ALLIANCE FOR AUTOMOTIVE INNOVATION

March 5, 2024

Ms. Sophie Shulman
Deputy Administrator
National Highway Traffic Safety Administration
1200 New Jersey Avenue, S.E.
Washington, D.C. 20590

RE: Advance Notice of Proposed Rulemaking; Advanced Impaired Driving Prevention Technology, Docket No. NHTSA-2022-0079, 89 FR 830 (January 5, 2024)

Dear Deputy Administrator Shulman,

The Alliance for Automotive Innovation (Auto Innovators) appreciates the opportunity to provide comments in response to the January 5, 2024, Federal Register Advance Notice of Proposed Rulemaking (ANPRM) on Advanced Impaired Driving Prevention Technology.[1,2] As we collectively work to reduce the crashes, injuries, and fatalities that occur on our roadways each year, driver impairment, and more specifically driver alcohol impairment, remains a significant problem that requires additional focus and attention. Since 2000, drunk driving has been implicated in roughly one-third of the fatalities on our nation's roadways. Implementing technology that helps reduce alcohol driving will save lives.[3]

Auto Innovators urges NHTSA to adopt a phased approach where the first priority should be on addressing alcohol impaired driving. There are several outstanding issues and questions that NHTSA must address prior to the development of an NPRM, including important issues related to consumer acceptance of the technology. Auto Innovators will continue its engagement in this rulemaking as it progresses and looks forward to working with the agency to achieve the important goals of this initiative.

As to the other forms of impairment, additional research is needed before a judgment can be made about the suitability of countermeasures for rulemaking. In the meantime, there may be some appropriate ways to incentivize the technologies into the market with recognition in the NCAP program as one strategy for building consumer awareness and acceptance. NHTSA should also look to other global markets to learn from their efforts and identify potential candidates for global harmonization in this area.

For more than a decade, the automotive industry has made significant investments in the development of advanced impaired driving technologies and driver support features, several of which are referenced within the ANPRM. Investments include the development of passive breath and touch based alcohol

[1] From the manufacturers producing most vehicles sold in the U.S. to autonomous vehicle innovators to equipment suppliers, battery producers and semiconductor makers – Alliance for Automotive Innovation represents the full auto industry, a sector supporting 10 million American jobs and five percent of the economy. Active in Washington, D.C. and all 50 states, the association is committed to a cleaner, safer, and smarter personal transportation future. www.autosinnovate.org.
[2] 89 FR 830.
[3] https://www.iii.org/fact-statistic/facts-statistics-alcohol-impaired-driving

detection, through the Driver Alcohol Detection System for Safety (DADSS), along with investments into the research, development, and integration of in-vehicle sensors to help manage driver focus and attention.[4] These proactive efforts were complemented by the establishment of comprehensive industry privacy principles to protect the privacy of vehicle-generated data.[5]

While these emerging technologies present potential significant opportunities to help improve roadway safety, there are a number of significant policy questions and considerations that the agency must take into account as it considers rulemaking in this area. These issues are discussed in more detail in the comments below and detailed responses are listed in Appendix A.

These comments fall into the following categories:

1. Initial Focus of the ANPRM: Phased Approach Recommended
2. Consumer Acceptance
3. Defining the Rulemaking Scope
4. Establishing Baseline Measures of Impairment
5. Advanced Impaired Driving Technology Considerations
6. Further Considerations in the Development of the NPRM; and
7. Ongoing Supporting Policy Actions are Critical.

1 Initial Focus of the ANPRM: Phased Approach Recommended.

Auto Innovators agrees with the agency's assessment that the primary focus of the first stage of the rulemaking effort should be on alcohol impairment because such impairment plays a role in nearly one-third of roadway fatalities. Because we also recognize that there could be safety benefits in addressing other underlying forms of impairment, we are providing the automotive industry's initial perspective and some preliminary recommendations.

The Bipartisan Infrastructure Law (BIL) mandates NHTSA to establish an FMVSS to address impairment. As required by law, any FMVSS must be objective, repeatable, and be written in performance terms with reproducible test procedures.[6] For purposes of this next stage of rulemaking, which we urge be initially focused on alcohol impairment, clearly defined criteria for classifying alcohol impairment within, or when exceeding, certain measurable threshold values are required. Over time the agency could consider including additional compliance options, providing alternate means for certifying the performance of driver impairment systems. (We agree with the agency that drugged driving should be excluded from this initial rulemaking due to the absence of clear metrics for classifying when a driver may be under the influence of drugs and a lack of testing protocols.) Any rule must also be data-driven and practicable, with consideration for any unintended consequences or adverse consumer acceptance issues.

2 Consumer Acceptance.

As NHTSA correctly notes in the ANPRM, any FMVSS must, by law, be developed with consideration of public acceptance of the technology that is mandated by the standard. We agree that NHTSA should ensure that it fully understands and considers consumer expectations for what constitutes a reasonable countermeasure upon impairment detection. Otherwise, the technology runs the risk of being rejected by consumers, which would defeat the purpose of the standard and reduce or eliminate its benefits.

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[4] https://dadss.org/

[5] https://www.autosinnovate.org/privacy

[6] FMVSS must also be reasonable and practicable, based on the availability of technology capable of providing the required level of performance under a range of conditions for the useful life of the vehicle.

Unlike most FMVSSs, an alcohol impairment standard involves many stakeholders with many different perspectives. We offer the following examples of stakeholders, some of which may overlap, for the agency's consideration in developing an alcohol impairment NPRM:

- **Drivers who do not consume alcohol before driving or drive impaired***.* This group constitutes the drivers in the vast majority of trips. This group may not understand the benefits of this technology or agree to tolerate the occasional inconvenience of a "false positive."
- **Drivers and other potential stakeholders who have no awareness of what advanced impaired driving technology is, or how it functions.** This group, the majority of people, currently has no knowledge of, or expectations regarding, the potential presence or functionality of these systems and could pose a significant challenge to public acceptance without a strong educational outreach strategy.
- **Drivers and other stakeholders who have a negative early experience.** This group would include those who initially accept the technology but become dissatisfied with it based on a negative experience or a misunderstanding of the system capabilities and limitations.
- **Drivers who incorrectly view the technology as an enabler of drinking and driving.** Consumer education will be essential to avoid the impression that the driver has "permission" from the vehicle to drive under the influence, simply because an alcohol impairment technology present in the vehicle does not restrict operation of the vehicle.
- **Persistent opponents of a government mandate of the technology.** This group includes those who are fundamentally opposed to mandating the technology for any number of philosophical reasons. This group will likely oppose the mandate regardless of educational efforts.
- **Stakeholders who already understand the need for a solution to alcohol impaired driving.** This group includes advocates and victims, and can be expected to be generally supportive of these features on their vehicle.

While the aforementioned list is not intended to be exhaustive of all public viewpoints that might exist, it is critical to recognize that these are among the diverse perspectives that should be accounted for when considering how to ensure broad public acceptance of the mandate.

A clearly defined scope that details the types of impairment and corresponding mitigations addressed through regulation is critical to avoid misunderstanding about this technology. Auto Innovators recommends that NHTSA consider additional research to understand consumer acceptance of advanced impairment detection technologies, as well as the expectations of consumers around the appropriate level of intervention based on the type of impairment. This research should explore potential misconceptions and develop strategies to increase baseline levels of acceptance, including how drivers respond to certain interventions. Such research would help address some of the key questions posed in the ANPRM. We also encourage NHTSA to leverage survey capabilities to understand what policies would help promote acceptance and adoption (e.g., insurance incentives).

One critical component of this rulemaking will be an accompanying consumer education campaign to ensure that drivers and other stakeholders understand the technology, the reasons for the technology, and learn how the systems address detected impairment. If there are misunderstandings about why and how the technology works, the standard may face headwinds in achieving its desired benefits.

3 Defining the Rulemaking Scope.

The BIL directs NHTSA to develop a rule prescribing a FMVSS requiring passenger motor vehicles to be equipped with advanced drunk and impaired driving prevention technology that can prevent or limit motor vehicle operation if either impairment or a BAC above the legal limit is detected, or both. In the

ANPRM, the agency identifies several approaches, including direct measurement of breath or touch based samples to detect the presence of alcohol, indirect measurement of impairment based on observed driver engagement and alertness characteristics using other in cabin sensors, and evaluating performance of the driving task based on external sensors.

The capabilities and limitations of the underlying sensors used to support an impairment determination can vary significantly. As noted above, Auto Innovators urges NHTSA to focus initially on technology to address alcohol impairment. However, since other forms of impairment are also addressed in the ANPRM, the following comments address concerns that go beyond technology to address alcohol impairment.

The following section focuses on how the required countermeasures (when impairment is detected) should take priority when establishing the necessary performance requirements and the level of robustness needed for accurately classifying impairment.[7]

Consideration for the temporal nature of certain driver impairments

Each of the impairments being considered in this rulemaking affects driving performance in different ways. There are also notable differences in terms of how driver performance of the driving task degrades among drivers with similar measured levels of impairment. However, there are certain characteristics that differentiate forms of impairment that are relevant to the countermeasures that may be most suitable, and the circumstances in which these countermeasures should be applied, to address the safety need.

