Michael DeKort

Response to Docket No. NHTSA-2020-0106 - Framework for Automated Driving System Safety

A. Questions about a Safety Framework
Question 1. Describe your conception of a Federal safety framework for ADS that encompasses the process and engineering measures described in this notice and explain your rationale for its design.
      The framework should be far more than a framework or guidance. Much like the FAA processes for aircraft qualification. (Barring the recent Boeing debacle.) Frameworks and guidance provide virtually no objective, measurable, testable or repeatable goodness bars. As an example, NHTSA should utilize UL 4600 to create the minimal testable set of V&V criteria needed to ensure a predetermined sigma or X times a human level of driving competency is obtained for each ODD. Where Deep Learning is utilized that ODD must contain variations due to location. Time of day, weather, composition of objects etc.

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?
      How is "comprehensive" defined and verified? See response to Question 1

Question 3. How would your conception of such a framework ensure that manufacturers assess and assure each core element of safety effectively?
      The framework would contain a minimal set of ODD based testing. See Question 1

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?
      This innovation hampering POV is a red herring. Why does it matter what tech is used to not slam into a police car ore firetruck? This can be done without favoring any technology as the process involves what should be done and not how. There is no effect negative impact to technology development to impose most objective safety requirements. The focus being what should be done and not how. An example would be to properly detect large stationary or crossing objects. Additionally, it has been proven over and over that imposing safety requirements creates a level playing field, suppresses hype and actually promotes competition and technological advancements. No industry that involves safety as a byproduct has ever self-policed properly. Every one of them has required heavy government intervention to obtain an acceptable level of safety performance. Often this is brought about by a succession of tragedies and associated press coverage and government hearings etc. While industry can and should be involved creating this V&V inventory, it should not be left on its own to do so.

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?
      The framework would contain a minimal set of ODD based testing. See Question 1

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.
      Yes. Execution and subsystem performance or "Intention" are separate – Due to the complexity of autonomous systems, the involvement of several critical interdependent subsystems: Perception, Planning and Execution, and the use of Machine and Deep Learning, it is imperative the V&V efforts not be limited to whether or not the vehicle executes the expected actions. The reason for this being that result could be luck or coincidental. Any combination of the major subsystems or

machine or deep learning performance could be flawed, and the expected result could pass. Given this all the contributing factors should be tested as well. In addition to this there are associated complications with the use of Deep Learning. The mechanics of Deep Learning result in the world and the objects in it being hyper scanned and detected. The approach does not work at a macro level, from outside in. It works at a micro level from inside out. While some micro detection is required to learn specific examples of things, like signs, this process is being used by many AV makers for all development. The negative consequence here being system confusion. Shadows are thought to be objects. Dirty signs, or signs with branches in front of them, could be property detected. Researchers have forced Tesla's to drive into oncoming lanes with a couple pieces of white tape. Or stopped Av systems in their tracks by wearing a short with complex patterns on them. Because of this these systems may have to be tested for billions of images to cover an acceptable level of object and degraded object recognition.

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.

UL4600 and SAE's On Road Autonomous Driving Verification and Validation Task Force has a list of V&V metrics NHTSA should review. Additionally, it is imperative to know when the system required disengagement and what the associated root causes are. It should be ascertained whether all disengagements have been eliminated prior to final testing. And if enough repetitive testing has occurred to ensure the results met expected reliability standards.

One of the core elements needs to be the use of a legitimate digital twin vs reliance on the real world. It is a myth that public shadow and safety driving can create a legitimate autonomous vehicle. And the lives the process takes are necessary and for the greater good. It is impossible to drive the trillion miles or spend $300B to stumble and restumble on all the scenarios necessary to complete the effort. The process also harms people for no reason. The first safety issue is handover. The time to regain proper situational awareness and do the right thing, especially in time critical scenarios. cannot be provided. Another dangerous area is learning accident scenarios. AV makers will have to run thousands of accident scenarios thousands of times to accomplish this. That will cause thousands of injuries and deaths. This is resolved through the use of proper simulation. Informed and validated by the real-world. (Not gaming architecture-based simulation). The current approach requires a paradigm shift. Reversing the current reliance on the real-world to one where proper simulation, which is informed and validated by the real-world, is used to ensure graduation to the real-world is required, earned and the risks to human life are necessary. NHTSA has a professional, ethical and moral obligation to review this technology to avoid as much safety driving in the public domain as possible. More details on this in the SAE Autonomous Vehicle Engineering magazine article – Simulation's Next Generation - https://www.sae.org/news/2020/08/new-gen-av-simulation

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?

See previous responses.

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?

See previous responses.

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?

Measurable, verifiable and repeatable metrics incorporated with UL4600 by ODD. Where that ODD properly incorporates any areas where Deep or Machine Learning is impacted by variation. Including location, Time of day, object composition etc.

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?

See question 12