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National Highway Traffic Safety Administration Issues First Federal Automated Vehicles Policy To Guide Industry

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1. Introduction

In the near future, the Office of Management and Budget will likely approve the National Highway Traffic Safety Administration's ("NHTSA") request to collect data from the automated vehicle ("AV") industry. Upon completion of the required analysis, the Office of Management and Budget will have acknowledged that the NHTSA has complied with the Paperwork Reduction Act.[2] The completion of this process marks a pivotal point in the NHTSA's development of a uniform federal guide for the burgeoning AV industry.

On September 20, 2016, NHTSA released the *Federal Automated Vehicles Policy* ("AV Policy") in order to guide and accelerate highly automated vehicle ("HAV") development.[3] The primary purpose of the AV Policy is to guide manufacturers and other entities in ensuring that their systems will be safe under real world conditions.[4] A crucial aspect of NHTSA's AV Policy is that upon the conclusion of the Paper Reduction Act analysis, entities must submit a safety assessment letter to NHTSA indicating how their particular HAV system complies with the AV Policy.[5]

NHTSA's mission, as a sub-agency within the U.S. Department of Transportation, is to prevent injuries and reduce economic costs due to road traffic accidents.[6] Conducting research, increasing public education, and establishing and enforcing safety standards are all primary means NHTSA employs to meet its objectives.[7] Thus, NHTSA is the primary safety standards regulator of the auto industry.[8]

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[2] The Paperwork Reduction Act was passed in 1980 and reissued in 1995. Its purpose is to reduce the paperwork burden the Federal Government and its agencies impose on the public. Information collection of more than 10 respondents requires OMB approval. 44 U.S.C. § 3501 (1995)

[3] *Federal Automated Vehicle Policy* ("AV Policy"), National Highway Traffic Safety Administration ("NHTSA"), September 20, 2016.

[4] See page 11 of the AV Policy.

[5] See page 16 of the AV Policy.

[6] The NHTSA was created as a sub-agency of the U.S. Department of Transportation through the Highways Safety Act of 1970. (See allgov.com). The U.S. Department of Transportation's mission is to ensure fast, safe, efficient transportation across the country. It is mean to assure the coordinated, effecting administration of the transportation programs of the Federal Government. (See transportation.gov and Government Publishing Office).

[7] *NHTSA Core Values*, NHTSA Website.

[8] *National Highway Traffic Safety Administration*, Allgov.com.

NHTSA views AVs as the next great automobile transformation. One aspect of the revolutionary potential of AVs is the possibility that they will remove human error and reduce road fatalities. The AV Policy notes that in 2015 there were 35,092 road deaths and 94% were the result of human choice and error.[9] The number of motor vehicle related accidents increased in 2016 with 40,200 deaths according to the National Safety Council, a non-profit organization.[10] Most of the reasons the National Safety Council put forth for this increase were related to human error, including distracted driving, driving while intoxicated, and failing to wear a seat belt.[11] NHTSA has made it a goal to eliminate traffic fatalities within 30 years and relies heavily on the development of AVs to reach this goal.[12] The release of the AV Policy demonstrates NHTSA's desire to accelerate the development of HAVs.[13]

2. Overview of the Current Regulatory Framework for Automobiles and HAVs

The NHTSA derives its regulatory authority from the National Traffic and Motor Safety Act ("Vehicle Safety Act") of 1966.[14] The Vehicle Safety Act gives the agency the power to issue Federal Motor Vehicle Safety Standards ("FMVSS").[15] Manufacturers must certify compliance with FMVSS for new motor vehicles and motor vehicle equipment.[16]

a. NHTSA regulatory authority and standards

Manufacturers currently bear the responsibility of self-certifying that their products or vehicles they manufacture for use on public roads comply with all FMVSS. As long as a vehicle complies with the existing FMVSS framework and maintains a conventional vehicle design, it can be sold to the public. As a result, there is currently no federal legal barrier to the sale of a HAV.

