AMERICAN PUBLIC TRANSPORTATION ASSOCIATION

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Department of Transportation
Docket Operations
M–30, West Building Ground Floor, Room W12–140
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Washington, DC 20590

RE: NHTSA-2020-0106

Dear Docket Clerk:

On behalf of the more than 1,500-member organizations of the American Public Transportation Association (APTA), I write to submit comments for the National Highway Traffic Safety Administration's (NHTSA) advance notice of proposed rulemaking (ANPRM) regarding the development of a framework for Automated Driving System (ADS) safety published in the *Federal Register* on December 3, 2020, at 85 FR 78058.

About APTA

APTA is a nonprofit, international association of 1,500 public and private sector organizations that represent a $74 billion industry directly employing 435,000 people and supports millions of private sector jobs. APTA members are engaged in the areas of bus, paratransit, light rail, commuter rail, subways, waterborne services, and intercity and high-speed passenger rail. This includes transit systems; planning, design, construction, and finance firms; product and service providers; academic institutions; transit associations and state departments of transportation. APTA is the only association in North America that represents all modes of public transportation. APTA members serve the public interest by providing safe, efficient, and economical transit services and products.

APTA's comments will respond both generally and specifically to many of the questions posed in the ANPRM:

General Comments

APTA's comments are led by two important guiding principles, the first of which is 'do no harm' especially in the context of the safety of automated and connected vehicles. NHTSA should aim to define a framework that does not

result in additional issues. The second principle is the provision of a policy framework that can facilitate a path toward integration and a higher overall safety throughout our full transportation network. In adhering to this second principle, we assume automated vehicles will be integrated in different venues over time and there will be a mix of different modes and non-connected vehicles in our mobility networks for years to come. Thus, any Federal safety framework developed must be compatible with the infrastructure and the mobility ecosystem we have today.

- **Question 1. Describe your conception of a Federal safety framework (FSF) for ADS that encompasses the process and engineering measures described in this notice and explain your rationale for its design.**

APTA supports the development of regulations for ADS by NHTSA. Public transit vehicles comprise a "niche market" within the automated vehicle space, with annual new vehicle purchases typically an order of magnitude less than automobiles or trucks. Consequently, there is less investment in research and development of ADS for transit. The process of developing ADS regulations by NHTSA will bring to bear NHTSA's technical and safety expertise, which will greatly benefit the transit industry.

Most public transit vehicles are subject to competitive procurements. Federal regulations can assist transit agency procurements by creating performance and safety standards that can be incorporated into uniform procurement documents.

For public transit vehicles, the FSF should include coordination with the Federal Transit Administration (FTA). Under 49 CFR Part 655 Bus Testing Regulations, all transit buses and cutaways purchased with Federal funds must be certified by the FTA Bus Testing Center.

Using Society of Automobile Engineers (SAE) levels[1] 4 and 5 to define what is and what is not included in ADS regulations may not be an appropriate in the case of ADS for transit. This is because transit adoption of ADS is likely to be incremental by functionality. In order to be most useful in promoting safety, NHTSA regulations for ADS for transit should extend to functionality typically included under the definitions for SAE Levels 1 and 2.

[1] **Level 0 - No Automation:** This is an everyday, human driven car; **Level 1 - Driver Assistance:** A vehicle with this level of automation might have adaptive cruise control and lane assistance features; **Level 2 - Partial Automation**: Level 2 automation can assist in controlling speed and steering, for instances such as stop-and-go traffic; **Level 3 - Conditional Automation**: Level 3 autonomous vehicles require a pilot, but they are capable of driving themselves, in ideal weather conditions and within certain speed limitations; **Level 4 - High Automation:** Level 4 autonomous vehicles can drive themselves without human interactions but will be restricted to known use cases;
Level 5 - Full Automation: Level 5 capable vehicles should be able to monitor and maneuver through all road conditions and require no human interventions whatsoever.

In addition, the regulations should address ADS retrofits as well as ADS installed by Original Equipment Manufacturers (OEMss). Transit agencies are required to keep vehicles in service for specified periods of time if purchased with Federal funds. For example, transit buses are expected to remain in service for 12 years. Consequently, ADS retrofits will enable transit agencies to reap the benefits, especially safety benefits, sooner rather than later if regulations address ADS installed on new buses only.

Finally, the safety framework should include provisions for standardized procedures to collect, store, and analyze ADS performance data using "black box" recording. Regulations should provide access to data for appropriate interested parties such as transit operating agencies and other governmental and non-profit groups for which such access would be in the public interest to assure operational safety of transit vehicles utilizing ADS.

- **Question 2. In consideration of optimum use of NHTSA's resources, on which aspects of a manufacturer's comprehensive demonstration of the safety of its ADS should the Agency place a priority and focus its monitoring and safety oversight efforts and why?**

No comment.

- **Question 3. How would your conception of such a framework ensure that manufacturers assess and assure each core element of safety effectively?**

No comment.

