

July 28, 2019

Mr. Ryan Posten
Associate Administrator Rulemaking
National Highway Traffic Safety Administration
1200 New Jersey Avenue, S.E.
Washington, D.C. 20590

Re: Docket No. NHTSA-2019-0036, Removing Regulatory Barriers for Vehicles with Automated Driving Systems, 49 CFR Part 571

Dear Mr. Posten:

Pursuant to NHTSA's advanced notice of proposed rulemaking published in the Federal Register on May 29, 2019, Beep Inc. respectfully submits the comments below in response to the NHTSA ANPRM referenced above. We welcome the opportunity to offer feedback on the suitability of approaches NHTSA may take in revising the Federal Motor Vehicle Safety Standards (FMVSS), 49 C.F.R. Part 571, to address compliance verification challenges and help NHTSA to define a path that encourages and enables development and deployment of automated driving systems.

Beep, Inc. was founded by experienced fleet managers and technology entrepreneurs and seeks to offer the next generation of transportation services for autonomous passenger mobility to fleet owners and operators in low speed environments across the public and private sector. Beep's offerings are designed to advance innovation and delight the passengers of our customers by providing safe, clean, and efficient movement of riders between defined locations on low-speed private and public roads. Because of our deep experience in transportation and technology, we share in NHTSA's objective to hold physical safety and cyber protection in the highest regard as we partner to bring these mobility solutions to market.

OUR RECOMMENDATIONS FOR CONSIDERATION

Currently, Title 49 §. 571.3 (c) states that a "Low Speed Vehicle (LSV) means a motor vehicle, (1) That is a 4-wheeled, (2) Whose speed attainable in 1.6km (1 mile) is more than 32 kilometers per hour (20 miles per hour) and not more than 40 kilometers per hour (25 miles per hour) on a paved level surface, and (3) Whose GVWR is less then 1,361 kilograms (3,000 pounds).

Pursuant to Appendix B to part 553 of Title 49 which states: (a) Based on a comparison of the performance of vehicles or equipment, the National Highway Traffic Safety Administration (NHTSA) may tentatively determine that a foreign motor vehicle safety standard is at least functionally equivalent to a Federal

Motor Vehicle Safety Standard (FMVSS), either on its own motion or in connection with a petition for rulemaking by any interested party under 49 CFR Part 553 — We suggest in the case of autonomous vehicles which potentially fit the description of LSVs according to individual state rules, but not NHTSA's federal rules under §. 571.3 (c), that NHTSA possibly allow state definitions to be acceptable over the federal version when they exist. While part 553 relates to foreign standards, allowing it to apply to US standards is reasonable and arguably preferable to invoking foreign standards considering local/State standards are likely better aligned with our U.S. safety objectives.

As one example, our research indicates that commercially available multi-passenger, low-speed autonomous shuttles fit the description of a Low-Speed-Vehicle under Florida's §. 320.01 (41) which states, "Low-speed vehicle means any four-wheeled vehicle whose top speed is greater than 20 miles per hour but not greater than 25 miles per hour, including, but not limited to neighborhood electric vehicles." Allowing Florida's §. 320.01 (41) to supersede Title 49 §. 571.3 (c) would facilitate a safe, more seamless implementation of LSV autonomous solutions at the state level.

Additionally, we recommend a blanket exemption consideration for the operation of specific multi-passenger, low-speed autonomous shuttles in agreed-upon operational design domains (ODDs). Examples of ODDs include: low speed intersections and roads within fixed routes; daytime or properly lighted operation; operating in mixed traffic with posted traffic speeds at or under 25 miles per hour — proper signage and path designations; dedicated support, on-shuttle communications and monitoring services; community and first responder training; etc. In this scenario, a plan must be provided to NHTSA to support safe operation within that ODD. Research findings can be provided by delivering proposed mappings and performance data from similar projects globally and/or providing a demonstration. Once agreed-upon, NHTSA would be notified of any upcoming deployments occurring within that ODD, with a Site Overview Report outlining the proposed project's service characteristics. This would allow for more rapid deployment of autonomous vehicles in proven ODDs, increasing the availability of this mode of transit and accelerating innovation and development of this technology while maintaining the highest, proactive safety standards.

We also suggest a change to the current "Box 7" import law to allow for sales or lease of vehicles as well as the elimination of the requirement to export/destroy vehicles after five years but, rather, the option to redeploy in another approved ODD. Additionally, we propose a rule or process change to enable the use of US made or assembled vehicles in a similar process. This would allow industry to align with the Administration's interest to advance automation and business opportunities in the U.S. This priority is reinforced by multiple projects that fund autonomous shuttle research and development and the use of same, including the Smart Cities Competition, ATCMTD, ADS NOFO, and the most recent FTA grant.

Like NHTSA, our main priority for the implementation of autonomous vehicles is safety. When considering the potential risk of damage and injury, particularly relating to the classification of a vehicle as a LSV, as

mentioned above, the ultimate consideration is of course, momentum, or *Kinetic Energy*. Momentum is a function of weight and velocity, which is presumably why NHTSA's definition of LSVs include both weight and speed. Though most commercially available multi-passenger shuttles exceed the designated gross weight of 3,000 pounds (Battery requirements are a major factor in this), the limited speed (11.2 mph) of some shuttles more than offsets the additional weight of the vehicles in terms of its momentum and risk.

To illustrate, kinetic energy is calculated by the equation, $KE = \frac{1}{2} mv^2$. Where m is the mass of the vehicle measured in kg, and v is the velocity (or speed) of the vehicle measured in meters per second (m/s), the energy is expressed in Joules (J). Under the current LSV regulations, maximum speed is 40 kmh, which is 11.11 m/s. The maximum kinetic energy is thus:

$$KE_{LSV} = \frac{1}{2} (1361 \text{ kg}) (11.11 \text{ m/s})^2 = 84,012 \text{ J.}$$

At the maximum permitted speed of certain commercially available low-speed, multi-passenger shuttles, 18 kmh or 5 m/s, the kinetic energy associated with the vehicle is:

$$KE_{Autonom} = \frac{1}{2} (3500 \text{ kg})(5 \text{ m/s})^2 = 43,750 \text{ J.}$$

Thus, the kinetic energy on these examples of shuttles is limited to 52% of the energy permitted by a vehicle under the current LSV regulations. The low operating energy combined with a carefully limited operational design domain provide a model under which NHTSA could reevaluate its LSV regulations to promote commercial deployment of vehicles at an equivalent (or greater) level of safety.

IN SUMMARY

We respectfully ask that NHTSA consider the recommendations above to advance the safe deployment of these AV mobility solutions to extend the testing and expanded use of this important technology.

- Potentially classify low-speed, fixed route, multi-passenger autonomous shuttles under appropriate State regulations such as Florida's §. 320.01.
- Consider blanket deployment waivers under agreed upon ODDs.
- Modify the "Box 7" import process to improve and expediate safe deployments of AVs within ODDs while advancing opportunities to use US based vehicles and drive more R&D focus in our Country.
- Modify LSV category standards to allow for acceptable kinetic energy metrics vs. just individual weight and speed restrictions thus establishing new safety standards which enable further ODD AV deployments while potentially improving the overall LSV safety standards

We believe, and experience has proven, that low speed, fixed route shuttles properly deployed and managed in approved ODDs are safer to implement than vehicles which aim to fully integrate alongside human drivers and travel at higher posted speeds. The expanded use of these low speed AV mobility



solutions will also advance our collective research opportunities by accumulating data and proving out live scenarios which continually extend our learnings and advance the technologies required to further expand the use of AVs more broadly and more safely.

With kind regards,

Joe Moye
CEO