The AV Policy is a collection of guiding steps and is the NHTSA's first move in developing federal standards for manufacturers as they design, test, and deploy HAVs. Although the AV Policy is not yet mandatory as a whole, HAV manufacturers will be required to submit safety assessment letters once the AV Policy receives Paper Reduction Act approval.[17]

b. HAV definitions

In defining HAVs, the AV Policy adopts the SAE International ("SAE") definitions for the varying levels of automation.[18] The AV Policy defines HAVs as SAE Levels 3-5: vehicles with automated systems that are responsible for monitoring the driving environment. At SAE Level 3 an automated system can both conduct some parts of the driving task and monitor the

[9] See page 5 of the AV Policy.
[10] "U.S. Traffic Deaths Rise for a Second Straight Year," *The New York Times*, February 15, 2017.
[11] "U.S. Traffic Deaths Rise for a Second Straight Year," *The New York Times*, February 15, 2017.
[12] "U.S. Traffic Deaths Rise for a Second Straight Year," *The New York Times*, February 15, 2017.
[13] See page 6 of the AV Policy.
[14] 49 U.S.C. Chapter 301, Government Publishing Office.
[15] 49 U.S.C. Chapter 301, Government Publishing Office.
[16] See page 38 of the AV Policy.
[17] See page 11 of the AV Policy.
[18] SAE International is a global association created to spur consensus standards development in the automotive industry. See About SAE and SAE Standards J3016A.

driving environment in some instances, but the human driver must be ready to take back control when the system requests it. At SAE Level 4 an automated system can only operate in certain environments and under certain conditions, but the human need not take back control. At SAE Level 5 the automated system takes over all driving tasks, under all conditions.[19]

The AV Policy is primarily concerned with HAVs, but also addresses SAE Level 2 vehicles. An SAE Level 2 vehicle has an automated system that can conduct some parts of the driving task, while the human continues to monitor the environment and performs the other driving tasks. The distinction between the varying levels of automation is important because they directly impact what information must be included in the safety assessment letters submitted to NHTSA.[20]

3. Vehicle Performance Guidance and Safety Assessment Letters

The AV Policy covers a broad range of HAV performance areas including: crashworthiness and occupant protection; data recording and sharing capabilities; functional safety and cybersecurity; and the human-machine interface system.[21] For each HAV system, the AV Policy requires entities to submit a safety assessment letter to NHTSA's Office of the Chief Counsel detailing how they comply with the guidance set forth in the AV Policy.[22]

Entities must submit this letter at the time they intend for their products to be ready for use, which includes testing or deployment, on public roads.[23] Testing is defined as when a researcher, manufacturer, entity, or expert third party at the request of one of those entities analyzes and evaluates HAV systems and vehicles on public roads. Deployment is defined as when members of the public, who are not employees or agents of researchers, manufacturers or other entities, operate a HAV on public roads.[24]

When the Paper Reduction Act process is concluded, there will likely be HAV systems that are already being tested and deployed. Those manufacturers and other entities are expected to submit a safety assessment letter within four months of the Paper Reduction Act completion date. Whenever a significant update is made to a HAV vehicle or system, a new safety assessment letter is required.[25] Given how rapidly evolving HAV software is, the NHTSA has also recognized that it will need to develop additional regulatory tools and rules to regulate the certification and compliance of post-sale software updates.[26] A significant update is one that results in a new safety evaluation across the assessment areas.

The safety assessment letter must cover the following 15 assessment areas[27]:

- Data recording and sharing

[19] See pages 9-10 of the AV Policy.
[20] See pages 9-10 of the AV Policy.
[21] See page 13 of the AV Policy.
[22] See page 15 of the AV Policy.
[23] See page 15 of the AV Policy.
[24] See page 39 of the AV Policy.
[25] See page 16 of the AV Policy.
[26] See page 76 of the AV Policy.
[27] See page 16 of the AV Policy.

