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December 10, 2018

RE: Docket No. NHTSA-2018-0092

## 1. Introduction

Securing America's Future Energy (SAFE) is pleased to submit the following in response to the request for comments on the advanced notice of proposed rulemaking (ANPRM) for the *Pilot Program for Collaborative Research on Motor Vehicles With High or Full Driving Automation* ("Pilot").

SAFE applauds the Department for undertaking this ANPRM and believes that the Pilot has significant potential to benefit the public by accelerating highly automated vehicle (HAV) deployment,<sup>1</sup> broadening the applications that may be achievable with HAVs,<sup>2</sup> improving both private and public understanding of and confidence in HAV safety,<sup>3</sup> and expanding the social benefits of the technology.<sup>4</sup>

These comments are structured by first presenting high-level perspectives on what the Pilot should accomplish and what design principles should be implemented. The design principles will be further detailed in response to some of the questions that the Department posed in the ANPRM.

## 2. Goals of a Federal Pilot

The last several years has seen numerous early-stage deployments of autonomous vehicles in a variety of settings, functions, and form factors.<sup>5</sup> While early-stage development can and often takes place on closed test tracks, ultimately, the advanced development and deployment of HAVs requires extensive testing and validation on public roads. Technology developers and experts agree that closed tracks are no substitute for the complexity and novelty of testing on public roads, making public testing a necessary prerequisite to widespread deployment.<sup>6</sup>

SAFE commends the Department for its thoughtful and pro-innovation stance toward HAV regulation, most recently manifested in its AV 3.0 policy document.<sup>7</sup> The policy begins to clarify the legality of HAV

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<sup>1</sup> See, e.g., Securing America's Future Energy, *A National Strategy for Energy Security: The Innovation Revolution*, May 2016.

<sup>2</sup> Comments on obstacles to automation from regulations

<sup>3</sup> See, e.g., Securing America's Future Energy, Commission on Autonomous Vehicle Testing and Safety, January 2017.

<sup>4</sup> See, e.g., Securing America's Future Energy and Ruderman Family Foundation, *Self-Driving Cars: The Impact on People with Disabilities*, January 2017.

<sup>5</sup> See, e.g., Patrick Sisson, "Small, autonomous shuttles seek to disrupt downtown transit," *Curbed*, July 12, 2018.

<sup>6</sup> See, e.g., Laura Fraade-Blonar, Marjory S. Blumenthal, James M. Anderson, and Nidhi Kalra, *Measuring Automated Vehicle Safety: Forging a Framework*, RAND Corporation, 2018.

<sup>7</sup> U.S. Department of Transportation, "Preparing for the Future of Transportation: Automated Vehicles 3.0," October 24, 2018.

activity on public roads, the roles of federal and state regulation, and outlines where further actions and proceedings might be required.

Senior DOT officials, as well as industry stakeholders and independent experts, have expressed the importance of better and more transparently measuring the safety of automated driving systems.<sup>8</sup> SAFE agrees with these assessments and believes that, over the long term, methods to objectively measure AV safety would contribute significantly to safety development and public acceptance of HAVs. Our recommendations below will focus on how to structure the Pilot in a way that advances this aim.

Currently, AV deployment faces barriers stemming from legacy automotive regulation; if not addressed, these barriers could delay or reduce the technology's potential to deliver societal benefits. Most often these regulatory barriers are due to an inability to make changes to the vehicle design. In the short term, restrictions may mean technology developers find difficulty removing—or even merely disabling while in autonomous mode—manual controls such as steering wheels and brake pedals. Over a longer timeframe, regulatory flexibility may enable new sorts of vehicle form factors which are more energy efficient and accessible.<sup>9</sup> Current regulatory restrictions place a ceiling on these innovations; the inability to experiment with new designs today may significantly delay the benefits associated with modifications of the vehicle form factor.

Therefore, there is a strong case to be made that the public interest is served by innovation in regulatory processes. A pilot that encourages collaboration between the public and private sectors on simultaneously overcoming regulatory barriers and advancing public understanding addresses some of the most pressing challenges facing HAV technology.

Below we outline our positions on the outcomes that could be achieved in a successful pilot, which we divide into desirable outcomes for both public and private interests.