- **Alcohol impaired driving.** If alcohol is present in a person's system, impairment is expected to persist until such time as BAC returns to a more acceptable (lower) level. In such cases, more stringent or persistent countermeasures may be needed.
- **Driver distraction.** Inattention to the forward roadway environment can either be a momentary or prolonged form of impairment that occurs when the driver diverts his or her attention from the driving task for a period of time. This can be quickly resolved if the driver refocuses back to the roadway environment.
- **Driver drowsiness**. Increased levels of fatigue may impact a driver's response time in reacting to changes in the roadway environment. High levels of drowsiness can even cause a driver to fall asleep at the wheel. In the absence of chronic fatigue, there are strategies to manage a driver's level of alertness on a temporary basis, such as recommending a break.

Considerations for vehicle countermeasures <u>before</u> a trip commences.

Several factors must be considered when deciding whether certain countermeasures can or should be implemented prior to a trip commencing.

Vehicle intervention before a trip has commenced.

Any passive system designed to limit operation of the vehicle based on impairment should be capable of accurately and reliably detecting relevant forms of impairment within an acceptable timeframe. To ensure public acceptance, this will likely need to be consistent with the timing that drivers are accustomed to when starting a vehicle today. Technologies that may restrict a driver's ability to operate the vehicle should ensure a high degree of specificity and sensitivity to avoid situations where an unimpaired driver (below a measurable threshold) is prevented from operating a vehicle or where an impaired driver is allowed to drive. This balance is extremely complex and requires sensors that can function with low latency and an

[7] As specified in the IIJA legislation.

extremely high level of accuracy over time in all conditions. These sensors do not currently exist, and current state of the art systems can vary significantly in terms functionality depending on the technology used for detection and classification (e.g., BAC- versus camera-based assessment).

Vehicle warnings (only) before a trip has commenced.
If a system is required to detect impairment but only requires that a warning be provided to the driver, this introduces a number of substantive policy questions that must be addressed within this rulemaking. There are significant challenges in developing systems capable of accurate, low latency detection of impairment. Auto Innovators recommends that NHTSA consider whether there is a need for systems to be capable of providing this level of functionality prior to a trip commencing. For example, detecting distraction-related impairment prior to a trip may be unnecessary if the driver is not actively engaged in the driving task. Requiring a vehicle capable of this level of detection would also add unnecessary burden. Similarly, it may not be reasonable to require that a system be capable of issuing a drowsy driver warning if there is likely to be insufficient data to make a reliable determination within an allotted timeframe. However, the Agency should consider warnings as part of an overall mitigation strategy.

Additional review is also needed to understand the potential concerns in providing the driver with an alert that they proceed to ignore. This is particularly relevant for alcohol-impaired driving where the impairment is likely to persist regardless of the number or level of warnings provided.

Considerations for vehicle countermeasures <u>after</u> a trip commences.
The approaches for addressing driver impairment after a trip has commenced will vary significantly depending upon the type of impairment and what constitutes a reasonable and effective countermeasure.

Active vehicle intervention after a trip has commenced.
NHTSA has requested input on possible vehicle intervention strategies that could be leveraged when impairment or incapacitation has been detected <u>after</u> a trip has commenced. While each of these strategies has the potential to reduce the risk of a crash, serious injury or fatality, the potential unintended consequences also should be considered.

Any strategy involving active vehicle interventions that limit the ability of the driver to operate or control the vehicle must ensure a high degree of accuracy and reliability in correctly classifying impairment above a predetermined level. In other words, the use of more stringent countermeasures may require the vehicle to establish the persistent presence of impaired driving indicators before active intervention occurs, which may only be possible after a period of time when the vehicle has already started moving. Potential false positives could have a significant impact on consumer acceptance, in addition to the possible safety implications for the driver and other road users that may arise as a result of these active interventions. The type of intervention should also be reasonable in its application and effectiveness in addressing the underlying issues of concern. As an example, an FMVSS specifying that a vehicle must stop in a lane is likely not appropriate in cases where the driver is distracted.

In the ANPRM, the agency notes that certain concept or production vehicles with Level 2 automation may be capable of pulling over to the side of the road, or into a "slow lane" once impairment is detected.[8] However, it is not reasonable or practicable for the agency to include such a requirement in this standard. Such a countermeasure should be outside the scope of what could be reasonably considered to be

[8] SAE J3016_202104 Taxonomy and Definitions for Terms Related to Driving Automation Systems for On-Road Motor Vehicles, SAE International, April 2021

"advanced impaired driving technology" as it requires a level of automation far exceeding that of most vehicles on the road today and for the foreseeable future. What is more, it would likely make the rulemaking prohibitively costly, particularly as systems capable of higher levels of automation would likely be required to function across a full range of Operational Design Domains (ODDs) – especially in the absence of an unimpaired "fallback ready user" (if the maneuver could not be completed). At a minimum, we anticipate significant hardware and software changes would be required and other regulatory barriers would need to be addressed to support this level of automated vehicle functionality.[9]

Other approaches such as "stop in lane" may provide opportunities to limit the potential for or severity of a crash by an impaired driver. However, additional research is needed to evaluate and understand the extent to which these strategies may result in unintended consequences, including the potential impact on the flow of traffic or inadvertently introducing additional safety risks from slow moving or stopped vehicles in a roadway. If not implemented appropriately, such actions could also negatively impact consumer acceptance of the technology among drivers that do not yet have such a system and would likely require supporting policy actions at the federal, state, and local level to manage any unforeseen challenges should these types of intervention be required.[10] Additionally, the agency may also need to address potential policy conflicts, including the extent to which a "stall" or "stop in lane" technology may be viewed as a possible safety related defect by NHTSA's Office of Defect Investigations. Furthermore, updates to FMVSSs may be needed to complement a "stop in lane" strategy by enabling, for example, the use of automatic hazard lights to communicate the presence of a potential stopped or slow-moving vehicle to other road users.[11]

Driver warnings and alerts after a trip has commenced.
The suitability of driver warnings for addressing each of the impairments under consideration in a future rulemaking is discussed in more detail below. However, there are certain overarching recommendations that the agency must consider when developing requirements for driver warnings. In circumstances where impairment is detected when the driver has already started operating the vehicle on the road, the type of impairment matters. For example, since an alcohol-impaired driver will remain impaired even after a warning has been issued, the efficacy of warnings in this scenario will likely be low. We recommend further analysis to understand how different drivers respond to different types of warnings at various levels of impairment.

The standard should provide flexibility in how manufacturers prioritize visual, auditory, and other alerts to the driver. As noted in Auto Innovators prior comments to NHTSA, there is limited space available in the instrument panel for providing visual alerts. In addition, given the number of potential audible warnings that a consumer may encounter during the course of trip, rigid requirements in this area may conflict with the ability to address other safety concerns in real-time.[12]

In determining the alert type, NHTSA should consider the temporal nature of certain forms of impairment (i.e., persistent, gradual onset, or momentary) and the extent to which a warning may require an immediate response from the driver versus situations where an alert can be reasonably delayed (i.e., the precise timing for a drowsiness alert using a coffee cup telltale, for example, seems less critical than the timing of a distraction alert). The agency should also consider other warning requirements found in

[9] FMVSS Considerations for Vehicles With Automated Driving Systems: Volume 1 (DOT HS 812 796) – April 2020
[10] e.g. policies to address stranded drivers, resources to manage vehicle recovery, etc.
[11] This may require changes to state laws where vehicles are prohibited from moving with hazard lamps activated.
[12] Auto Innovators Seat Belt Reminder Systems NPRM Comments - https://www.regulations.gov/comment/NHTSA-2023-0032-0048

existing standards or being proposed in other contexts. For example, there is a very plausible scenario in which there could be three or more warnings at once if a driver is not wearing his or her seatbelt, is distracted, and is drowsy. If NHTSA were to require a warning when either distracted or drowsy driving was detected, the agency may need to prioritize the distracted driving warning over the drowsy driving warning since the former involves a more immediate, momentary response. In a case which may result in overlapping alerts (e.g., one for distraction, one for drowsiness, and one for failure to use a seat belt), a distraction alert first may be reasonable to reengage the driver's attentiveness, including attentiveness to other reminders (for drowsiness and seatbelt usage).

However, the agency should consider that an impairment alert may not be the only alert required in a given moment. For example, there could also be a driving event that occurs while a driver is distracted that triggers an Automatic Emergency Braking (AEB) warning. The AEB warning would reasonably take precedence over the distraction warning.

To avoid drivers being in potentially confusing situations where they are receiving multiple, simultaneous alerts which they may not be able to process, sufficient research needs to be conducted to determine a priority order for such alerts. The agency should take a consistent approach to all planned rulemaking activities and ensure that there are no permanent override prohibitions for any of the required alerts subject to this rulemaking. This is needed to avoid unnecessary regulatory conflicts as a result of this or future rulemaking efforts.[13]

Auto Innovators is not aware of any research on the effectiveness of various warning strategies for addressing impairment at this time. However, we suggest that the agency undertake such analysis to ensure that any requirements do not create significant consumer acceptance or effectiveness challenges which could thereby reduce the effectiveness of a future standard for driver impairment. While it is important that drivers respond to vehicle warnings, it is also important to consider the potential for resistance or de-sensitivity to excessive alerts over time, particularly if consumers view an alert as unwarranted, if the characteristics of an alert create irritation, or if an alert is inconsistent with other required alerts in terms of perceived urgency. We urge NHTSA to explore the potential of multiple alternate warnings (including escalating alerts) as part of the aforementioned research. This research should be prioritized if the agency determines that impairment warnings during the trip are within the scope of this rulemaking.

