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December 10, 2018

The Honorable Heidi King, Deputy Administrator  
National Highway Traffic Safety Administration  
U.S. Department of Transportation  
1200 New Jersey Avenue, SE  
West Building  
Washington, DC 20590

RE: Pilot Program for Collaborative Research on Motor Vehicles With High or Full Driving Automation (Docket No. NHTSA-2018-0092)

Dear Deputy Administrator King:

AAA appreciates the opportunity to provide input as NHTSA determines how to structure a national pilot program for collaborative research for highly and fully automated vehicles to ensure that the program maximizes public benefit of the research. Because of the safety benefits that highly automated vehicles (HAVs) could provide, and the potential risks posed as drivers become accustomed to the new technology, AAA supports their thorough testing and safe deployment. Given the complexity of the technologies and the driving environment in which they will operate, ongoing research and pilot testing will be important to maximize safety and foster consumer acceptance. The benefits of the technology could be unfulfilled if the public remains skeptical of the safety of automated vehicles. AAA urges NHTSA to take a leading role in facilitating safe innovation during its pilot program by ensuring that industry participants meet key safety objectives, while also educating the public about the safety-enhancing benefits - and where appropriate, the risks and limitations - of these technologies.

AAA is doing its part to help educate our members, the public and other stakeholders on the opportunities and challenges associated with vehicle automation. Through research and testing, we are working to understand the benefits and potential limitations of automated vehicle technology and the implications for consumers. Many recent and ongoing research projects at the AAA Foundation for Traffic Safety (AAAFTS) examine driver perceptions, understanding of, and their interactions with new in-vehicle technology. AAA's Automotive Engineering team also tests technologies available on vehicles today to better understand performance and variability.

Many AAA clubs around the country have also embarked on initiatives involving AVs that may inform the ANPRM. Some examples include:

- AAA Northern California, Nevada and Utah (NCNU):

- Collaborated with the City of Las Vegas to introduce the nation's first autonomous shuttle available to the public.<sup>1</sup> The shuttle operated over 11 months with 1,515 hours in service to over 32,800 riders, whose sentiment towards AVs improved by 30% after experiencing the technology first-hand.
- Partnered with Torc Robotics to develop AV safety assessment criteria<sup>2</sup> and to test an AV against such criteria.<sup>3</sup>
- Operates GoMentum Station, one of the largest AV testing facilities in the U.S., where comprehensive closed-track testing can take place and vehicle and infrastructure technologies can be evaluated. With a long history and strong partnership with the Contra Costa Transportation Authority and the City of Concord, GoMentum Station continues to connect the public sector to new technologies, which facilitates informed policy, regulation, and planning decisions.
- Automobile Club of Southern California (ACSC) – Automotive Research Center (ARC):
  - Tested Level 2 automated vehicles to better understand the capabilities and limitations of these vehicles and published results to inform AAA members and the motoring public.
  - Continues to educate and inform consumers about the latest automated vehicle technology in the annual AAA Green Car Guide.
- AAA Oregon/Idaho:
  - Club representatives serve on the Oregon Task Force on Autonomous Vehicles and the Idaho Autonomous and Connected Vehicle Testing and Deployment Committee offering perspective on consumer education and issues surrounding the testing and deployment of AVs, including licensing and regulation, law enforcement and crash reporting, insurance and liability, and cybersecurity.
- The Auto Club Group:
  - Club representatives serve on state AV advisory councils, task forces and coalitions in Iowa, Minnesota and Illinois, and are actively involved in AV activities in Florida.
- AAA Club Alliance:
  - Club hosted a TEDx Wilmington Salon focused on the transformation of transportation and is working with universities in the Mid-Atlantic region to host public education forums on vehicle technology.
- AAA Northeast:
  - Hosted an Autonomous Vehicle Summit in Stamford, Massachusetts (10-12-18) with state and federal legislators.

Insights gained from these and other AAA club activities can help inform regional, state or local projects.

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<sup>1</sup> <http://www.AAA.NCNUhoponlasvegas.com/>

<sup>2</sup> <https://torc.ai/aaa-partners-torc-robotics-on-self-driving-car-safety-criteria/>

<sup>3</sup> <https://torc.ai/torc-and-aaa-northern-california-nevada-utah-run-self-driving-car-through-hazardous-traffic-scenarios/>

## **Pilot Program Structure and Design**

NHTSA's ANPRM requests that commenters identify the potential factors that 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. First and foremost, AAA believes that safety should never be compromised to hasten automated vehicle deployment. Motorists and others who share the roads with AVs have a right to expect that the vehicles will be operated safely.