### Public Outcomes

SAFE believes that the federal government has several critical responsibilities in regulating autonomous vehicles – responsibilities which are likely to evolve over time. Additional information gleaned from a pilot can help the government regulate more efficiently, precisely, and transparently. Some regulatory mechanisms are in place already, while others will develop in concert with the deployment and widespread public use of HAVs.

First, the Department is in a position to use its recall authority to ask technology developers to clarify their design and intentions, or ask technology developers to curtail its use.<sup>10</sup> Experience with use cases can help the government better identify when the public is at risk and when an intervention does not serve the public interest.

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<sup>8</sup> See, e.g., David Shepardson, “U.S. regulators grappling with self-driving vehicle security,” July 10, 2018; and Uber, UberATG Safety Report, “Uber Advanced Technologies Group A Principled Approach To Safety,” 2018; and See, e.g., Mobileye, *Implementing the RSS Model on NHTSA Pre-Crash Scenarios*; and See, e.g., Laura Fraade-Blanar, Marjory S. Blumenthal, James M. Anderson, and Nidhi Kalra, *Measuring Automated Vehicle Safety: Forging a Framework*, RAND Corporation, 2018.

<sup>9</sup> Lawrence Burns with Christopher Shulgan, *Autonomy: The Quest to Build the Driverless Car—And How It Will Reshape Our World*, August 2018; and See, e.g., Securing America's Future Energy and Ruderman Family Foundation, *Self-Driving Cars: The Impact on People with Disabilities*, January 2017.

<sup>10</sup> Paul Lienert and Heather Somerville, “Comma.ai drops self-driving device after warning from U.S. regulators,” Reuters, October 28, 2016; and Roger Simmons, “Feds call Florida driverless school bus 'irresponsible' and 'unlawful' — company says student riders were safe,” Orlando Sentinel, October 23, 2018.

Additionally, DOT administrations such as NHTSA and FMCSA have identified areas of conflict between HAV technology and regulations, and will need a sound basis for legally issuing exemptions to resolve these conflicts.<sup>11</sup> A pilot can help the Department develop its understand of HAV safety performance and use findings to assist in executing this regulatory agenda.

Finally, the Department is seeking to help better guide the long-term evolution of AV regulations. As the Department itself has noted,<sup>12</sup> this may require the integration of new approaches for performance-standards, including the use of software simulations<sup>13</sup> or mathematical formulas to define the “safety envelope” of a vehicle.<sup>14</sup> Additionally, SAFE believes that the Administration should further research performance-based standards based on “roadmanship metrics,” including a variety of metrics already measured with granularity and at considerable scale by telematics programs at insurance companies.<sup>15</sup>

The Pilot should be seen as a tool for “proof of concept” to test new approaches for any of the above. In particular, SAFE believes that better informing the long-term evolution of HAV standards should be seen as the key outcome, from a Departmental perspective, of this Pilot.

### Private Outcomes

HAVs are on the cusp of commercial deployment, with numerous pilots involving low-speed automated shuttles already serving the public in the United States and abroad.<sup>16</sup> Several companies are also running taxi-like service pilots allowing members of the public in HAVs, although all are using safety drivers at this time and are geographically contained (“geofenced”) within a relatively small area.<sup>17</sup>

The continued evolution of the HAV industry and the leading role of the United States is highly dependent on the continued policy support of the Department. The creation and annual update of the AV policy has given the industry some clarity on future policy pathways and fostered additional engagement by encouraging the submission of Voluntary Safety Self-Assessments.<sup>18</sup> These policy documents set the stage for the next step for the Department, the development of appropriate standards which serve the public interest and further safety innovation. It is our hope that the Pilot will be used to inform this effort and improve resulting regulatory actions. Generally, better visibility into the direction of federal standards will provide clarity and direction in technology development as well as the opportunity for industry and other stakeholders to offer informed feedback to improve standard

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<sup>11</sup> U.S. Department of Transportation, “Review of Federal Motor Vehicle Safety Standards (FMVSS) for Automated Vehicles,” March 2016; and U.S. Department of Transportation, “Review of the Federal Motor Carrier Safety Regulations for Automated Commercial Vehicles,” March 2018.

<sup>12</sup> U.S. Department of Transportation, “Preparing for the Future of Transportation: Automated Vehicles 3.0,” October 24, 2018.