4 Establishing Baseline Measures of Impairment.

As noted previously, it is important that any standard to address driver impairment be technology neutral and ensure objective, repeatable, and reproducible measures of performance. This is also critical for establishing a baseline level of consumer acceptance; consumers must understand the types of impairment that an advanced driver impairment system is designed to address and the underlying behaviors that will elicit a response from the system. If the baseline measure of impairment is not clear, the public may view responses as haphazard or without merit and not respond appropriately, for example, when an alert is received. Such an outcome may erode the overall effectiveness of the standard.

[13] Consistent with Auto Innovators comments submitted in response to the Seat Belt Reminder NPRM (see 14), we urge the Agency to permit the visual warning to be displayed according to the common display space requirements currently in FMVSS No. 101 Section 5.5.

Defining objective measures of impairment.
This rulemaking presents several challenges to defining objective measures of impairment. For each of the impairments under consideration, there are differences in terms of how impairment impacts drivers in their ability to perform the driving task. Correspondingly, the extent to which the driving task is safely performed is subjective and cannot be quantified by a single measurement. In some cases, certain measures of impairment are already defined in legislation (i.e., alcohol impairment based on BAC). In others, additional research and standards development is needed to define the criteria upon which an impairment determination is made. These determinations could be based on objective, standalone metrics, or several weighted measurements that, when combined, provide an approximation that impairment is present. Auto Innovators notes that, due to restrictions on the use of human subjects and potential ethical considerations, it is not possible to develop certain metrics based on real world testing (e.g., for drugged driving) and there is likely a need to rely on simulator data as a means for assessing the impact of impairment.

Addressing false positives and false negatives.
Ensuring confidence in the vehicle sensor data is an essential element in making an accurate impairment determination. False negatives and false positives must be minimized as much as possible. We urge NHTSA to conduct additional research to determine how much tolerance of false positives and false negatives will be supported by consumers and by the public. Failure to provide accommodations for a reasonable rate of false positive or false negative outcomes in the field may make it impossible or impractical for manufacturers to meet the requirements of a future FMVSS.

Considerations for consumers disabling impairment technology.
The agency seeks comment on whether there are any conditions whereby a vehicle should allow a driver to turn off advanced driver impairment systems on either a temporary or permanent basis. This is a complex question that is likely to be impacted by the level of consumer acceptance for the given impairment technology. It may also be influenced by the extent to which reasonable redundancies are in place to address potential false positives or system malfunctions.

NHTSA must carefully consider whether there are reasonable circumstances in which an alcohol impaired driver should be provided with the ability to override an impairment system and operate a vehicle, and the likelihood that such overrides will be abused and undermine the effectiveness of the safety technologies and the overall real-world safety benefits achievable through rulemaking. For example, if an emergency override is required, it is not possible for the vehicle to verify the nature of the emergency. Therefore, if NHTSA determines there are circumstances where the driver can override the system, these should be clearly specified in the standard.

Considerations for systems with active intervention.
A situation in which a person may be prevented from operating his or her vehicle due to a false positive result is one of the most challenging to navigate. For example, due to system maintenance-related issues or if there is insufficient data (based on the FMVSS performance requirements) to make a more informed, accurate determination, an impairment detection system for alcohol impairment could potentially detect a BAC at or above the threshold when the driver has consumed no alcohol at all. Although this set of circumstances may be a legitimate reason to turn off or temporarily bypass the system, the agency also must address how to avoid a true positive impaired driver abusing this capability. Any requirement to include redundancies to minimize false positives must be reflected in the agency's regulatory impact analysis.

Considerations for warning based systems.
Warnings to the driver must be effective and encourage safer driving behavior. However, the triggering conditions specified in the standard must also be appropriately balanced to avoid excessive warnings that a driver may become desensitized to over time or may simply disable. As previously mentioned, the rulemaking should be developed with careful consideration for overall levels of consumer acceptance.

Considerations for intentional defeat strategies.
It is unreasonable (and likely impossible) to require that any mandated technologies be impervious to defeat. Those seeking to circumvent or disable any system may take approaches that vary in sophistication and in ways that cannot be reasonably foreseen or easily addressed through reasonable or practicable design changes.

5 Advanced Impaired Driving Technology Considerations.
The following section discusses additional elements that NHTSA should consider when defining the scope and baseline measures of impairment for each impairment type discussed in the ANPRM.

Alcohol impaired driving: driver warnings versus intervention.
We agree with the agency's assessment that "the most challenging countermeasure for preventing drunk and impaired driving fatalities is implementing vehicle interventions while the vehicle is in motion." While it may be possible to accurately detect driver alcohol impairment after a trip has commenced, the complexity in implementing reasonable countermeasures is significant and likely requires vehicles to be capable of high levels of vehicle automation.

NHTSA should conduct further research to identify the potential impact of a warning or intervention approach before making a more substantive proposal to adopt either type of mitigation strategy. Attempting to solve all issues at once could create significant delays for the agency and the technology. Due to the limitations in addressing all aspects of impaired driving, we recommend that the agency focus on the detection of alcohol impaired drivers with consideration for both direct and indirect measures of impairment (i.e., BAC, BrAC, or DMS-based approaches).

There are several aspects that the agency must consider in the development of its Regulatory Impact Analysis. It is assumed that the benefits of the proposed rulemaking are likely to be significantly higher if alcohol impaired drivers are prohibited from operating the vehicle – particularly where high levels of impairment or intoxication are present – versus being simply provided with a warning. However, additional research is needed to quantify the precise benefits, weighing the effectiveness and acceptance of an intervention-based approach, as well as any potential unintended consequences.

It is also unreasonable for NHTSA to prescribe performance requirements that are not practicable based on the current state of technology. For example, technology today cannot ascertain whether a BAC is rising or falling. Another example is that camera-based systems today may not be able to perform accurately if the time required to make a determination is not reasonable or sufficient. There are also additional considerations in terms of how readily technologies can be integrated within the occupant compartment based on existing vehicle architecture. For example, direct alcohol detection, like passive breath-based technologies, present significant challenges in terms of cost, durability, accuracy, and packaging, and requires more development time. The implementation of interlocks must therefore be thoroughly considered, as the inability for a driver to start the vehicle can introduce new risk factors that must be carefully weighed by the agency. Regardless of approach, it is critical that the agency clearly define expectations for how a vehicle must respond and consider the different circumstances which could arise. For this reason, providing a warning may be more straightforward but may come with other downsides.

NHTSA must establish a clear criteria for defining "Alcohol Impairment."

As NHTSA pursues an intervention-based approach, it is essential to clearly define an "alcohol impaired driver" within the context of this rulemaking. While there are longstanding definitions based on a driver's Blood Alcohol Content (BAC) or Breath Alcohol Content (BrAC), NHTSA must leave no ambiguity with respect to the thresholds that will apply for determining when certain countermeasures or interventions are required.[14] As noted in the ANPRM, a person's reaction to a specific BAC can be highly individual and can vary depending on the person's prior exposure and experience drinking alcohol. Despite this variability, the agency must ultimately make a determination on reasonable metrics for classifying of "alcohol impairment" that can be consistently applied across all people.

For non-BAC and non-BrAC measures of impairment, further research is needed to identify which metrics (or a combination of metrics) are best suited for making an accurate impairment determination. This includes whether there is a need to establish threshold values or weighting criteria for when warnings or interventions may be required. These metrics should ultimately inform how the compliance test procedures are structured.

NHTSA should ensure the rulemaking supports multiple compliance options for alcohol impairment.

The development of touch-based and breath-based sensors for detecting the level of alcohol in a person's system is at an advanced stage. However, research is also ongoing to evaluate the development of other metrics for measuring equivalent levels of impairment using in-cabin and/or external vehicle sensors (e.g., driver eye movements, lane position, etc.). It is therefore important that the agency maintains a technology-neutral approach when developing test procedures for evaluating the performance of any advanced driver impairment system. We recommend that NHTSA consider the development of multiple compliance options to support future technology innovation.

Regardless of the defined measures of impairment, ensuring practicable, repeatable, and reproducible performance requirements is critical. If the agency focuses on alcohol impairment detection prior to the driver operating the vehicle, performance requirements must consider latency and accuracy to avoid false positives/negatives and minimize the potential for any consumer acceptance-related concerns that unduly interfere with the ability to operate a vehicle. Support for additional compliance options should include consideration for supplemental technologies intended to verify and validate an impairment classification based on additional driver metrics. For example, providing a "second stage" impairment assessment using different sensors and/or measures of impairment could potentially minimize false positive or false negative results, but may come with additional costs or acceptance hurdles.

NHTSA rulemaking should not prescribe unreasonable countermeasures to address misuse.

The success of this rulemaking in reducing alcohol impaired crashes and fatalities is dependent not only on the effectiveness of advanced impaired driving prevention technology, but also the extent to which drivers are successful in circumventing the system. In the case of breath or touch-based intervention systems, this could include situations where an impaired driver attempts to have an unimpaired passenger start the vehicle before switching positions. More extreme examples might involve the owner disabling or damaging the sensors used to determine the potential presence of impairment. In both scenarios, there may be potential safeguards that could be implemented but these likely vary in terms of efficacy, cost, and

[14] BIL references section 163(a) of title 23, United States Code

complexity. NHTSA must take a measured approach to avoid prescribing unreasonable countermeasures against possible circumvention. There are also situations where an override may be necessary (e.g., in the case of a system failure or emergency situation). To the extent that countermeasures are defined, the agency should seek to leverage existing sensors already required through other regulations (e.g., seat sensors to confirm continued presence of a driver in the driver seat position). In the case of deliberate tampering, destruction, or failure to maintain a functional impairment system, NHTSA could consider requiring a warning symbol to indicate the system is not active.

