

!important

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Berkeley, CA 94704

Friday, February 5, 2021

James C. Owens

Deputy Administrator, National Highway Traffic Safety Administration
M-30, U.S. Department of Transportation, West Building
Ground Floor, Room W12-140
1200 New Jersey Avenue SE
Washington, DC 20590

RE: Advance Notice of Proposed Rulemaking on Framework for Automated Driving Safety, Docket No. NHTSA-2020-0106

Dear Deputy Administrator Owens,

limportant, a company working to save the lives of Vulnerable Road Users (VRU's: pedestrians, wheelchairs, scooters, bicyclists, motorcyclists) by creating a Pedestrian-to-Vehicle (P2V) and Vehicle-to-Pedestrian (V2P) communication solution, thanks you for the opportunity to provide input on the Framework for Automated Driving Safety Advance Notice of Proposed Rulemaking (ANPRM) released by the National Highway Traffic Safety Administration (NHTSA).

Motor vehicle accidents are a top 3 fatality cause in the US for people aged 1-35 years (CDC, 2018¹). In 2019, 6205 pedestrians and 846 bicyclists were killed on US roads². In addition to those fatalities, we also saw 75,842 pedestrians and 49,288 bicyclists seriously injured. The problem is getting more dire every year; the number of pedestrian fatalities has increased more than 51% in last decade³. On average in the US, traffic accidents kill one pedestrian every 84 minutes and injure one every 7 minutes (US, 2020⁴). All of these fatalities and injuries are preventable with the new technologies available in the market today. NHTSA's role today is key for the American society.

While limportant is grateful for the dedicated efforts and consideration from the agency, we remain concerned that pivotal safety technologies, specifically those necessary to provide robust protections to

¹ <https://wisqars-viz.cdc.gov:8006/lcd/home>

² <https://cdan.dot.gov/query>

³ <https://cdan.dot.gov/query>

⁴ <https://highways.dot.gov/research/research-programs/safety/pedestrian-bicycle-safety>

VRU's, are not given the weight and attention necessary to facilitate their adoption. Safety features relying on vehicle-mounted sensors, such as cameras, radars, lidars and sonars, can save lives in most cases but fail to cover all fatality scenarios. Vehicle-to-Infrastructure (V2I) and Pedestrian-to-Vehicle (P2V) technologies can complement and solve the remaining pedestrian fatality scenarios. Therefore, V2X capability on vehicle should be mandatory to allow V2I and P2V safety features. **To advance the agency's goal to keep people safe on America's roadways, it is necessary for the agency to pave the road for adoption of V2X technology, including V2I and P2V communications.**

The ability to detect and protect lives of VRU's from Automated Driving Systems (ADS) can be complemented today with technologies like !important's, solving the 65% of crash scenarios left unaddressed or weakly addressed by on-board vehicle sensors, including the infamous Trolley Problem. !important has the solution to the problem now, but is held up from implementation by slow adoption of V2X technologies due to the industry confusion on standards and regulations. Today we strongly encourage NHTSA to make the difficult decision on standards and regulations in order to clearly direct the market, who waits for government decision to move forward. **The power to save these vulnerable people is in our hands already, and any unnecessary delay comes at the cost of one life every eighty-four minutes⁵.**

P2V Solution is Required to Address All Scenarios

P2V is the new seatbelt for pedestrians. It has the potential to save lives by the millions Worldwide. P2V is !important's available solution. It tracks VRU locations via mobile devices, sends that data to our cloud server where our proprietary AI is applied to determine a risk factor between each VRU and nearby connected vehicle. Connected vehicles are informed of VRU locations, projected paths and likelihood of collision, and VRU's are sent a warning alert when the risk of an accident is high. **Patents are pending for the system to also slow down vehicles and trigger the brakes automatically if a collision is predicted (patent granted in South Korea. USA still pending).**