- **Question 4. How would your framework assist NHTSA in engaging with ADS development in a manner that helps address safety, but without unnecessarily hampering innovation?**

Because there are few OEMs in the bus and cutaway vehicle market, and costs of those vehicles are largely passed along to public agencies and the Federal government, it is in the public interest that NHTSA, in developing regulations, consider the economic impact of those regulations on the industry. We ask that the regulatory development process include constructive collaboration with transit OEMs, suppliers, and procuring agencies.

- **Question 5. How could the Agency best assess whether each manufacturer had adequately demonstrated the extent of its ADS' ability to meet each prioritized element of safety**?

No comment.

- **Question 6. Do you agree or disagree with the core elements (i.e., "sensing," "perception," "planning" and "control") described in this notice? Please explain why.**

APTA agrees with the four core elements. APTA would like to suggest that for the sake of the transit industry, vehicle to vehicle (V2V) infrastructure communications be emphasized,

especially in relation to multi-modal environments in which different types of vehicles will be occupying the same space/corridors, and vehicles will have varying autonomous capabilities.

- **Question 7. Can you suggest any other core element(s) that NHTSA should consider in developing a safety framework for ADS? Please provide the basis of your suggestion.**

APTA believes there should be two more core elements added:

Data and Acquisition: We have a data deficit when it comes to autonomous vehicles. We must be able to provide data in all aspects, which we can share openly as needed. APTA feels strongly about the need for data collection prior to the development of a framework and perhaps a data repository. We need data to truly understand the capabilities of AVS vehicles. A safety framework should include provisions for standardized procedures to collect, store, and analyze ADS performance data using "black box" recording. Regulations should provide transit agencies access to relevant safety and trip data to assure operational safety of transit vehicles utilizing ADS. Additionally, experts agree that to best protect the safety and security of public transportation riders, public transit agencies must be able to collect comprehensive and confidential data about safety risks without a looming threat of exposure to litigation. [2]

Cybersecurity: As autonomous vehicles are highly dependent upon connectivity, APTA believes cybersecurity should be among the primary functions prioritized in the ADS framework.

- **Question 8. At this early point in the development of ADS, how should NHTSA determine whether regulation is actually needed versus theoretically desirable? Can it be done effectively at this early stage and would it yield a safety outcome outweighing the associated risk of delaying or distorting paths of technological development in ways that might result in forgone safety benefits and/or increased costs?**

APTA asks that the regulatory development process include constructive collaboration with transit OEM's, suppliers, and procuring transit agencies.

- **Question 9. If NHTSA were to develop standards before an ADS-equipped vehicle or an ADS that the Agency could test is widely available, how could NHTSA validate the appropriateness of its standards? How would such a standard impact future ADS development and design? How would such standards be consistent with NHTSA's legal obligations?**

APTA believes the establishment of a FSF should leverage the opportunity to establish universal technology standards for ADS. We should approach this in a way that still encourages innovation but avoids a situation in which there are multiple conflicting technology standards.

[2] APTA's position is that we must protect safety-sensitive transit data from state and federal Freedom of Information Act (FOIA) requests and from admissibility into evidence in state and federal courts. Citation: *Public Transportation Safety Program (§ 5329)*, Page 30. APTA Recommendations on Surface Transportation Law. Accessed February 18, 2021: https://www.apta.com/wp-content/uploads/APTA-RECOMMENDATIONS-Surface-Trans-Auth_10122019.pdf

- **Question 10. Which safety standards would be considered the most effective as improving safety and consumer confidence and should therefore be given priority over other possible standards? What about other administrative mechanisms available to NHTSA?**

  Collision avoidance should be a high priority for the transit industry.

- **Question 11. What rule-based and statistical methodologies are best suited for assessing the extent to which an ADS meets the core functions of ADS safety performance? Please explain the basis for your answers. Rule-based assessment involves the definition of a comprehensive set of rules that define precisely what it means to function safely, and which vehicles can be empirically tested against. Statistical approaches track the performance of vehicles over millions of miles of real-world operation and calculate their probability of safe operation as an extrapolation of their observed frequency of safety violations. If there are other types of methodologies that would be suitable, please identify and discuss them. Please explain the basis for your answers.**

APTA encourages utilization of the methodologies employed by the FTA Bus Testing Center.[3]

- **Question 12. What types and quanta of evidence would be necessary for reliable demonstrations of the level of performance achieved for the core elements of ADS safety performance?**

  Baseline data collection should include:

  - Origin/destination
  - Collision reporting
  - Collision avoidance
  - Near misses
  - Transit AV uptime,
  - Driver interaction or AV abnormalities (faults) while in service
  - Emission/fuel economy
  - V2V data exchange
  - V2X data exchange
  - Passenger load

[3] For public transit vehicles, the FSF should include coordination with FTA. Under 49 CFR Part 655 Bus Testing Regulations, all transit buses and cutaways purchased with Federal funds must be certified by the FTA Bus Testing Center. See also, response to Question 1.