NHTSA should provide rulemaking support for phased updates to the standard.
To the extent that research does not support the inclusion of certain technologies in the timeframe that NHTSA expects to issue a NPRM or final rule on this matter, the agency should - at a minimum - consider a phased approach where the rulemaking may be updated as new technologies that demonstrate equivalent safety benefits enter the market. Considering the potential benefits of providing this flexibility is fundamental to the future success of this rulemaking and could provide manufacturers with new opportunities, for example, to manage and consolidate sensor systems to better manage costs while maintaining equivalent levels of safety. It should be noted, however, that any requirement to capture additional measures of impairment may require an expanded set of sensors. While these may increase redundancy, it may also increase overall costs to consumers.

The rule should not require manufacturers to perform the role of law enforcement.
It is important to note that while most states have enacted driver impairment laws for persons with a BAC of 0.08 g/dL or greater for those 21 and over and 0.00 -- 0.02 g/dL for those under 21, neither the Federal government nor any state or local government should view this rulemaking as a means for enforcing traffic or criminal laws. Auto Innovators is strongly opposed to any suggestion that manufacturers should, in any way, perform the role or fulfill the function of law enforcement officers. While we recognize the importance of considering performance requirements consistent with state laws (as required by the BIL), using vehicle technology as a means to enforce state impairment laws is squarely outside the scope of this ANPRM.

The agency must not require that systems be capable of either manually or automatically adjusting the threshold values for determining impairment. While several states have enacted (or are in the process of considering laws) that revise the BAC threshold for drunk driving from 0.08 to 0.05 g/dL, developing variable requirements at this nascent stage of technology deployment would significantly expand the scope of rulemaking. First, it would increase the overall technical complexity. Second, it would introduce additional privacy considerations if the agency were to tie performance requirements to the real-time geolocation of the vehicle should it cross from one state to another with a different BAC limit. Further, adjusting the BAC threshold could potentially impact the accuracy, sensitivity, and specificity of systems in making an impairment determination. This is particularly true at lower levels of impairment where reliably detecting the presence of alcohol becomes increasingly more challenging because of the smaller margins required in terms of accuracy.

NHTSA should specify whether warnings are required if some level of impairment is detected below the threshold for active intervention.
There is a question as to whether a driver should be permitted to operate a vehicle if impairment is detected, but the impairment is below the threshold identified by NHTSA in the standard to classify the driver as “impaired.” Regardless of whether warnings or active interventions are chosen, we urge NHTSA to provide specific details within the standard on the <u>only</u> ways that a vehicle may respond in such instances.

Driver distraction.
Additional research and standards development is needed to establish clear metrics for classifying the presence of driver distraction or inattention. It is likely that such metrics will require a combination of observed driver behavior data – including, but not necessarily limited to, eye glance direction, duration of glances from the roadway environment, and steering wheel inputs. Given that driver distraction is typically momentary or prolonged inattention to the roadway environment, countermeasures for reengaging the driver could reasonably be limited to a warning-based approach. The agency must also ensure that manufacturers are provided with the ability to temporarily override these warnings should a more urgent situation take precedence.

The criteria for issuing warnings should be clearly defined, capable of being communicated in a manner that can be easily understood, and commensurate with the potential risks. This is essential for maintaining consumer trust and avoiding misunderstanding about why alerts are being issued. Ensuring well-defined metrics for classifying the presence of distraction-related impairment also provides a basis for objective, repeatable, and reproducible test procedures.

We urge NHTSA to engage with industry if it seeks to develop these criteria. Manufacturers and suppliers are investing significant resources to ensure that systems provide alerts that are meaningful and actionable by the driver, while also maintaining a level of balance to avoid unnecessary or excessive warnings that may result in drivers seeking to disable the system. A set of poorly conceived criteria could limit the ability to deploy more effective systems in the marketplace. Finally, to avoid conflicts with systems designed to manage driver engagement or to accommodate the presence of additional sensors that support the driving task and allow drivers to engage in secondary tasks, reasonable accommodations are likely needed to account for differences in vehicles with Level 2 or Level 3 functionality.

Driver drowsiness.
Research and standards development is needed to establish clear metrics for classifying the presence of driver drowsiness.[15] Again, it is likely that such metrics will require a combination of observed driver behavior data – including eye closure duration, steering wheel inputs, yawning, etc. The onset of driver drowsiness is typically more gradual than other forms of impairment. Another challenge in defining these metrics is that many of the characteristics of drowsy driving may overlap with other forms of impairment – including alcohol impairment. Additional research is needed to identify key differentiators in instances where more than one form of impairment may be present, so that appropriate technologies can be developed.

Driver incapacitation.
Driver incapacitation was not expressly identified within the scope of legislation; however, NHTSA has included several questions on this topic within the ANPRM. Here, the driver may be unconscious or unable to respond to warnings or alerts and other potential vehicle countermeasures may be needed to mitigate risk to the driver and others in the roadway environment. Additional research is needed to understand the effectiveness of various countermeasures when driver incapacitation is detected.

[15] EU 2021/1341 requires classification of drowsiness using the Karolinska Sleepiness Scale (or other valid alternative means). However, it is unclear how this method might be applied in the context of FMVSS to ensure an objective, repeatable, and reproducible test procedure. See: https://eur-lex.europa.eu/eli/reg_del/2021/1341/oj

6 Further Considerations in the Development of the NPRM.

NCAP.
Auto Innovators strongly recommends that NHTSA consider the role of NCAP in advancing the near-term introduction of advanced impaired driving technologies, particularly where questions regarding overall consumer acceptance remain unresolved. While it is important that NCAP remain data driven and include objective test procedures for assessing vehicle performance, there is an opportunity to leverage the program to promote the introduction of features not covered by regulation. This can help build an understanding of the effectiveness of new systems and help inform any future rulemaking decisions, particularly for camera-based systems that may use multiple weighted variables to make an impairment determination. NCAP can also be used to encourage early adoption and consumer acceptance in situations where a longer lead time or effective date is needed by manufacturers to meet the performance requirements of a given rule.

Auto Innovators continues to strongly advocate that the agency develop a clear NCAP Roadmap and a comprehensive Research and Rulemaking Priority Plan. In the context of this rulemaking, NCAP can be leveraged to drive higher levels of performance than those specified in regulation (e.g., include additional measures of impairment, incorporate additional sensor data, provide enhanced countermeasures), but it should not be applied haphazardly. Both a roadmap and priority plan should be in place to ensure that there is a clear path forward to inform future research needs and investment decisions by manufacturers.

Privacy and cybersecurity.
Auto Innovators supports the agency's efforts to develop a comprehensive analysis of relevant privacy-related issues that need to be considered regarding this rulemaking. This effort should not be delayed because it is important to understand the scope, necessity, and appropriateness of data that may be required to support FMVSS. We recommend that NHTSA publish its Privacy Impact Analysis (PIA) as soon as practicable and provide adequate time for comment.

The automotive industry has been proactive in its efforts to address emerging consumer privacy concerns through the development of comprehensive privacy principles, which are subject to Federal Trade Commission enforcement.[16] While we recognize privacy is an important issue, NHTSA has not previously sought to address the issue through rulemaking, and we are not clear as to how the agency might include such requirements within FMVSS. One way to alleviate some potential concerns would be to define performance requirements in such a way that they do not rely on the collection of personal information. Identifying a specific individual may not be necessary to provide relevant countermeasures or mitigations. However, manufacturers should not be limited in their ability to capture information needed to support product improvement or investigate or diagnose reports of such systems not functioning as intended.

NHTSA has guidance in place for how manufacturers should consider the cybersecurity of on-vehicle systems and data. Therefore, NHTSA need not address these issues here, but if it does, the approach should remain consistent with the guidance.

[16] Auto Innovators Consumer Privacy Protection Principles Privacy Principles For Vehicle Technologies and Services - https://www.autosinnovate.org/innovation/Automotive%20Privacy/Consumer_Privacy_Principlesfor_VehicleTechnologies_Services-03-21-19.pdf

Global harmonization.
OEMs are currently developing technologies to meet European laws and regulations with respect to driver monitoring. The direction of Global Safety Regulation and Euro NCAP is to utilize camera-based driver monitoring systems to address drunk driving, drowsy driving, and distraction. We urge NHTSA to review the current European requirements to identify potential areas for harmonization (with consideration for US-specific issues).

Consideration for ADS equipped vehicles.
NHTSA should ensure that any requirements related to driver impairment are only required when a vehicle has a designated driver seating position or if the vehicle is capable of being operated in manual mode. In addition, any intervention or warning requirements should not apply to vehicles capable of completing a trip (including performing DDT fallback) in automated mode without reliance on a fallback ready driver.[17] In such cases, the operation of the vehicle is not dependent on the level of alcohol or other impairment exhibited by passengers in an automated vehicle. Conversely, it may be appropriate for the standard to apply vehicles with Level 3 (or below) functionality, where a fallback ready user is required to respond to a request to intervene.

Resolving outstanding technical issues.
We support continued engagement in advancing this rulemaking. There are several outstanding questions that NHTSA must address prior to the development of a more comprehensive NPRM. Many of these issues require thoughtful consideration; there are opportunities for NHTSA to help minimize the time spent resolving these challenges through enhanced stakeholder engagement. The docket provides a mechanism for providing stakeholder input, but is limited in the extent to which it can be leveraged to further refine the agency's regulatory proposals. NHTSA should consider the development of public sessions to provide a forum to discuss the current state of impairment technology development, and leverage expert stakeholder engagement.