The distinct advantages to !important's software-only solution, differentiating it from all other sensing methods, are that it does not require a line-of-sight between the subject vehicle and the target, it is robust in all lighting and weather conditions and it can quickly react to unexpected pedestrian behaviors (such as darting out into traffic). This unique P2V approach solves the famous Trolley problem and all the scenarios where vehicle mounted sensors fail. It also works perfectly where there is no infrastructure with which to support V2I: 74% of pedestrian fatalities in the US happen on the open road (not at intersections) -according to NTSHA 2018. Our AI expertise allows us to determine risk of collision early enough to issue actionable alerts; no longer do systems need to be hampered by short reveal times. These strengths are essential to address all VRU collision situations, but most especially those scenarios in which the sensing capabilities of traditional, vehicle-mounted sensors are most prone to failure-

- View of VRU is obstructed (28% of pedestrian fatality cases)
- Adverse weather or lighting conditions (11% of pedestrian fatality cases)
- Erratic or unexpected VRU behavior (26% of pedestrian fatality cases)

⁵ <https://highways.dot.gov/research/research-programs/safety/pedestrian-bicycle-safety>

To avoid causing harm ADS need more robust, complete information and they need it earlier. ADS require information beyond that which can be provided by vehicle-mounted, hardware-based sensors. **ADS require V2X connectivity, and a P2V solution to ensure the highest level of safety for all.**

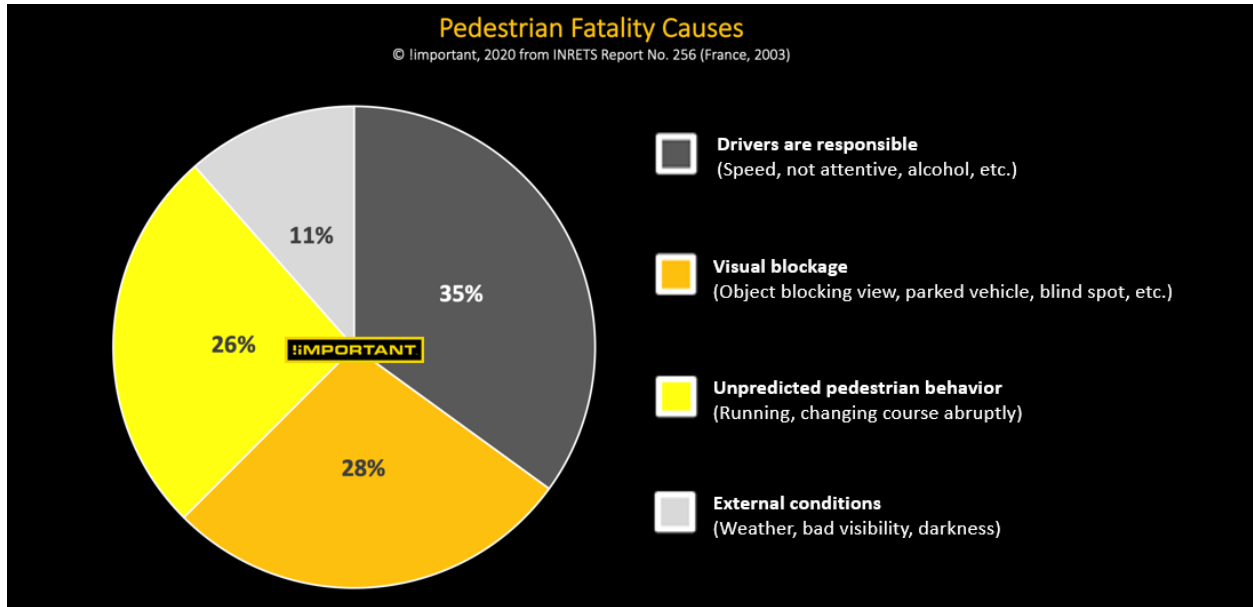


Figure 1: Pedestrian Fatality Causes

As illustrated by Figures 1 and 2, vehicle-based sensors can be helpful in roughly one third of pedestrian fatality accidents, corresponding to the 35% of scenarios caused by driver error.