- Privacy
- System safety
- Vehicle cybersecurity
- Human machine interface ("HMI")
- Crashworthiness
- Consumer education and training
- Registration and certification
- Post-crash Behavior
- Federal, state and local laws
- Ethical considerations
- Operational design domain ("ODD")
- Object and event detection response ("OEDR")
- Fall back minimum risk condition
- Validation methods

4. Select Safety Assessment Areas

Several of the safety assessment areas merit further discussion. These are of particular interest to not only HAV development, but other aspects of the technology that facilitates HAVs as well. What follows is an expansion on the following safety assessment areas: data recording and sharing, the human machine interface, ethical considerations, and the operational design domain.

a. Data recording and sharing

While testing or deploying a HAV system or vehicle the manufacturer or other entity is required to record relevant data. Relevant data is defined as data that sheds light on the event in question, such as an accident, and how the system performed during and after that event. An important element of the data recording system is that it must include a means to easily share the recorded information. That information will be stripped of any identifying information and then shared with other entities.[28] These entities include: equipment designers and suppliers, entities that outfit any vehicle with automation capabilities or HAV equipment for testing, for commercial sale, and/or for use on public roadways, transit companies, automated fleet operators, driverless taxi companies, and any other individual or entity that offers services utilizing HAVs.[29]

b. Human Machine Interface

As HAVs take on more driving functions, the system's ability to accurately convey information to the human driver becomes crucial. This ability is especially important for SAE Level 3 systems in which human drivers are expected to monitor the environment and take over driving if necessary. The human driver's capacity for staying alert when disengaged in the

[28] See pages 17-18 of the AV Policy.
[29] See page 11 of the AV Policy.

driving task directly limits their ability to retake control of the driving function. This fact gives the HMI's communication skills vital importance and explains why this section is required in the safety assessment letter.[30] The AV Policy sets out what the HMI system must be able to convey to the driver and includes:

- When the system is functioning properly;
- Currently engaged in automated driving mode;
- Currently unavailable for automated driving;
- Experiencing a malfunction; and
- Requesting control transition from the HAV system to the human operator.[31]

c. Ethical Considerations

According to the AV Policy, when operating a vehicle most individuals have the following objectives: safety, mobility, and legality. Sometimes these goals will conflict, however, and a choice must be made as to which one takes priority. The AV Policy recognizes that a HAV will also be faced with these conflicts and its decision will depend on the decision rules it has been programed with or settings applied by the human operator. The AV Policy recommends that the algorithms used to create these programs should be developed with transparency and with input from shareholders. The HAV's decisions have broad consequences as they impact all roadway drivers and the ethical considerations raised by technology making traditional driving decisions are a crucial area of study moving forward. [32]

d. Operational Design Domain

In the safety assessment letter, the manufacturer or other entity should define its operational design domain ("ODD"). The ODD can vary for each HAV system and is meant to define conditions in which the SAE function is intended to operate with respect to roadway types, location, and speed range.[33] The SAE system will then map to the ODD.[34] The HAV is then responsible for complying with all traffic laws, both state and federal, within its ODD.[35] When the HAV is outside of its defined ODD, the vehicle should transition to a minimal risk condition and give a clear indication that the HAV system is not available.[36] A minimum risk condition is the fall back condition where the vehicle decreases automation and gives more control to the human driver. HAVs designed to operate without a human driver need to address what the minimum risk condition will be for their system.[37]

4. Model State Policy

Currently, HAVs are subject to the same division in jurisdiction as regular vehicles and NHTSA does not expect the responsibilities to shift dramatically. The Vehicle Safety Act

[30] See page 22 of the AV Policy.
[31] See page 22-23 of the AV Policy.
[32] See pages 26-27 of the AV Policy.
[33] See page 13 of the AV Policy.
[34] See page 15 of the AV Policy.
[35] See page 25 of the AV Policy.
[36] See page 27 of the AV Policy.
[37] See page 30 of the AV Policy.

expressly preempts states from issuing any standard that deviates from the FMVSS that covers the same aspect of performance. The implication of this fact for HAVs is that if NHTSA issued an FMVSS that created a performance standard for HAVs, then a state could not have its own performance standard unless it was identical to the FMVSS.[38]

The AV Policy includes a model state policy that reaffirms the distinction between state and federal jurisdiction and calls on states to evaluate their current laws and remove unnecessary impediments to the testing and deployment of HAVs.[39] The model state policy proposed is meant to create a consistent unified national framework for regulation of HAVs if it were to be adopted.[40] NHTSA's objective is to avoid a patchwork of inconsistent state laws that could impede the advancement of HAVs and their dispersion across the country.