Based on AAA research and club experience, AAA believes NHTSA's pilot program for HAVs should have a well-designed safety program to prevent mishaps that could affect public confidence in the potentially life-saving technologies. The program should focus on maintaining key safety factors for all road users, including safety operator training and work practices that reflect industry best practices, as well as comprehensive protocols for pre-drive, post-drive, and regular operational safety checks. AAA, as a member of an American National Standards Institute subcommittee, is currently working with other automated vehicle and safety experts to develop standards for HAVs.

The pilot program should also consider assessing vehicles using driving simulators to conduct human subjects research and microsimulation modeling to examine vehicle handling and traffic on closed course and on-road testing scenarios to demonstrate a high level of safe performance. Research and lessons learned in varying scenarios can be complementary and can further be used to inform subsequent evaluations.

The ANPRM also seeks to understand if pilot participants' research should be conducted in multiple locations to account for differing weather conditions, topographical features and traffic densities. AAA supports thorough testing of AV technologies as they continue to evolve, including testing at progressively more complex settings and under varying conditions to ensure the safety of other roadway users. AAA NCNU's operation of a low-speed automated shuttle pilot in Las Vegas provided insight into automated technology needs. One important lesson learned was that all-electric vehicles experienced battery limitations in the heat of a Las Vegas summer, especially given passengers' cooling needs. Additionally, throughout the 11-month pilot, AAA NCNU experienced other vehicle maintenance and repair issues that required service, which was at times challenging to obtain for such a limited-production vehicle. The lesson learned here was that it was important to have relevant service and technical support available, and that contingency planning (such as having two shuttles) was important to providing reliable service.

Given the diversity of use cases and environments in which HAVs could operate in the U.S., we recommend that NHTSA conduct research in multiple different locations with a focus on testing in extreme weather conditions. While AAA NCNU gained invaluable experience from piloting the shuttle in an urban environment with well-developed infrastructure, research across a representative range of environments could provide more insight on vehicle performance. We also suggest that a variety of vehicles be piloted to inform the major use cases of HAVs, including high-occupancy commercial passenger vehicles, personal vehicles, and paratransit.

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The Agency also asks what role should be played by the 12 safety elements listed in “A Vision for Safety.”<sup>4</sup> AAA believes that pilot participants should be able to demonstrate how they are meeting the 12 safety elements through the submission of a safety self-assessment<sup>5</sup> (system safety, operational design domain, object and event detection and response, fallback, validation methods, human-machine interface, vehicle cybersecurity, crashworthiness, post-crash ADS behavior, data recording, consumer education and Federal, State and Local laws).

### **Statutory Provisions and Vehicle Safety**

With regard to vehicle design for safe operation, NHTSA noted in the ANPRM that it has previously issued a Request for Comment regarding those provisions in the Federal Motor Vehicle Safety Standards (FMVSS) that may pose barriers for the design, testing and deployment of some safe vehicles with high and full driving automation. AAA responded to that RFC<sup>6</sup>, stating that the current standards have been developed over time to protect consumers and as a result, they should not be readily discarded. NHTSA should put the burden on commenters to justify why a particular standard is no longer applicable to automated vehicles. If the commenter does not meet this burden, NHTSA should maintain the current rule. To remove or revise a safety standard without this convincing evidence would be arbitrary. In the event that a commenter does meet this burden, we expect that NHTSA would clearly explain the justification in changing or eliminating the standard in a final rulemaking. AAA still believes this to be true – pilot participants should be able to adequately justify why, and how a standard should be updated.

Within current FMVSS, we urge NHTSA to maintain the telltale requirement, since it is too soon to discard these safety and confidence-enhancing requirements. AAA believes that consumers will want and expect information regarding the critical safety systems of an autonomous vehicle, so that they can make an informed choice regarding their use of the vehicle. We note that many telltales that may seem purely operational actually serve safety needs. For example, while the fuel gauge/battery capacity seems operational rather than directly safety-related, if the vehicle occupant is unaware that the vehicle is operating on very low fuel/battery charge, that could lead to a safety incident. All such mission critical telltales should therefore be maintained.