The remaining 65% can be solved by a combination of V2I & P2V technologies. We know that one out of four fatal accidents happen at an intersection. Therefore, V2I can solve one quarter of the remaining fatal scenarios-one sixth of all scenarios, representing crashes which occur at or around intersections. Between vehicle-based sensors and V2I, one stands a good chance of preventing or mitigating around 50% of all pedestrian deaths-please refer to figure 2.

The outstanding 50% of accidents occur on open roads, away from intersections, and are unrelated to driver error. Therefore, vehicle-based sensors have limited effect on these scenarios, and no infrastructure is available with which to take advantage of V2I benefits. The only technology possibly present for the pedestrian in half of the scenarios is her or his smartphone, smartwatch or IoTs.

!important's P2V solution represents the difference between life and death for 50% of all pedestrians killed on our roads.

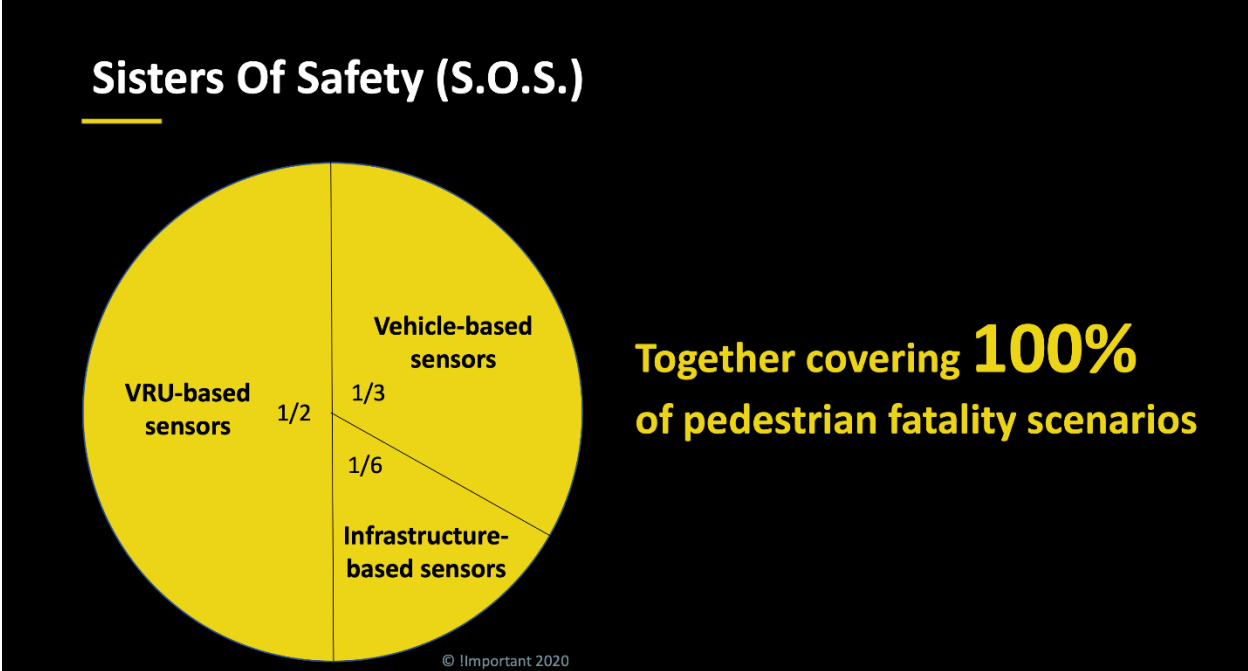


Figure 2: Pedestrian Fatality Solutions

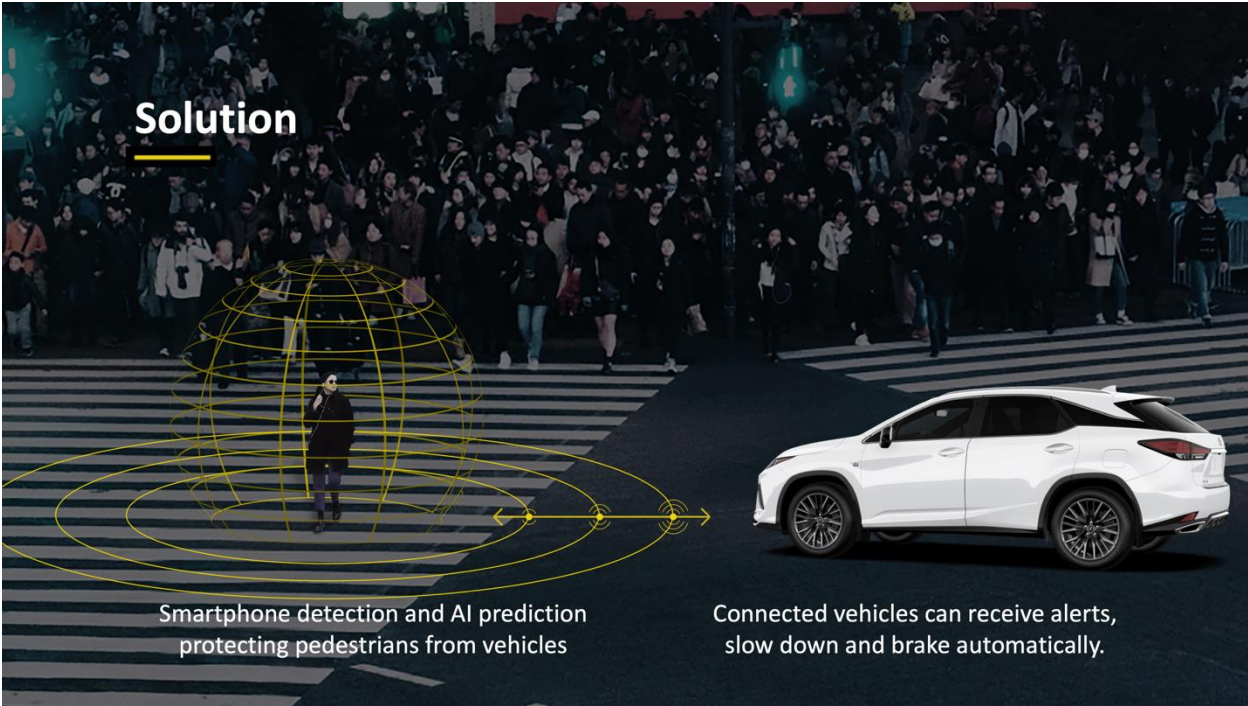


Figure 3: Example of !important's patented Pedestrian-to-Vehicle (P2V) solution

P2V-V2P Communications Key to Developing Public Trust

In addition to supporting ADS with critical information, !important technology also alerts VRU's to impending collisions by sending a warning directly to their mobile devices and can support other communications as well. By allowing for messaging from the ADS to the VRU's mobile device, our technology re-establishes the communications between vehicle and VRU that are lost when the human driver is removed from the equation (namely eye contact and hand gesturing).

This P2V-V2P concept, and the ability for two-way communication between a VRU and ADS builds public trust by granting VRU's the power to confirm that a vehicle has detected them and is taking their presence and movements into account. **Empowering people to communicate directly with ADS is fundamental to developing public trust of self-driving vehicles.**

Privacy and Control

While !important strongly believes in the overwhelmingly positive impacts of P2V technology, we are also sensitive to the privacy concerns of the public. !important limits itself to accessing only that data which is critical to pinpointing a user's location and determining their intended path. All data is anonymized and encrypted, and nothing identifiable to a unique user is sold to third parties. At all times, users retain the power to chose whether or not to use our product. If there is any doubt of privacy or security, one has only to close the app to disconnect from our service. We believe that P2V should be mandatory on vehicles (source of danger), while remaining voluntary for VRU (potential victim who might not want to be tracked for privacy concerns).