Consideration for Small Volume Manufacturers.
There are unique design characteristics associated with vehicles produced by Small Volume Manufacturers that increase the complexity and cost of introducing new sensor technologies that are typically designed for integration as part of more conventional mass-market designs. Additional time is needed for suppliers to adjust the design of components to be more readily integrated for use in high end performance vehicles with novel designs, notwithstanding any practical limitations regarding the placement of interior and exterior sensors that may be required to assess the driver or forward roadway environment.

Ongoing supporting policy actions are critical: Maintaining a Safe System Approach on impaired driving.
Auto Innovators supports the DOT National Roadway Safety Strategy (NRSS) that embraces a Safe System approach to roadway safety improvement.[18] It remains critical for NHTSA and state/local governments to maintain targeted measures to prevent drunk driving – particularly if those frequently engage in alcohol impaired driving opt not to purchase a vehicle with this technology or disable it if it does. Addressing this issue requires changing public sentiment and societal acceptance of impaired driving and should not rely solely on vehicle technologies. Efforts to address alcohol impaired driving through the use of vehicle technology should be done in parallel with enhanced education, laws, and enforcement. Fleet turnover takes time, and it is important that agencies ensure that the appropriate resources are available to foster further reductions in impaired driving fatalities and injuries.

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[17] DDT – Dynamic Driving Task
[18] NRSS reference

We stand ready to work with NHTSA as the agency continues its progress on this effort.

Sincerely,

Sarah Puro
Vice President, Safety and Technology Policy
Alliance for Automotive Innovation

Appendix A

Auto Innovators responses to specific NHTSA questions included in the January 5, 2024, Advanced Impaired Driving Prevention Technology ANPRM

Appendix

Auto Innovators Comments in response to the NHTSA Advanced Impaired Driving ANPRM Questions
Docket: NHTSA-2022-0079

Key Issue Areas from NHTSA ANPRM
(press ctrl + click to quickly access each section)

###

1 Technologies that Passively Monitor the Performance of a Driver to Accurately Detect Whether that Driver may be Impaired.

1.1 NHTSA requests feedback on the two technology scan findings. Are there technologies, or technology capabilities or limitations not captured in these reports? If so, what are they?
We generally agree with the findings of the NHTSA technology scan. While there are several potential products, concepts, and research efforts underway, most are still in the early stage of development, and none have demonstrated a sufficient level of confidence and reliability required by a feature of this nature – particularly where active interventions may be imposed.

1.2 NHTSA is concerned that behaviors consistent with drunk driving, like repeated potential lane departure and erratic speeding/braking, would be masked by an engaged SAE Level 2 driving automation systems. Would there be enough information from other sensors (e.g., camera-based DMS, hands-on-wheel detection) to detect driver impairment and driver impairment type when SAE Level 1 or 2 driving automation systems are active?
SAE Level 2 driving automation systems are designed to support the driver by providing lane positioning and speed management functionality, which, when engaged could limit the ability to use lane departures or erratic speeding and braking characteristics as a surrogate for measuring impairment (*to the extent that these can be reasonably used to infer alcohol impairment*).

Similarly, standalone lane keep assistance/centering or adaptive cruise control could also reduce the suitability of using either metric for estimating BAC above a certain threshold – particularly due to variability in the way alcohol can affect different segments of the population. Therefore, it may not be suitable to use these metrics as a primary indicator of impairment detection as part of any proposed regulatory test procedure if these assistance systems are active.

Additionally, it may be possible to determine that driver impairment exists using interior camera and steering systems. However, additional research is needed to develop minimum performance requirements for determining the presence of impairment based on observed characteristics – particularly given that there is overlap in the observed behaviors that may be associated with distinct types of impairment.

1.3 NHTSA is concerned about the limitations of vehicle sensor-based impairment detection systems to operate fully when certain sensors are impeded. External circumstances may include common roadway conditions such as darkness, heavy weather, roads with poor markings, or unpaved roads. Circumstances within the vehicle may include driver accessories, such as infrared light-blocking sunglasses, masks, or hats that may obscure the view of the driver to a DMS camera. If one or more sensors are impeded by such conditions, is there enough information from other sensors to detect driver impairment? Does this vary by impairment type? What are the operational limitations of such systems?

An impairment determination is only as robust as the sensor data it is based upon. In general, all sensors (including BAC and BrAC sensors) have limitations. Reliable estimates based on sensor data can be impacted due to external circumstances that limit sensor performance. These could include deliberate attempts to obscure the sensor (or sensors). For example, for DMS systems, it is not possible to judge the type of impairment unless the face direction, the line of sight, and the opening and closing of the eyes are visible. In cases where sensors are obscured, it may be possible to make a determination depending upon data obtained from other sensors (depending on the required sensor configuration), but it is likely that the confidence in the overall assessment will be much lower. Similarly, if an in-cabin sensor is obscured, but an external sensor shows degradation in lane keeping capabilities, it may only be possible for the system to notify that some form of impairment is present, without the ability to classify the specific impairment type.

NHTSA must carefully consider the scope of rulemaking and the extent to which requirements for external sensors are needed to capture the data needed to further improve an impairment determination. Requiring lane position monitoring, for example, would be akin to developing a mandate for LDW/LKA systems. If NHTSA seeks to mandate this technology, it must be done through a separate LDW/LKA rulemaking process with its own set of performance standards.

Requirements based on metrics that rely on specific sensors or sensor data for detecting driver impairment will add further complexity and cost to any rulemaking effort. Furthermore, it is unclear the extent to which external vehicle-sensor based data may complement, conflict, or potentially be given precedent in making an impairment determination versus measured BAC, BrAC, or eye-based measurements alone.

1.4 NHTSA is seeking input on how a test procedure for driver impairment detection systems could be developed and executed in a FMVSS. For example, does the test need to be conducted in a moving vehicle to capture lane drift or weaving? If so, what are potential testing approaches or procedures? Are humans required for camera-based DMS assessment? Are there particular accessories (e.g.,

sunglass types, facial coverings) that would be required for testing? Is it feasible to conduct testing in darkness? What type of accuracy could be attained? How might this vary based on intended impairment type detection?
It is not possible to fully respond to this question given that the agency has not provided clear direction in terms of the anticipated scope of the regulation, nor the metrics upon which an impairment determination should be made. However, as a general matter, the agency must ensure objective, repeatable, reproducible test procedures are in place. These should also be reasonably practicable to minimize any undue testing burden.

We anticipate that classifying impairment using a DMS based approach will likely be based on multiple variables (or measures of impairment, several of which are referenced in the ANPRM. In its simplest form a test procedure could be set up to evaluate the ability of sensors to track various measures such as head position, eye glance, blink rate etc., but additional research is likely needed to develop a test procedure that will result in a specific impairment mitigation based on these values (or combination of measured impairment values). EuroNCAP and EU test procedures include details on classifying certain impairments; however, there may be limitations on how readily these can be applied within the context of FMVSS.[1,2]

The evaluation of some driver impairments (e.g., distraction) could potentially be conducted in a static environment using human subjects; however, there are ethical considerations that limit certain types of impairment testing, and careful consideration would need to be taken to ensure repeatability, reproducibility, and objectivity. This could include specific requirements related to the height of test procedure participants and how they are seated in the vehicle. Detailed instructions would also need to be developed to structure the sequence of testing. NHTSA should also consider developing a human surrogate test device similar to an ATD that can repeatably perform the required motions in order to remove the subjectivity inherent in human subjects. We do not support the use of human dosing in FMVSS due to variability in test subject physiology.

If the agency is to require that determination of impairment based on data that requires both internal and external sensors this creates additional complexity as it may introduce the need for some type of dynamic testing. In this case, it may not be possible to develop repeatable and reproducible tests, particularly if the test participant is required to both operate the vehicle in a consistent manner, while also following detailed instructions needed to assess the ability of in-cabin sensors to track various metrics. This is potentially complicated further again still if the agency determines the need to evaluate performance in both well-lit and dark conditions. We note, however, that this may not be necessary depending on the type of sensors used (e.g., IR sensors have no performance difference between day and night operation). We request that NHTSA perform a comprehensive review of existing test procedures, as there may be opportunities for harmonization.

1.5 What kind of performance requirement should NHTSA consider to mitigate defeat strategies (e.g., taping over the camera-based DMS or removing/replacing rear-view mirrors that contain driver monitoring equipment)?
The primary focus of regulation should be on performance requirements that yield a high level of acceptance to reduce the likelihood that consumers will seek to circumvent them. This challenge is significantly greater for intervention strategies that include an interlock. While it is reasonable that

[1] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32021R1341&from=EN
[2] https://cdn.euroncap.com/media/67892/euro-ncap-assessment-protocol-sa-safe-driving-v1001.pdf

NHTSA may seek to develop performance requirements to minimize the potential for rudimentary defeat strategies to be employed, there are limitations to what may be achievable through practical design countermeasures.

It is unreasonable to require that any technologies mandated through FMVSS be impervious to defeat as the approaches used by those seeking to circumvent or potentially disable the system may vary in sophistication and may not be easily addressed through reasonable or practicable design changes – particularly where additional redundancies or countermeasures may result in added cost and complexity. Moreover, while customers should be discouraged from doing so, an individual is legally allowed to render a technology on his or her vehicle inoperative.

We are not opposed to the agency requiring a warning to be displayed to notify drivers to the presence of a malfunction, however, as noted in our main comments, reasonable flexibility must be provided for how these warnings are prioritized and communicated to the driver.