The AV Policy anticipates that the development of HAVs will cause the line between state and federal jurisdiction to blur and shift towards more federal control as HAV equipment begins to replace human drivers. The model state policy notes that states may recognize a HAV system that conducts the driving task and monitors the driving environment (SAE Level 3-5) to be the driver. The AV Policy suggests that states would only regulate these HAVs for the very limited purpose of enforcement of traffic laws.[41] The other aspects of the technology would be regulated at the federal level. Note that for lower level SAE 2 vehicles, the human is still considered the driver and would not pose any jurisdictional issues. In general, the AV Policy currently puts the burden of establishing liability rules on the states.[42]

In the model state policy, NHTSA encourages states to create a state agency responsible for the testing, deployment, and operation of HAVs. This lead agency is expected to coordinate with the industry and create a safety committee that is aware of all entities that want to test in their jurisdiction. The model state policy calls on the state to establish an internal process including a standard manufacturer's application to test in the state and a process for issuing permits to do so.[43] The manufacturer's application must state: (i) that each vehicle used for testing follows NHTSA performance guidance and applicable FMVSS; (ii) detailed identification of the manufacturer; (iii) specific information on the vehicles that will be used for testing; (iv) the identity of each test operator; and (v) the manufacturer's ability to cover person injury, death, or property damage for at least $5 million.[44]

5. Proposed New Regulatory Tools

The AV Policy identifies potential new tools that could help NHTSA encourage the development of HAVs.[45] Under the current regulatory system, manufacturers self-certify that

[38] See page 38 of the AV Policy.
[39] See page 39 of the AV Policy.
[40] See page 37 of the AV Policy.
[41] See page 39 of the AV Policy.
[42] See page 45 of the AV Policy.
[43] See pages 40-41 of the AV Policy.
[44] See page 41-43 of the AV Policy.
[45] See page 68 of the AV Policy.

their vehicles and equipment comply with all FMVSS. The vehicles are then randomly purchased from dealerships and tested for compliance.[46]

The AV Policy suggests a possible departure from this system in its consideration of the many tools available to regulate HAVs. One potential regulatory tool that the AV Policy describes is a pre-market approval process. This approval process would entail NHTSA testing vehicle prototypes to determine if the vehicle meets all standards established for HAVs. This change would result in the inability to sell a HAV without prior NHTSA approval. In considering the potential of applying this process to HAVs, the AV policy acknowledges that the new system would require fundamental statutory changes in order to give NHTSA the authority to test vehicles in this way, and a large increase in NHTSA resources.[47]

The pre-market approval process considered in the AV Policy is similar to that used by the Federal Aviation Administration ("FAA") for their testing of autopilot systems on commercial aircraft and unmanned aircraft systems.[48] The FAA and NHTSA recognize, however, that there are significant differences between the aircraft industry and automobile industry that might make HAV Pre-Market Approval less feasible. The FAA only deals with a few manufacturers and rarely needs to approve an entirely new model of an aircraft. On the other hand, the motor vehicle industry has many manufacturers and a long-standing practice of introducing and producing motor vehicles on a model-year basis. Thus, a Pre-Market Approval Process could prove to be extremely disruptive because of the increase in time required for approval.[49]

[46] See pages 71-72 of the AV Policy.
[47] See pages 72-73 of the AV Policy.
[48] See page 71 of the AV Policy.
[49] See page 73 of the AV Policy.