<sup>13</sup> See, e.g., Lucy Yu, “Certification of Highly Automated Vehicles for Use on UK Roads,” Medium.com, November 6, 2018.

<sup>14</sup> See, e.g., Mobileye, *Implementing the RSS Model on NHTSA Pre-Crash Scenarios*.

<sup>15</sup> See, e.g., Progressive Insurance, “Hard Braking Most Likely Predictor of Future Crashes: Progressive,” May 19, 2015.

<sup>16</sup> See, e.g., Michael Laris, “A lot of cities want roboshuttles, including D.C. But will they work?,” Washington Post, November 25, 2018; and See, e.g., Joann Muller, “May Mobility Is Deploying Self-Driving Vehicles Now, Starting In Detroit,” Forbes, June 26, 2018.

<sup>17</sup> See, e.g., Heather Somerville, “Lyft surpasses 5,000 self-driving rides with Aptiv fleet,” Reuters, August 21, 2018.

<sup>18</sup> See, e.g., Edward Niedermeyer, “Nvidia's first autonomous safety report promotes simulations,” Automotive News, October 23, 2018.

development. In the same vein, clarity on state and federal roles will help other levels of government contribute constructively to the development of HAV policy.

In particular, there are several short-term policy issues that could benefit from additional regulatory development. They include:

- **Standards for exemptions:** HAVs hold considerable promise to improve safety, efficiency, and accessibility. As well-identified by the Department,<sup>19</sup> existing regulations can interfere with these benefits without necessarily contributing to safety (e.g., the absence of a steering wheel does not impact the safety of an HAV operating without the expectation of human input). Clarity on the process and standards for approving or denying exemptions for all vehicle types and HAV services will make it easier for industry and public advocates to build the future mobility industry.
- **Visibility into future standards:** Many voices in the Department and industry agree that standards will be required to foster public confidence in HAV technology.<sup>20</sup> Ideally, the Department would develop standards in a deliberate, iterative fashion. Allowing the public and interested stakeholders visibility into standards development would encourage useful feedback and assist in long-term planning.

To accomplish these goals, SAFE makes the following recommendations as to the structure of the Pilot.

### 3. Recommendations on High-Level Pilot Structure

SAFE understands this Pilot as an opportunity for a productive collaboration between the government and participating entities (ideally including private sector actors) to foster regulatory innovation. Participating entities would receive additional pathways to regulatory compliance than available outside the Pilot, allowing deployment of new HAV business models, use cases, and/or vehicle designs. At the same time, its engagement and central role would offer the Department the opportunity to closely observe pilots and glean data and information to enhance and accelerate regulatory efforts.

SAFE believes that the fundamental value of this partnership is sound and in the public interest. To succeed and realize its full value, the Pilot must offer an appropriate value proposition to all parties. If structured and managed with care, the pilot will enhance the ability of participants to bring new products and services to market unencumbered by legacy regulations while the government will glean key information and learnings which will allow it to continue to improve in its role overseeing the safety of HAV development.

SAFE outlines below some of the most important considerations for the Pilot, including recommendations on the structure, scope, entry requirements, key regulatory barriers that should be addressed by the Pilot, and data collection specifications.

#### Scope

HAVs are in their commercial infancy. Although they have been an intense topic of research and development in the last decade and are now in the earliest stages of deployment, it is impossible, at this juncture, to state with confidence the business models, use cases, and locations that will characterize

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<sup>19</sup> See, e.g., NHTSA, "Removing Regulatory Barriers for Vehicles With Automated Driving Systems," Request for Comments - Docket No. NHTSA-2018-0009, January 18, 2018.

<sup>20</sup> See, e.g., Ryan Beene, "Self-Driving Car Industry Needs Better Metrics, DOT Official Says," Bloomberg, October 23, 2018; and The Economist, "The success of AVs will depend on sensible regulation," March 1, 2018.

HAV deployment. Potential business models include: Providing on-demand mobility from a shared HAV fleet, selling HAVs to consumers for private ownership, providing mobility in retirement communities or closed campuses, or other applications. HAV deployment can take many shapes and forms, and certainly more business models can and will emerge.