1.6 What metrics and thresholds (e.g., eye gaze, lane departure violations, speed, blind spot warning triggers, lane position variability, speed variability), or combination thereof, are most effective at measuring driver impairment? These would include time-based parameters from the start of the ignition cycle and those used for continuous monitoring. How feasible is it to implement these metrics in passenger vehicles? Should these vary by impairment type? Might these measures conflict across impairment types? Should NHTSA require impairment detection systems be able to collect specific metrics? Why or why not?

Before determining what metrics and thresholds are needed for measuring impairment, the agency must first decide, based upon research, the type(s) of mitigation that will be required when impairment is detected. If the mitigation strategy involves some form of active intervention, the level of accuracy for making an impairment decision is likely to be much higher due to the consequences of a false positive determination.

If the agency is to consider the use of indirect or observed measures of impairment, the inclusion of these metrics must also consider the extent to which they can be reasonably, practicably, and objectively defined within FMVSS. Additional research is needed to establish a broad correlation of multiple measures of impairment and how these may be combined (with potential corresponding weighting factors) to classify various forms of impairment. Any rule should be technology neutral, and not seek to prescribe minimum requirements that exclude the use of alternate technologies or otherwise limit innovation.

If needed, each potential metric for estimating impairment (listed in Question 1.6) will likely require additional sensors to capture the information needed to make an impairment determination. The additional cost and benefits of setting requirements based on an expanded set of metrics will likely require vehicles to be equipped with additional sensors and technological capabilities. This must be carefully considered as part of the agency's regulatory analysis. We urge NHTSA to prioritize those metrics that are fundamental for making an impairment determination and avoid situations where costly sensors may be required.

As noted in the response to Question 1.2, the use of lane keeping systems, adaptive cruise control, and/or L2 automation, limits the ability to rely on lane departures or erratic speeding and braking characteristics as additional data points for measuring impairment. Therefore, basing an impairment determination on these metrics alone may reduce the potential accuracy and timeliness of detection. Additional redundancy may be needed when these systems are active.

1.7 NHTSA seeks comment on whether it should be necessary for an impairment detection system to determine what kind of impairment a driver has (e.g., drowsy, distracted, drunk) if the driver triggers certain metrics that indicate the driver is impaired by at least one of those impairments? For example, incapacitation, drowsiness, and distraction could be captured by camera-based monitoring systems, but they may also detect some alcohol-impaired drivers.

The need for systems to distinguish between different types of impairment is only necessary if a specific or targeted mitigation or actionable warning needs to be provided in relation to each individual impairment. If such a distinction cannot be made, or is otherwise deemed unnecessary, careful consideration needs to be given in regard to the effectiveness of providing a *generic* warning when "undefined" impairment is detected, and the extent to which this may cause confusion or annoyance. However, as with some current systems, even if they cannot isolate the impairment source, the system can identify and warn (or intervene) against unsafe behavior.

Any future rule should include clear metrics (including, but not limited to, statistical models) for how each type of impairment is defined and classified. The ability to classify impairments and provide actionable information on the reason for an alert, provides additional context so that the driver can take steps to address the underlying issue. As noted in our main comments, there is likely an overlap between the measurable driver characteristics used to classify certain forms of impairment (e.g., eye gaze, blink rate). However, there may be subtle differences in the underlying measurements that allow for one form of impairment to be distinguished from another. Furthermore, the (potentially weighted) combination of observed characteristics may allow for a more accurate determination – however depends upon how the classification metrics are defined in regulation. Similarly, if the initial focus of regulation is on addressing alcohol-impaired driving, the likelihood of potential consumer confusion may be reduced.

If multiple forms of impairment are found to be present at the same time (or simultaneously trigger the need for an alert to be provided), manufacturers should be given flexibility for how alerts are prioritized to ensure an appropriate and timely response from the driver. For example, if a drowsy driver was exhibiting signs of distraction, it may be more suitable to first provide a distraction warning to address the immediate safety concern before alerting the driver to the presence of potential drowsiness which may be less time sensitive.

The rule should also allow driver impairment warnings to be temporarily overridden in cases where crash avoidance systems may need to alert the driver to an impending collision. When executing an AEB intervention, the reasons for the driver ending up in the situation is not important, because the intervention is meaningful and effective independently of estimates of a potential driver impairment.

1.8 Are there characteristics that would separate sober impairments from alcohol-induced impairments (e.g., horizontal gaze nystagmus or myokymia)? If so, what are they? Are there other non-alcohol induced conditions in which some of these characteristics might appear? If so, please provide examples.

There are many non-alcohol impairments that can impact a driver with no alcohol in his or her system, and it is likely not all are known or easily documented. While human behavior varies, and some non-alcohol impairments may overlap with alcohol-induced impairments, additional research is needed to understand the extent to which these can be separated.. There are also forms of impairment that cannot be readily identified based on observed behavior and response (e.g., cognitive load). Similarly, some impaired drivers may not exhibit behaviors in the same way.

1.9 NHTSA seeks comment about whether certain conditions listed in the previous question (e.g., myokymia) might result in false positives in certain situations (e.g., stress) or with certain populations (e.g., older drivers).

The size of the universe of conditions and circumstances that may contribute to a false positive impairment determination is unknown. These can include, but are not limited to, a range of factors including but not limited to age, fitness level, and squinting due to sunlight glare. This also highlights the need to consider the potential need for drivers to be provided with the ability to override the system or disable functionality in certain circumstances.

1.10 What precision and accuracy should driver monitoring technology be required to meet for the purposes of detecting alcohol impairment? Under what conditions should these technologies be demonstrated to work? Are there driver characteristics, environmental conditions, or other factors that might limit the usefulness or applicability of certain technologies under certain conditions? Should there be a maximum time allowed for a system to develop a determination of impairment, after the indicators of impairment are detected?

If pursuing an intervention strategy that limits operation of the vehicle, the precision and accuracy of the system must minimize the potential for false positives and negatives. This is important for avoiding major consumer acceptance issues.

For a warning as opposed to an intervention, the level of precision and accuracy is less critical.

1.11 Under what conditions should a vehicle allow a driver to turn off driver impairment monitoring, if at all? If allowed, should a system be reset to "on" upon the next ignition cycle?

This is a complex issue. Turning off the system reduces the potential safety benefits of the regulation. In the near term, NHTSA may consider permitting manufacturers to employ an override function if the underlying sensors needed to make an impairment decision do not have sufficiently high sensitivity and there are no specified countermeasures for addressing false positives. A challenge exists to ensure that drivers do not misuse any potential accommodations that are provided. It is not reasonable for a vehicle manufacturer to discern whether a person is experiencing an emergency where override is appropriate. Unless specifically ordered by the FMVSS, overrides create potential liability concerns for manufacturers that must be addressed.

1.12 NHTSA is interested in data, studies, or information pertaining to the effectiveness of various sensors or algorithms in correctly detecting driver impairment (collectively, and individual impairments). NHTSA is seeking comment on which metrics, thresholds, sensors, and algorithms employed by existing DMS technology that could be used in an alcohol impairment detection system could be sufficiently robust to meet the requirement that an FMVSS be objective.

There are several measures of impairment that can be objectively measured using DMS technology (e.g., the direction and duration of an eye gaze can be objectively defined). The challenge is the extent to which these observable measures can be used in isolation or combination to make a determination that a driver is alcohol impaired. Additional research is ongoing in this area, and we encourage the agency to continue to explore potential options for including DMS based approaches in FMVSS.

The rulemaking must not only be objective, it must also be repeatable and reproducible. To the extent that multiple compliance options within the regulation measure a specific type of driver impairment (e.g., using BAC or BrAC for alcohol detection), any of the options must demonstrate some level of equivalency. Auto innovators supports a technology neutral approach, and NHTSA must ensure that new compliance options are added as manufacturers and suppliers continue to innovate in this space.

1.13 Are there other innovative technologies, such as impaired-voice recognition, that could be used to detect driver impairment at start-up? If so, how might these function passively without inconveniencing unimpaired drivers? How mature and accurate are these technologies?

Further research is needed to understand the extent to which impaired-voice recognition could be used to accurately detect driver impairment. However, regardless of the viability of such an approach, the suggested proposal raises a number of fundamental policy issues that will need to be addressed. First, the approach is not passive as it requires a deliberate action by the driver to speak, which is inconsistent with the intent of the IIJA. Second, given the significant variability in human speech patterns, it is likely that some level of baseline "unimpaired" speech to be stored to compare speech samples against, which raises several privacy questions, notwithstanding the practicability challenges in implementing such an approach. It is also unclear what objective metrics would be used to accurately determine the driver's level of impairment.

1.14 What level of sensitivity and specificity is necessary to ensure the DMS technology does not unduly burden unimpaired drivers or prevent unimpaired drivers from driving? Are there any DMS available on the market capable of detecting alcohol impairment with the level of sensitivity and specificity necessary to ensure this?

The level of sensitivity is important when triggering certain countermeasures. Interventions need to avoid undue burden and negative consumer acceptance among unimpaired drivers should there be a false positive situation – particularly if intervention is required prior to taking a trip. Even if 1 in 10,000 trips were expected to experience a false positive, this could result in thousands of unimpaired drivers encountering problems that prevent them from driving each day.[3] Correlation studies should be completed on a broad scale that represents the entire range of human drivers.

1.15 How can developers of DMS technology ensure that people with disabilities are not disproportionately impacted? Specifically, how can the technology accurately account for facial/body differences, chronic health conditions, and adaptive driving technologies?