Mandate vs. Guidance

The agency seeks feedback on whether to issue the safety framework as a voluntary guidance or as a regulation. !important admires and generally agrees with NHTSA's goals to be technology neutral and to minimize regulation and safeguard innovation. However, in some cases choosing and regulating a technology is the most appropriate course. For several years, NHTSA has discussed and been encouraged to issue rulemaking on V2X communication technologies. V2X technologies have the potential to impact millions of lives, yet the lack of clear direction (standards and regulations) on this topic has allowed this critical technology to be sidelined. In order to speed the progress in this area, **!important encourages NHTSA to proceed with rulemaking and commit to standards** requiring V2X communication capabilities, on all vehicles. Specifically, P2V communications should be highlighted as an essential, required component of V2X. **As an interim step, to speed adoption, !important suggests that V2X connectivity, Pedestrian Automatic Emergency Braking (PAEB) and a star-rated Pedestrian Safety category (as previously proposed by NHTSA) be incorporated into the NCAP program** right away.

Testing, Metrics

To represent the reality of the fatality scenarios, NHTSA has the obligation to take a stance. In conjunction with a V2X mandate and incorporation of V2X, PAEB and Pedestrian Safety category into the NCAP program, !important suggests that all applicable tests should be updated to include scenarios representative of real-world accident conditions, including low light settings with obstructed views and

minimal target reveal times. A test for dooring-type accidents should also be created. Subject vehicle, target vehicles and test mannequins should have connectivity through a general mobile device with dual frequency GNSS antenna, Wi-Fi and Bluetooth functionalities. VRU's should be included in all applicable tests, representing both adult and child pedestrians as well as cyclists.

Additional Core Element: "communication"

Within the ANPRM, the agency proposes four core elements (i.e., "sensing, "perception," "planning" and "control") and asks for input on additional elements needing to be considered. !important would like to suggest an **additional core element of "communication"**. In lieu of physical gestures and eye contact, signals that are commonly shared between fellow human drivers and pedestrians, vehicles using ADS technologies must be provided with a new method to signal their intended actions and to receive acknowledgement that their intention has been understood and accepted. Without such ability, an ADS must make decisions based on assumptions about how a neighboring ADS will behave. Due to variation inherent in systems designed by competing manufacturers, making an assumption on expected ADS behavior is risky. Furthermore, the ability to communicate recognition of and intended behavior around pedestrians and other VRU's is essential to providing safety, reducing traffic delays, and establishing trust and public acceptance of ADS. 3 out of 4 Americans are afraid of automated vehicles, according to AAA 2019⁶. **We perceive the "Communication" aspect – some feedback loop to pedestrians to confirm the ADS activities – is essential for the social acceptance of AVs and an essential part of ADS.**

Ethical Framework: Famous Trolley Problem

The agency further asked for feedback on the process and engineering measures necessary for consideration in a Federal safety framework for ADS. The agency has made clear the direction to prioritize safety in the development and deployment of ADS, however has not proposed ethical guidelines on how to handle safety conflicts. Is the life of an ADS passenger worthy of greater protections than that of a pedestrian? Should an ADS be prevented from protecting its own passengers at the cost of all others, and how do we fairly balance everyone's right to safety? !important proposes that ethical guidance be provided in the safety framework, requiring a prioritization of VRU and pedestrian safety. Only !important's P2V approach solves the Trolley Problem (#1 Ethical problem for automotive) since it tracks people at all time and can see their position from afar and brings a level of "certainty" when it comes to tracking humans.

Conclusion

In summary, !important shares in NHTSA's objective of improving road safety for all. We are offering our already working technology to NHTSA to contribute to this goal and start saving lives together. The opportunity to share our thoughts and insights is greatly appreciated, and we thank NHTSA for the consideration of our input.