Similarly, we do not understand how HAVs may alter the physical form factor of the vehicle. Today, most HAVs are commercially available vehicles that have been fitted with sensors and computational resources to provide automated functionality, although there are some new designs primarily meant to serve business models such as the delivery of goods or transporting people at low speeds. Just as the earliest motor vehicles were straightforward modifications of horse carriages, but evolved significantly over the course of decades, it is difficult to anticipate what HAVs will look like or be capable of in the future.

Therefore, it is essential that any Pilot be extremely broad in its conception. SAFE recommends that:

*The government use flexible criteria for the eligibility of a deployment project for the Pilot, allowing a wide range of technical functionalities, geographic locations, operating environments or use cases.*

To offer material value, a pilot should take place in the real world, in the context, environment, and use case that present and future HAV deployments will take place (or are already taking place in). If the goal of this Pilot is to help the private sector and government jointly formulate and substantiate a safety case, that safety case is likely to be specific to the conditions of deployment.<sup>21</sup> Since it is not possible to accurately enumerate the future use cases of HAVs or the environment and conditions they will operate in, we recommend that the Government use an expansive lens when considering eligibility for the Pilot. SAFE recommends that the Pilot not be a specific project, whether government or privately run, because that will considerably narrow the potential learnings of the government and foreclose opportunities for regulatory innovation.

*SAFE recommends that the Department specifically seek to include a broad range of projects, geographies, participants, and use cases for the Pilot program. By including a broad portfolio of projects, the Department will increase the likelihood of gaining valuable information about future use cases and functionalities of HAVs.*

### Structure

In regards to the potential entry requirements of the Pilot, we offer several recommendations.

The Pilot should exist on an opt-in basis, giving individual entities the ability to choose whether to enter the Pilot. Structuring the Pilot on an opt-in basis will encourage an appropriate balance between the Pilot's requirements and the opportunities offered to participants. Further, the Department should specifically set any specific entry criteria for the Pilot in a manner that encourages broad participation.

The Department should be as transparent as possible about the requirements and responsibilities of entities participating in the Pilot as well as any regulatory flexibilities or alternative regulatory structures that participation in the Pilot will grant to participating entities.

SAFE recommends that the Pilot be broadly open. The question of which and how many applicants should be accepted to a Pilot should be driven by the goals of the Pilot.

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<sup>21</sup> Note: Over time, it is likely that the details of a safety case will become generalizable to other deployments, but for the foreseeable future, a company making a safety case for a specific deployment project will likely need present to create a safety case (whether for internal or external consumption)

## Areas of Regulatory Focus

SAFE recommends that the Pilot include, on a trial basis, additional pathways to compliance on regulatory requirements posing barriers to innovation. Any alternative compliance should not materially degrade public safety. By offering the potential to circumvent current regulatory barriers, the Department would not only be able to evaluate alternative regulatory structures on a trial basis, but would be in a position to use the Pilot to constructively engage private actors constrained by the current regulatory environment.

**Compliance with Current Design Requirements:** As discussed earlier, the current regulatory structure generally prohibits deploying vehicles without manual controls. Many low-speed shuttles do not include manual controls and are therefore dependent on exemptions from the Department. Leading HAV developers seeking to deploy taxi-like services have either developed and tested prototypes of vehicles without manual controls,<sup>22</sup> or filed exemptions to scale production of vehicles without manual controls.<sup>23</sup> In SAFE's view, the Pilot will contribute meaningfully to the public interest if it allows developers a clearer pathway to the deployment of vehicles without manual controls and clarifies that it is permitted to deactivate manual controls during autonomous operation. Additionally, as discussed earlier, a prime goal of the Pilot should be to expedite the creation of a comprehensive standard for HAVs that would include alternative designs.

**Clarity on Federal Role:** In the absence of federal standards, states and localities are promulgating their own HAV regulations.<sup>24</sup> The Department should whether Pilot participants are subject to state and local regulations on HAV safety. As a general rule, SAFE does not believe that it is in the public interest to site a Pilot or pilot project where there are deep-seated public objections.<sup>25</sup> That said, there may be a role for the Department to clarify whether Pilot participation can clarify the legality of projects that would otherwise be subject to ambiguity in state or local laws.

