for determining liability rules for AVs.

States should consider how to allocate liability among AV owners, operators, passengers, manufacturers, and others when a crash occurs.

- For example, if an AV is determined to be at fault in a crash then who should be held liable?

For insurance, states need to determine who (owner, operator, passenger, manufacturer, etc.) must carry motor vehicle insurance.

- Determination of who or what is the “driver” of an AV in a given circumstance does not necessarily determine liability for crashes involving that AV. States may determine that in some circumstances liability for a crash involving a human driver of an AV should be assigned to the manufacturer of the AV.

NHTSA Guidance: Next Steps

Activities to Improve, Expand and Oversee the Guidance

1. Obtain Public Input: NHTSA will seek public input through a Request for Comment on this and all other sections of this Policy.
2. Public Workshop(s): NHTSA plans to hold a public workshop to provide interactive discussions of the Guidance and gather additional input.
3. Expert Review: In parallel with the public workshop effort, NHTSA will conduct an external expert peer review.
4. Publish Safety Assessment Template: NHTSA will publish a template for manufacturers and other entities to use to submit their Safety Assessments.
5. Pursue Anonymous Data Sharing: NHTSA will explore a mechanism to facilitate anonymous data sharing among those parties testing and deploying AVs.
6. Work Plan for Priority Safety Areas: To further enhance the Guidance, some elements would benefit from specific actions taken by industry. NHTSA will formally request actions needed from specific industry associations and groups (e.g., SAE) to address priority safety areas.

NHTSA Guidance: Next Steps

7. Continual Coordination: NHTSA will coordinate with State partners to ensure that the Guidance and the Model State Policy sections complement each other.
8. Automated Vehicle Classification: NHTSA will publish an objective method that manufacturers and other entities may use to classify their automated vehicle systems.
9. Gather Data: Use special and general order authority when necessary and appropriate to gather data.
10. Mandate Safety Assessment: Implement a rule mandating the submission of the Safety Assessment letter identified in this Guidance.
11. HAV Registration: Consider a rulemaking that would require any entity planning to test or operate HAVs on public roadways (i.e., those vehicles with systems that correspond to SAE Levels 3-5) to register with the Agency and to document and report to the Agency items related to NHTSA's Guidance such as data recording, cybersecurity, test and evaluation process and methods used to ensure on-road operational safety.