⁶ <https://newsroom.aaa.com/2019/03/americans-fear-self-driving-cars-survey/>

After much experimentation and reflection, we respectfully make the following requests of NHTSA:

1. Take prompt action to require V2X capabilities on all vehicles, and specifically require V2I and P2V technologies under the V2X umbrella
2. As an immediate step, incorporate V2X, PAEB and the Pedestrian Safety category into the NCAP program
3. Update existing test procedures and introduce new test procedures to ensure the most common VRU fatality scenarios are properly represented in validation of ADS and ADAS systems and that V2X technologies can be utilized during said tests.
 - a. Include pedestrian hidden from line-of-sight conditions
 - b. Include low lighting conditions
 - c. Include cyclists as test targets
 - d. Include dooring scenario
 - e. Connect all test vehicles, subject and target, and VRU mannequins
4. Create a fifth core element to represent the critical activity of “communication”
5. Issue ethical guidelines ensuring the safety of VRU’s is properly prioritized

Also, please find in Appendix our answers to some of your specific questions.

Respectfully,



Bastien Beauchamp, CEO

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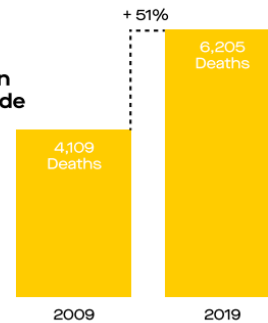
Pedestrian Safety Statistics

TOP 3
 Road deaths are in the **top 3 fatality causes** for 1-35 year olds in the United States (CDC, 2018)¹
 Could be solved by V2V, V2P, V2I, P2V altogether called **V2X technologies** (!important, 2021)²

Increase in US pedestrian fatalities in the last decade

+51%

(US DOT, 2019)³



1.35M road deaths worldwide annually

50%+ of the fatalities are pedestrians, cyclists, and motorcyclists

(WHO, 2018)⁴

In the United States in 2019...

75,842

Pedestrian Injuries

49,288

Bicyclist Injuries

(US DOT, 2019)⁵

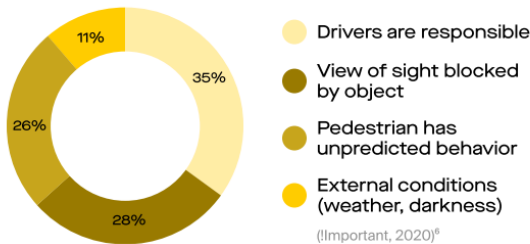
6,205

Pedestrian Fatalities

846

Bicyclist Fatalities

Pedestrian Fatality Causes



(!important, 2020)⁶



(NHTSA, 2019)⁷

3 out of 4

fatalities happen on open roads (not at intersections)

Total and Pedestrians Killed in Traffic Crashes, by Age Group, 2019			
Age Group	Total Killed	Pedestrians	%
<5	316	57	18%
5-9	322	46	14%
10-15	586	103	18%
16-20	2,667	218	8%
21-24	2,956	304	10%
25-34	6,548	1,006	15%
35-44	5,117	946	18%
45-54	4,958	992	20%
55-64	5,347	1,209	23%
65-74	3,658	716	20%
75+	3,556	574	16%
Total	36,031	6171	17%

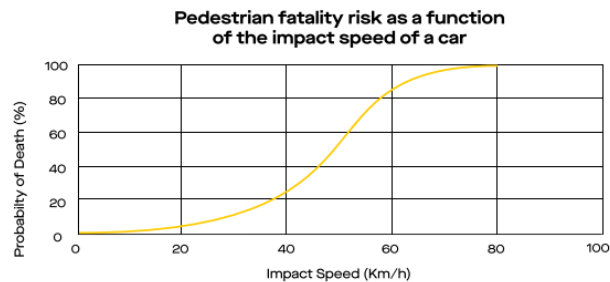
(US DOT, 2019)⁸

81% of US pedestrian traffic deaths occurred in urban settings in 2018

(IHS, 2018)⁹

An increase of 1 km/h results in a 4-5% increase for crashes that result in fatalities

(WHO, 2018)¹⁰



Every 84 Minutes

A pedestrian is killed in a traffic crash

Every 7 Minutes

A pedestrian gets injured in a traffic crash

(US DOT, 2020)¹¹

Statistics gathered by !important in January 2021

!important provides a patented, software-only solution to solve the alarming problem of vulnerable road user deaths. No hardware or additional infrastructure needed. An unparalleled approach. The fastest way to act now.