NHTSA should also consider maintaining a means for the occupant to alert others, including non-automated vehicles and pedestrians. Without such a means — which the horn currently fulfills — the automated vehicle may pose a safety risk to others. A good of example of this was discovered during AAA NCNU’s Las Vegas shuttle pilot test, when a delivery truck backed into the shuttle. The Las Vegas Metropolitan Police determined that the shuttle came to a stop when it sensed the truck was trying to back up. However, the truck continued to back up until its tires touched the front of the shuttle, resulting in minor damage to the shuttle’s front fender. While the shuttle is equipped with a horn that activates when the shuttle’s LIDAR sensors detect that an object, be it another vehicle or a pedestrian, is getting too close to the vehicle, the truck driver did not hear the horn. It will be

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<sup>4</sup> Pilot Program for Collaborative Research on Motor Vehicles With High or Full Driving Automation, 83 Fed. Reg. 196 (Oct. 10, 2018)

<sup>5</sup> U.S. Department of Transportation and National Highway Traffic Safety Administration, Automated Driving Systems 2.0: A Vision for Safety (Sept. 2017) at 8, [https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/13069a-ads2.0\\_090617\\_v9a\\_tag.pdf](https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/13069a-ads2.0_090617_v9a_tag.pdf)

<sup>6</sup>AAA Comments submitted March 20, 2018 <https://www.regulations.gov/document?D=NHTSA-2018-0009-0068>

beneficial for pilot participants to continue to study the use of telltale signs and vehicle indicators by occupants, pedestrians and other vehicles (traditional and highly automated).

### **Data and Research Needs**

AAA has a long history of safety advocacy and research that we readily share with industry stakeholders. The AAAFTS is celebrating its 70th anniversary this year, and is actively involved with a variety of stakeholders on automated vehicle issues. The Foundation co-hosted forums in 2017 and 2018 on the impact of vehicle technology and automation on road users, attended by representatives from the automobile and technology industries, government, private research facilities, and university technology centers. A summary report of the 2017 forum<sup>7</sup> is available to the public. A summary of the 2018 forum is forthcoming, and AAA would welcome an opportunity to share key findings from the forum with NHTSA's team.

A common concern discussed at the 2017 forum was the importance of providing accurate information about the levels of automation. While the Agency is seeking feedback on potential factors that should be considered in developing a HAV pilot program, the need for consumer education about connected and automated vehicles more broadly is still necessary. Consumers need clear, concise information about the different levels and types of automated vehicle technologies to understand not only the safety benefits of each system, but more importantly, system limitations that still require an engaged driver. The system functionality and capabilities - which often differs greatly among manufacturers - must be explicitly defined in efforts to minimize potential driver and occupant risk.

Using a robust research agenda, we use our findings to help the public understand new technologies in the market. We recommend that NHTSA make the sharing of data and findings from its own pilot program a top priority. As the federal agency charged with protecting American consumers who use new technologies on our nation's roads, NHTSA should use data from the pilot program to inform and influence safety testing, deployment and adoption rates, setting key thresholds that all industry stakeholders will aim toward in order to promote safe usage of the vehicles.

While there is much research needed on HAVs, pilot program participants could aid research in the following specific areas: (1) how occupants perceive the automated system with which they are interacting (the occupants "mental model"); (2) consumer education and training regarding automated systems; and (3) automated system design, especially of the human-machine interface.

AAA believes that data transparency and sharing between industry players will be critically important to identifying cross-industry defects, system shortcomings, and potential recalls. We share our findings with the public and industry stakeholders to promote industry-wide efforts that ensure safety benefits are realized. We urge NHTSA to push the industry and pilot participants to prioritize the development of necessary protocols to capture and share key safety data while also being mindful of intellectual property rights and competitive concerns.

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<sup>7</sup> <http://aaafoundation.org/2017-forum-impact-vehicle-technologies-automation-users-summary-report/>

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In closing, AAA hopes the above comments can enhance the shared goal of continuing to focus on the safe testing and deployment of automated vehicles. By encouraging safe innovation, NHTSA's leadership will ensure that the benefits offered by testing in real-world conditions enables the potentially life-saving benefits of new technologies for all road users.

Respectfully,

A handwritten signature in cursive script, appearing to read "Jill Engstler".

Managing Director  
Government Relations and Traffic Safety Advocacy