It is important that regulations do not result in situations where people with disabilities are adversely impacted due to potential misclassification of impairment due to health conditions or body differences that may inadvertently trigger unwarranted warnings or interventions.

Provisions should be made so customers with disabilities can deactivate the feature where appropriate. This should be dependent on the underlying metrics used to identify impairment and underscores the importance of NHTSA providing multiple compliance options that may be able to accommodate a broader cross section of the driving public. For example, a breath based system does not rely on the same metrics as a camera based system.

1.16 How repeatable and reliable must these systems be? Is there societal acceptance of some potential false positives that could inconvenience sober drivers knowing that it would capture drunk drivers? If so, what countermeasure might best facilitate this? In considering a possible performance standard, what false positive rate would place too great a burden on unimpaired drivers?

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[3] According to the National Household Travel Survey, 1.1 billion trips are taken in the US each day. With a false positive ratio of 1:10,000, this would result in approximately 110,000 false positives per day.

Systems must have a high degree of repeatability and reliability given the potential for unintended consequences, particularly if sober drivers are unable to start their vehicle. While we expect substantial consumer acceptance research is needed to understand the magnitude off the potential public concern, it can be reasonably expected that low levels of repeatability reliability an accuracy are likely to yield lower levels of acceptance among the public depending upon the level of mitigation encountered when a false positive result occurs. For a warning-only mitigations, these may be viewed as more acceptable (or less intrusive) by the driver. While this approach may still negatively impact consumer acceptance, the inconvenience of additional time to start the vehicle likely outweighs not being able to start the vehicle at all.

1.17 What can be done to mitigate physical destruction or misuse concerns? If mitigations exist, how might these mitigations impact the effectiveness of DMS monitoring driver impairment?
It is unreasonable to require that any mandated technologies be impervious to defeat, especially given that these technologies intend to restrict or change intentional, although potentially illegal, behavior. Those seeking to circumvent or disable any system may take approaches that vary in sophistication or easily addressed through reasonable or practicable design changes.

The success of this rulemaking in reducing alcohol impaired crashes and fatalities is dependent not only on the effectiveness of advanced impaired driving prevention technology, but more importantly the extent to which drivers decide to adopt (and to not circumvent) the system.

There are many scenarios where a driver could try to defeat the device. In the case of breath or touch-based intervention systems, this could include situations where an impaired driver attempts to have an unimpaired passenger start the vehicle before switching positions. More extreme examples might involve the owner disabling or damaging the sensors used to determine the potential presence of impairment. In both scenarios, there may be potential safeguards that could be implemented but these likely vary in terms of efficacy, cost, and complexity. NHTSA must take a measured approach to avoid prescribing unreasonable countermeasures against possible circumvention. To the extent that countermeasures are defined, the agency should seek to leverage existing sensors already required through other regulations (e.g., seat sensors to confirm continued presence of a driver in the driver seat position). In the case of deliberate tampering, destruction, or failure to maintain a functional impairment system, NHTSA could consider requiring a warning symbol (with appropriate flexibility for OEMs) to indicate the system is not active.

1.18 NHTSA seeks to ensure fairness and equity in its programs and regulations. As NHTSA considers technologies that can passively detect impairment, some of which monitor facial features through camera-based systems or voice recognition, how can NHTSA, in the context of an FMVSS, best ensure these systems meet the needs of vehicle users of all genders, races and ethnicities, and those with disabilities?
It is important that NHTSA consider equity issues in the context of FMVSS. However, without knowing the specific scope or related measures of impairment that are included as part of this rulemaking, it is unclear what actions may be needed at this time. Nonetheless, since impairment technologies are measuring attributes that depend on human physiology, there is inherent variation that must be considered in all technology approaches. For example, the measured BrAC, when compared to BAC, can vary depending upon the subject's sex, weight, and time elapsed from alcohol consumption. In another example, a camera-based system's accuracy in detecting a "flushed face" may be sensitive to the subject's skin complexion. In the context of ensuring that FMVSS requirements do not disproportionately harm certain demographics (i.e. minimize false positives), NHTSA should consider a less stringent

threshold for impairment which, at least initially, would make the technical and societal challenges more manageable, while still being able to target the greatest safety needs associated with heavily impaired drivers.

2 Technologies Aimed at Passively and Accurately Detecting Whether the BAC of a Driver of a Motor Vehicle is Equal to or Greater than .08 g/dL

2.1 In a follow-up to NHTSA's technology scans, NHTSA seeks any new information on technologies that can passively and accurately detect whether the BAC of a motor vehicle driver is equal to or greater than .08 g/dL.

At present, no commercially available system has demonstrated that it can passively and accurately detect BAC impairment with the necessary precision for inclusion in FMVSS. While systems currently in development have potential to provide passive detection capabilities, additional data is required to determine suitability based on various measures of performance (e.g., time to detect based on specified measures of impairment, minimum accuracy, , sensitivity, and specificity).

2.2 Although the legal thresholds for DUI/DWI laws focus on BAC/BrAC, BAC/BrAC are typically not used in isolation by law enforcement to determine impairment. BrAC/BAC may provide additional evidence of impairment after an officer has observed driving behavior, the appearance of the driver (e.g., face flushed, speech slurred, odor of alcoholic beverages on breath), the behavior of the driver, and any statements the driver has made about alcohol or drug use. Additionally, an officer may have administered the Standard Field Sobriety Test. Considering this, should regulatory options use BAC/BrAC in isolation to determine whether drivers are above the legal limit? If so, why?

This question is fundamental in defining the scope of rulemaking as it relates to alcohol impairment technology. As indicated elsewhere in these comments, this rulemaking should be considered independent of state laws. While the presence of existing laws may inform the impairment thresholds chosen to define impairment, the Federal government nor any state or local government should view this rulemaking as a means for enforcing traffic or criminal laws.

NHTSA must clearly define what is meant by the term alcohol impairment and the measurements upon which a determination of impairment is made. If the agency decides that other measures of impairment must be considered either in the place of or in addition to BAC/BrAC measurements, this must be carefully considered based the technology capabilities and limitations of sensors needed ensure timely and accurate readings. This will help inform the necessary compliance options for detecting impairment and or improving the accuracy of an impairment determination.

2.3 Are commenters concerned about using the legal limit (.08 g/dL) when there are indications that some individuals exhibit intoxication that would impact driving at lower or higher levels, depending on a number of factors discussed in the introduction? Why or why not? Might drivers with a BAC greater than 0 g/dL but less than .08 g/dL interpret the fact that their vehicle allows them to drive as an indication that it is safe for them to drive after drinking? If so, are there ways to mitigate this possible unintended consequence?

The 0.08 g/dL threshold is a value that is used to legally define "driving while intoxicated." It does not define whether an individual is fit to operate a vehicle. The decision to use 0.08g/dL or any other threshold to define drunk driving is a legal matter that if adopted, should be applied uniformly , and minimize consumer confusion.

NHTSA asks whether “drivers with a BAC greater than 0 g/dL but less than .08 g/dL interpret the fact that their vehicle allows them to drive as an indication that it is safe for them to drive after drinking.” This is a question that current members of the public encounter on a regular basis if they have consumed alcohol and are contemplating driving a vehicle. While further study may be needed to understand the degree to which drivers may seek to drive despite a non-zero presence of alcohol, the agency must ultimately decide what, if any, level should be permissible – particularly where not all non-zero scores manifest themselves in terms of physically observable impairments. This question is critical to defining the scope of regulation and must be addressed early in the process as it likely defines other aspects of how the regulation is structured.

2.4 Given the quantifiable positive impacts on highway safety that Utah has experienced since lowering its BAC thresholds to .05 g/dL, should NHTSA consider setting a threshold lower than .08 g/dL?

Additional research is needed to improve the level of sensitivity and specificity of passive alcohol detection systems if the threshold is set at 0.05 g/dl. Lowering the threshold for a detection system introduces additional complexities but this should not discourage states from adopting stricter state laws. Any decision on this matter should be data driven, and the agency should consider the regulatory impact of adopting this approach, or, as suggested elsewhere by the agency, setting the limit at 0.15g/dL.

2.5 Is a BrAC detection that correlates to a BAC of .08 g/dL or above sufficiently accurate?

BrAC and BAC have both been sufficiently documented as a measurable criteria. Data exist to relate the two measures. However, there are inherent differences due to physiological traits and variables (e.g., body size, sex, delayed onset from alcohol intake). Since these physiological traits create variability in measured BrAC that cannot be controlled (and measuring BAC presents substantially more technical challenges), the Agency should consider an appropriate threshold for BrAC that ensures that minimizes false positives when actual BAC is not 0.8g/dL or less. A correlation between BrAC and BAC exists and should be supported by available research to ensure appropriate levels of equivalency.

2.6 Would a standard that allows or requires systems that approximate BAC using BrAC (at any concentration) meet the Safety Act’s requirement that standards be objective? Would the technology detect BAC?

This is a determination that NHTSA must make based on its analysis of the data. If the rule supports the use of different measures of impairment for classifying alcohol impairment, there must be some means for demonstrating that equivalent levels of safety are provided when applying these different metrics.

2.7 NHTSA is seeking input on how a .08 g/dL BAC detection test procedure could be developed and executed in a FMVSS. For example, are dosed humans required or would a test device to simulate human dosing be required? What type of accuracy could be attained? Would static test procedures accurately simulate dynamic performance? In a BrAC evaluation, how would variance in vehicle cabin volume be accounted for?