- **Question 13. What types and amount of argumentation would be necessary for reliable and persuasive demonstrations of the level of performance achieved for the core functions of ADS safety performance?**

APTA encourages adherence to the testing methodologies employed by the FTA Bus Testing Center.[1]

- **Question 14. What additional research would best support the creation of a safety framework? In what sequence should the additional research be conducted and why? What tools are necessary to perform such research?**

There is a data deficit when it comes to autonomous vehicles. We must be able to provide data in all aspects, which we can share openly as needed. APTA feels strongly about the need for data collection prior to the development of a framework and perhaps a data repository. We need data to understand the capabilities of AVS vehicles. In addition to more data, we need to develop a standardized procedure to collect, store and analyze it, and make sure any relevant transit safety and trip data that is collected is accessible to transit agencies to assure operational safety of transit vehicles utilizing ADS.

Additionally, NHTSA should collaborate with FTA to incorporate safety provisions unique to the transit industry. Some examples include:

- Cybersecurity: As autonomous vehicles are highly dependent upon connectivity, APTA feels that cybersecurity should be prioritized in terms of research.[4]
- Prediction: In addition to connectivity, prediction should be considered as an element of the framework. Connectivity is not a precondition for ADS. While communication depends on connectivity, pedestrian avoidance does not.
- Accessibility: We need to conduct more research on the ways ADS impacts accessibility, and the opportunities that exist for universal design.
- Safety for Non-Seated Passengers: Safety standards for automated transit will need to account for passengers who are standing or using assistive devices (e.g., wheelchair, scooters) on a vehicle.
- Transit Signal Priority: There should be research conducted on transit signal priority and the ways in which that might impact or complement the FSF.
- MaaS: APTA encourages NHTSA to consider the ways in which there might be interplay between ADS frameworks and certain trends in mobility, such a Mobility-as-a-Service (MaaS).
- Connectivity: To understand the true potential of AVS, reliable, safe, connected infrastructure will be critical. NHTSA should conduct research on the implications of varying degrees and quality of signal connectivity on ADS safety.
- Software: APTA encourages the establishment of a clearinghouse for software updates to be tested prior to implementation.

[4] As autonomous vehicles are highly dependent upon connectivity, APTA feels that cybersecurity should be among the primary functions prioritized in the ADS framework. See also, response to Question 7.

- **Question 15. Discuss the administrative mechanisms described in this notice in terms of how well they meet the selection criteria in this notice.**

This is the only place in this ANPRM the term "selection criteria" appears. Please provide additional explanation.

- **Question 16. Of the administrative mechanisms described in this notice, which single mechanism or combination of mechanisms would best enable the Agency to carry out its safety mission, and why? If you believe that any of the mechanisms described in this notice should not be considered, please explain why.**

APTA does not believe voluntary mechanisms will be sufficient for ADS. We suggest mandatory reporting and regulation to the FMVSS will be needed.

- **Question 17. Which mechanisms could be implemented in the near term or are the easiest and quickest to implement, and why?**

NHTSA should avoid moving too quickly on this topic. A program to develop input from the transit industry should be developed and Federal funding should be provided to APTA to administer it under the ITS JPO Standards program.

- **Question 18. Which mechanisms might not be implementable until the mid or long term but might be a logical next step to those mechanisms that could be implemented in the near term, and why?**

See answer to Question 17.

- **Question 19. What additional mechanisms should be considered, and why?**

No comment.

- **Question 20. What are the pros and cons of incorporating the elements of the framework in new FMVSS or alternative compliance pathways?**

No comment.

- **Question 21. Should NHTSA consider an alternative regulatory path, with a parallel path for compliance verification testing, that could allow for flexible demonstrations of competence with respect to the core functions of ADS safety performance? If so, what are the pros and cons of such alternative regulatory path? What are the pros and cons of an alternative pathway that would allow a vehicle to comply with either applicable FMVSS or with novel demonstrations, or a combination of both, as is appropriate for the vehicle design and its intended operation? Under what authority could such an approach be developed?**

APTA encourages adherence to the testing methodologies employed by the FTA Bus Testing Center.[1]

- **Question 22. Discuss how each element of the framework would interact with NHTSA's rulemaking, enforcement, and other authority under the Vehicle Safety Act.**

  No comment.

- **Question 23. Discuss how each element of the framework would interact with Department of Transportation Rules concerning rulemaking, enforcement, and guidance.**

Examples exist for other USDOT modal administrations that have exerted regulatory authority on applications of technology like ADS, most notably Federal Railroad Administration in regulating Positive Train Control and FAA in overseeing the matter of the Boeing 737 Max and its automated flight control system, Maneuver Control Augmentation System. APTA suggests leveraging that experience and encourages NHTSA to closely evaluate those efforts to determine lessons learned and best practices.

- **Question 24. If your comment supports the Agency taking actions that you believe may fall outside its existing rulemaking or enforcement authority, please explain your reasons for that belief and describe what additional authority might be needed.**

  No comment.

- **Question 25. If you believe that any of the administrative mechanisms described in this Notice falls outside the Agency's existing rulemaking or enforcement authority under the Vehicle Safety Act or Department of Transportation regulations, please explain the reasons for that belief.**

  No comment.

We appreciate your consideration of these comments. For additional information, please contact Linda Ford, APTA's General Counsel, at (202) 496-4808 or lford@apta.com.

Sincerely yours,

Paul P. Skoutelas

Paul P. Skoutelas
President and CEO