Learn more: <https://www.important.com/>

¹ CDC, 2018: <https://wisqars-viz.cdc.gov:8006/lcd/home>
² !important, 2021: vehicle-to-vehicle (V2V), vehicle-to-pedestrian (V2P), vehicle-to-infrastructure (V2I), pedestrian-to-vehicle (P2V) altogether called vehicle-to-everything (V2X) can solve all pedestrian safety scenarios.
³ US DOT, 2019: <https://cdan.dot.gov/query>
⁴ WHO, 2018: <https://www.who.int/publications/i/item/9789241565684>
⁵ US DOT, 2019: <https://cdan.dot.gov/query>
⁶ !important, 2020: <https://medium.com/@importanttech/a-digital-seat-belt-for-the-modern-era-c5192562b0c3> based out of INRETS Nb.256 (France, 2003) https://www.ifsttar.fr/fileadmin/user_upload/editions/inrets/Recherches/Rapport_INRETS_R256.pdf
⁷ NHTSA, 2019: <https://cdan.nhtsa.gov/query>
⁸ US DOT, 2019: <https://cdan.dot.gov/query>
⁹ WHO, 2018: https://www.who.int/violence_injury_prevention/publications/road_traffic/world_report/speed_en.pdf
¹⁰ IHS, 2018: <https://www.ihs.org/topics/fatality-statistics/detail/pedestrians>
¹¹ US DOT, 2020: <https://highways.dot.gov/research/research-programs/safety/pedestrian-bicycle-safety>

Appendix: Questions & Answers

No	Question	Response
A	Questions about a Safety Framework	
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.	NHTSA should extend the safety technology stack out of the vehicle and include infrastructure and people’s connectivity. V2X capabilities should be required. Both P2V and V2I should be mandatory for vehicles. Safety framework should include ethical guidelines ensuring safety of VRU's is properly prioritized.
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?	Manufacturers must be confronted to more realistic scenarios. Different road conditions, scenarios with obstructed view, and pedestrian realistic behaviors must be included in NCAP once V2X is mandated. Also, emphasizing detection and protection of VRU's will help address fears and mistrust from the public of automated vehicles.
3	How would your conception of such a framework ensure that manufacturers assess and assure each core element of safety effectively?	To be effective, the framework must include V2X communications, PAEB, Pedestrian Safety category in NCAP. Update test scenarios to include connected mannequins through smartphones and test vehicles, obstructed view scenarios and expand conditions to encompass low light and dooring accident type.
4	How would your framework assist NHTSA in engaging with ADS development in a manner that helps address safety, but without unnecessarily hampering innovation?	Requiring V2X capabilities is unlikely to hamper capabilities, the question of which mechanisms to use in gathering data to communicate via V2X and what to do with information is still left open.
6	Do you agree or disagree with the core elements (i.e., “sensing,” “perception,” “planning” and “control”) described in this notice? Please explain why.	Disagree, need for 5th core element: "communication"
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.	"Communication"- require ADS to provide acknowledgement of the presence of other vehicles/VRU's and signal their intended actions.
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?	Recommend incorporation of V2X, PAEB, Pedestrian Safety category into NCAP immediately, while working on pushing regulation for V2X into law.
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?	To ensure highest levels of safety one requires V2X communications. Issuing a mandate for this technology, and specifically requiring a P2V/V2I/V2P component, should be given top priority.