This is of particular relevance to the emerging autonomous trucking market. Recent Department policy clarified that current Federal Motor Carrier Safety Regulations do not legally require a driver to be present in an autonomous truck.<sup>26</sup> We applaud this clarification and believe it is a key step in unlocking further innovation in the heavy-duty space.<sup>27</sup> SAFE believes that the Pilot should include deployments of highly automated trucks as well as include assurances that the legal umbrella created by the Pilot permits the operation of autonomous trucks in states and localities that have not expressly prohibited such operation.

Most states have remained silent on the legality of autonomous trucking and have not explicitly regulated or legislated on the topic, presenting a barrier to autonomous truck deployment. The absence of express permission creates an environment of ambiguous legality. This is an especially difficult barrier for trucking, as long-haul truck routes can cross multiple states in a single trip. If the Pilot

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<sup>22</sup> See, e.g., Jack Nicas, "Google Parent Retires 'Firefly' Self-Driving Prototype," Wall Street Journal, June 13, 2017.

<sup>23</sup> General Motors, "Meet the Cruise AV: the First Production-Ready Car With No Steering Wheel or Pedals," Corporate Newsroom, January 12, 2018.

<sup>24</sup> Aarian Marshall, California's Heavy-Handed Plan To Regulate The Self-Driving Car Biz," Wired, May 24, 2018.

<sup>25</sup> See, e.g., Securing America's Future Energy, Commission on Autonomous Vehicle Testing and Safety, January 2017.

<sup>26</sup> U.S. Department of Transportation, "Preparing for the Future of Transportation: Automated Vehicles 3.0," October 24, 2018.

<sup>27</sup> See, e.g., Securing America's Future Energy, *Heavy-Duty Innovation: Energy, Automation & Tech in the Trucking Sector*, November 2017.

clarifies the legality of autonomous trucks operating in states that have remained silent on the topic, it would prevent the requirement for all the states along a shipping corridor to update their laws before a viable market is created. SAFE believes this would serve the public interest and hasten the safety, energy efficiency, and economic growth potential of autonomous trucks.

### Pilot Data Sharing Considerations

The Department has signaled that while it believes it may be premature to begin the standards development process for HAVs, it seeks to gather more information that will inform an eventual rulemaking and any interim policy measures that may be taken. SAFE believes that, structured appropriately, the Pilot is an appropriate opportunity to experiment with the role of various technologies and approaches to HAV safety assurance. While not claiming to be exhaustive, there are several methodologies for HAV safety assurance that could be integrated into a Pilot.

**Roadmanship:** A recent report identified “roadmanship metrics” as a promising avenue for assessing the safety of HAVs.<sup>28</sup> SAFE has been unable to identify significant research examining whether roadmanship metrics are predictive of HAV safety, even as insurance companies continue to invest in telematics programs designed to assess the safety performance of human drivers.<sup>29</sup> An innovative formulation of a roadmanship metric is Mobileye’s Responsibility Sensitive Safety (RSS),<sup>30</sup> which defines a mathematical “safety envelope” for driving behavior. Any Pilot should seek to facilitate research on roadmanship metrics as a potential method for HAV safety assurance. SAFE’s conversations with experts in the field suggest that roadmanship metrics, while not sufficient as a standalone and comprehensive proof of HAV safety, may have a role in the short term while a more comprehensive standard is developed.

**Simulation:** Many major HAV developers are using simulation software to develop HAVs. As the Department stated in its *AV 3.0* guidance, it is possible that some form of simulation would be used as part of a comprehensive HAV standard. The Pilot should seek to better understand the fidelity of HAV simulations and identify further technology development on scenarios and simulation tools that should occur before its incorporation into any standard or policy. Additionally, the use of simulation as a safety assurance tool will likely require sophisticated methods for testing an ADS while protecting confidential information.<sup>31</sup> The Pilot could include an attempt to use “test oracle” procedures and gauge its suitability for use in standards.

The Pilot’s success will require the right governance structure. SAFE believes that data generated by assets belonging to private entities should be protected in the absence of a compelling public interest to the contrary. Therefore, we believe that overly broad requests for data are counterproductive to the public interest served by the Pilot. SAFE believes that any data requested by the Department from Pilot participants should fill a concrete and specific research or regulatory need and the rationale for any data requested by the Department should be clearly articulated.

Creating a reasonable specification for data requirements and analyzing data acquired in the Pilot will require significant technical leadership. SAFE recommends that the Department establish an advisory

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<sup>28</sup> See, e.g., Laura Fraade-Blanar, Marjory S. Blumenthal, James M. Anderson, and Nidhi Kalra, *Measuring Automated Vehicle Safety: Forging a Framework*, RAND Corporation, 2018.

<sup>29</sup> See, e.g., Shafiq Dharani, Tom Isherwood, Diego Mattone, and Paolo Moretti, “Telematics: Poised for strong global growth,” McKinsey&Company, April 2018.

<sup>30</sup> See, e.g., Mobileye, *Implementing the RSS Model on NHTSA Pre-Crash Scenarios*.

<sup>31</sup> FiveAI, “Certification of Highly Automated Vehicles for Use on UK Roads,” November 2018.

board of subject matter experts to advise the Pilot. We also recommend that the Department seek to partner with innovation agencies with significant expertise in computer science, such as the Department of Energy's National Labs or Advanced Research Projects Agency-Energy (ARPA-E), in addition to the Department's usual research assets.

**Connectivity and Other Supplemental Technologies:** The Pilot might be structured as a venue for parties wishing to test capabilities and infrastructure enablement that is complementary to automated driving systems. The potential for safety benefits resulting for vehicle-to-vehicle or vehicle-to-infrastructure capabilities acting in concert with vehicle automation would be a potential topic for study. In an illustrative example, a major paint manufacturer suggested that specific coatings could enhance the visibility of vehicles and signage to HAV sensors and improve safety.<sup>32</sup> The feasibility of implementing such suggestions could be integrated into a Pilot.

#### 4. Responses to Specific Questions

Question 1. What potential factors should be considered in designing the structure of a pilot program that would enable the Agency to facilitate, monitor and learn from on-road research through the safe testing and eventual deployment of vehicles with high and full driving automation and associated equipment?

SAFE would encourage a broad pilot program that captures a range of use cases (e.g., taxi-like passenger services, goods delivery, trucking, low-speed shuttles) operating across different geographies. There is no way to determine today which use cases will figure most prominently in the future deployment of HAVs, so the Department should be as expansive as possible in its conception of the Pilot.

The value of the Pilot comes from enabling the Department to collaborate closely with entities seeking to engage in innovative deployments of HAVs. This will have the mutual benefit of allowing entities to expand the range of permissible deployments while affording the Department an opportunity to better understand the safety performance of HAV technology and improve present and future regulations on the topic.

The Pilot could be envisioned not as a sponsored project or set of projects, but as a broad program that projects could apply to for entry. Projects should be admitted if doing so would further the goals of the Pilot (to advance deployment of HAVs and Department understanding of HAV safety regulation)

Question 2. If NHTSA were to create a pilot program, how long would there be a need for such a program? What number of vehicles should be involved? Should NHTSA encourage the conducting of research projects in multiple locations with different weather conditions, topographical features, traffic densities, etc.?

SAFE believes that a Pilot structured to enable collaboration with the Department to resolve current regulatory barriers would be beneficial for HAV development until a more comprehensive rule on HAVs takes effect.

Question 3. What specific difficulties should be addressed in designing a national vehicle pilot program for vehicles with high and full driving automation either through the exemption request process relevant for FMVSS or more broadly related to other areas of NHTSA and/or other authorities.

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<sup>32</sup> Joyce Gannon, "PPG making paint that's easier for self-driving cars to 'see'," *Pittsburgh Post-Gazette*, January 11, 2018.



The Pilot can address difficulties in deploying vehicles with designs that were not anticipated by standards developed for human-operated vehicles. For example, the presence of manual controls is currently interpreted as a requirement of federal safety standards and it is unclear whether HAV operators are permitted to disable input from manual controls even if doing might prevent unauthorized and unsafe input from HAV riders.

Additionally, the pilot can clarify the legality of operations in states and localities where HAV deployment activities are either ambiguously addressed by law or not addressed at all. This would be of particular relevance to the deployment of autonomous medium- and heavy-duty vehicles.

Question 7. What types of performance measures should be considered to ensure safety while allowing for innovation of emerging technology in vehicles with high and full driving automation participating in a pilot program?

In addition to developing simulation and software validation capabilities, SAFE believes that the Pilot should explore the use of performance metrics for HAV safety assurance. In particular, “whole vehicle” performance metrics that capture vehicle dynamic information and determine whether an AV is making safe decisions are promising as a short-term pathway towards HAV safety metrics. Performance metrics could measure compliance with traffic laws or a defined “safety envelope,” (such as in Mobileye’s Responsibility Sensitive Safety proposal) and enable benchmarking against human driving behavior.

Question 8. How should the Operational Design Domains of individual vehicle models be defined and reinforced and how should Federal, State and local authorities work together to ensure that they are observed?

A recent Department publication identified key elements that might define an ODD.<sup>33</sup> A comprehensive HAV safety framework will likely require integrating the reality that HAV deployments will be ODD-specific and, therefore, safety regulation will need to be as well. A desirable outcome of the Pilot is to advance Department understanding of the ODD concept, its role in HAV safety regulation, and how ODDs might be segmented in a way that reflects the evolving reality of HAV development (e.g. which domains are similar from the perspective of HAV systems).

Question 9. What type and amount of data should participants be expected to share with NHTSA and/or with the public for the safe testing of vehicles with high and full driving automation and how frequently should the sharing occur?

SAFE believes that data generated by assets belonging to private entities should be protected in the absence of a compelling public interest to the contrary. Therefore, we believe that overly broad requests for data are counterproductive to the public interest served by the Pilot. SAFE believes that any data requested by the Department from Pilot participants should fill a concrete and specific research or regulatory need and the rationale for any data requested by the Department should be articulated.

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<sup>33</sup> Eric Thorn, Shawn Kimmel, Michelle Chaka, *A Framework for Automated Driving System Testable Cases and Scenarios*, NHTSA, September 2018.

Question 11. In the design of a pilot program, what role should be played by—

- Objective performance criteria, testable scenarios and test procedures for evaluating crash avoidance performance of vehicles with high and full driving automation?

SAFE believes that, structured appropriately, the Pilot is an appropriate opportunity to experiment with the role of various technologies and approaches to HAV safety assurance, including roadmanship metrics, simulation, and scenario development. In particular, SAFE believes that roadmanship metrics have not received due attention as a potential predictor of crash avoidance performance.

Question 13. Which of the following matters should NHTSA consider requiring parties that wish to participate in the pilot program to address in their applications?

The Department should be as transparent as possible about the requirements and responsibilities of entities participating in the Pilot as well as any regulatory flexibilities or alternative regulatory structures that participation in the Pilot will grant to participating entities.

SAFE recommends that the Pilot be broadly open. The question of which and how many applicants should be accepted to a Pilot should be driven by the goals of the Pilot in advancing HAV deployment and Department understand of HAV safety regulation.

Question 20. What role could exemptions under section 30114 play in the pilot program? Could participation in the pilot program assist a manufacturer in qualifying for an exemption under section 30114? Could participation be considered part of the terms the Secretary determines are necessary to be granted an exemption under section 30114 for vehicles that are engaged in “research, investigations, demonstrations, training, competitive racing events, show, or display”?

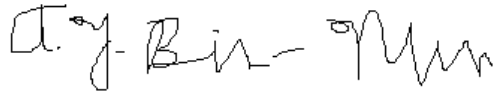
SAFE believes that the fundamental value of this Pilot is in the national interest. If structured and managed appropriately, the Pilot will enhance the ability of participants to bring new products and services to market unencumbered by legacy regulations while the government will glean key information and learnings which will allow it to continue to improve in its role overseeing the safety of HAV development. Therefore, exemptions under section 30114 are essential for Department “research, investigations, [and] training,” and are an appropriate application of such authority.

## 5. Conclusion

SAFE looks forward to working with the Department on this critical study and other topics related to vehicle automation. We would welcome the opportunity for further discussion.

Thank you for considering SAFE’s comments. Should you have any questions related to these comments, please direct them to Dr. Amitai Bin-Nun at [abinnun@secureenergy.org](mailto:abinnun@secureenergy.org).

Respectfully submitted,

A handwritten signature in black ink that reads "Amitai Bin-Nun". The signature is written in a cursive, slightly slanted style.

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