The use of this method for compliance verification is dependent on requirements based on BAC or BrAC and is not likely suitable for assessing the performance of systems that monitor other impairment metrics. We do not support the use of human dosing in FMVSS due to potential ethical concerns and variability in test subject physiology (or driving task abilities if such requirements are included in the rule). Alternate approaches could be to develop a simulated driving model that can be standardized as a means to certify vehicle compliance in more controlled laboratory test conditions, or a human surrogate device that can provide “breaths” at specific BrAC. Further technical discussion is likely required, and we urge NHTSA to engage with groups such as SAE International to identify a path forward.

In a BrAC evaluation, BrAC can be influenced by cabin volume, the status of open/closed windows, reconfigurable vehicle interior and exterior (i.e., convertible), or the potential presence of other occupants that may or may not have consumed alcohol. We do not have a proposal for how this might be accounted for within regulation but would welcome further technical discussion on this issue.

2.8 What precision/accuracy should BAC detection technology be required to meet? Should any precision/accuracy requirement be fixed at a final rule stage, or should it become progressively more stringent over time with a phase-in?

As noted in our main comments, the level of required precision and accuracy is likely dependent upon the level of mitigation (i.e., intervention vs. warning). In the case of an intervention strategy, the precision and accuracy must be extremely high to reduce the likelihood of false positives and any related unintended consequences. Precision/accuracy requirements should only be considered as part of any established test procedure if existing technology is robust enough to fulfil the specified requirements. For example, passing a prespecified number of trails. Technologies today is not suitably mature for an intervention-based approach so requirements that becomes progressively more stringent over time would support the ability for technology to advance while not creating public outrage when false positives occur.

2.9 For a BAC-based sensor, NHTSA seeks comment on when during a vehicle’s start-up sequence an impairment detection measurement should occur. For example, should an initial measurement of BAC/BrAC be required upon vehicle start-up, or before the vehicle is put into drive, and why? What is a reasonable amount of time for that reading to occur?

If intervention is required prior to a trip, a measurement should be taken as soon as the detection system is operational but before the vehicle is put into drive. To address latency concerns, measurements may be taken as soon as practicable and could include other logic requirements (e.g., door closed, constant driver presence) to avoid potential misuse – i.e., if driver leaves seating position, then retesting is required. In general, even an active intervention system should not prevent the vehicle from being started (as there may be a need to access certain features), even if the requirements limit the ability to drive the vehicle.

2.10 NHTSA recognizes that ongoing detection would be necessary to identify if a driver reaches an impairment threshold only after commencing a trip, particularly if drinking during a drive. NHTSA seeks comment on whether BAC/BrAC measurements should be required on an ongoing basis once driving has commenced, and, if so, with what frequency, and why. Further, would a differentiation of the concentration threshold between initial and ongoing detection be recommended and why?

This depends on the required mitigation strategy and the extent to which this type of scenario is expected to occur in the real-world. We request that NHTSA include its analysis on this matter if requiring mid-trip retesting, including an assessment of the interventions that may be specified in regulation and data to support the scenarios in which the agency deems the need to retest mid trip will be triggered.

2.11 NHTSA requests comments on operational difficulties in using touch-based sensing (e.g., consumer acceptance in colder climates when gloves may interfere) or in using breath-based sensing (e.g., mouthwash, vaping, alcohol-drenched clothing, or other false positive indicators).

At present, touch based systems are not passive or developed to a sufficient level to be considered automotive grade. Testing has identified some false positives when evaluating breath-based sensors, and additional field testing is needed to validate these systems.

2.12 What can be done to mitigate physical destruction and misuse? Examples may include having a sober passenger press the touch sensor or breathe toward the breath sensor. If mitigations exist, how might these mitigations impact the effectiveness of alcohol detection systems?
Ensuring higher acceptance reduces the incentives for abuse. However, it is unreasonable to require that any mandated technologies be impervious to defeat by a motivated actor, especially with requirements that intend to intervene and force changes in human behaviors. Those seeking to circumvent or disable any system may take approaches that vary in sophistication and cannot be easily addressed through reasonable or practicable design changes.

2.13 Are there cybersecurity threats related to impairment detection systems? If so, what are they? Are there potential vulnerabilities that might allow outside actors to interfere with vehicles' impairment detection systems or gain unauthorized access to system data? How can cybersecurity threats be mitigated? Are there impairment detection methods or technologies that are less vulnerable than others?
We are still in the preliminary stages of understanding potential cybersecurity countermeasures for these products. Based on an initial assessment, an impairment detection system may experience less threats than an alcohol interlock functionality. From a data security perspective, there is less risk if data stays on board the vehicle and is not transmitted off the vehicle. OEM cybersecurity standards with encryption will mitigate risk, and potential countermeasures could include sensor redundancy and securing functional safety. NHTSA 's cybersecurity guidance, which was most recently updated in 2022, spells out how manufacturers should consider the cybersecurity of on-vehicle systems and data. As a result, it is not necessary for NHTSA to address these issues within this regulation, but any decision to do so should remain consistent with that guidance.

2.14 What temporal considerations should NHTSA include in any performance standards it develops (i.e., should NHTSA specify the amount of time a system needs to make a first detection upon startup before it will enable driving)? What amount of time is reasonable?
Any latency requirements should be consistent with the current state of the technology in terms of initialization time and the time needed to make an accurate determination based on sampled data. NHTSA should also consider the extent to which any time requirements may impact other time-dependent rules (e.g. *FMVSS 111 testing requires that the vehicle reverse direction be selected not less than 4.0 seconds more than 6.0 seconds after the driver's door is opened*).

3 Technologies Aimed at a Combination of Driver Impairment and BAC Detection

3.1 In light of the technology development needs to both passively and accurately detect .08 g/dL BAC and passively monitor the performance of a driver of a motor vehicle to accurately identify whether that driver may be impaired, are there interim strategies NHTSA should pursue?
In general, it is important that this rule be flexible and that it can be updated periodically to include additional compliance options as new technologies enter the marketplace, while maintaining the original baseline standards for systems designed to meet any existing performance requirements. To the extent that interim strategies are needed. It also depends on the scope of the rulemaking and required level of

mitigation (i.e., warning versus active intervention). The trade off in this case, however, is the effectiveness of either approach in addressing driver impairment. As noted in our comments, we anticipate there are differences in the extent to which a driver may respond to a warning versus some form of interlock that prevents driving the vehicle. Regardless of approach, it is still important for the agency to consider all factors necessary to support rulemaking including objective repeatable reproducible test procedures as well as consideration for how anybody mitigation strategies are defined. Above all, the readiness of the technology becomes a moot point if it is not accompanied with consumer awareness and acceptance. The Agency should study this and develop programs in parallel to the rulemaking to educate the public so that they are prepared for when these new technologies become required.

3.2 *If an alcohol impairment detection system utilizes both BAC detection and DMS components, which DMS metrics best complement a BAC system to ensure accuracy, precision, and reliability?*
Using DMS may not necessarily improve overall latency in making an alcohol impairment classification or address the current limitations of using BAC alone (since neither technology alone is sufficiently mature). Targeted research is required to adequately define the relevant metrics. This and will likely be needed regardless – especially if should NHTSA seek to develop objective, repeatable, and reproducible test procedures for compliance options DMS that demonstrate equivalency in making an impairment determination at or around a given alcohol impairment threshold. This should be studied further prior to any inclusion into the standard.

3.3 One possible benefit of a hybrid approach is that a camera system could help prevent intentional defeat of BAC/BrAC sensors. For example, when a driver presses a touch sensor to measure BAC, a camera using machine vision could verify that it is the driver and not a passenger who touches the sensor. Could the camera provide additional benefits against defeating the system?
If retesting is required each time a person sits in the driver's seat, this may reduce instances of a sober occupant starting the vehicle and an impaired person taking the driver's seat. This may be achievable using a combination of other sensors (e.g., door logic, seat sensor, belt sensor).

Note: For the example cited in the question, verification that only the driver touches the sensor requires that the camera be unobscured, functional, capable of seeing both the driver and passenger, or at least confirming that the driver's hand is the one contacting the sensor. However, given that there may be several defeat strategies not comprehended by regulation, developing specific requirements to prevent all forms of misuse or deliberate damage may not be suitable or appropriate.

3.4 NHTSA is considering a phased approach to addressing alcohol impairment. The agency is concerned about false positives. Effectively, this approach could have a first phase that aims to address alcohol-impaired drivers with a BAC of .15 g/dL or higher, where an alcohol sensor could have better accuracy in detecting alcohol-impairment, in combination with a camera-based DMS and/or other vehicle technologies. By improving the BAC detection accuracy, it may gain more consumer acceptance by lowering the false positive rate (i.e., the chance that someone with a BAC below .08 g/dL is incorrectly identified as alcohol-impaired by a vehicle system). This would also target the drivers with the highest levels of impairment. With time and accuracy improvement, a second phase could be pursued to achieve the .08 g/dL BAC accuracy needed to comply with BIL. NHTSA therefore seeks comment on the viability of this regulatory approach. Is a BAC of .15 g/dL the right limit to phase in?
Neither the technology in sensors that directly measure BAC or BrAC nor camera-based systems are sufficiently mature in their ability to rapidly assess impairment above a certain threshold with the accuracy needed for an objective, repeatable FMVSS test procedure. The agency asks about improving

false positive rates by increasing from .08g/dL to .15 g/DL. In general, an approach that initially addresses alcohol-impaired drivers with a BAC of 0.15g/dL may be good public policy because it may engender more public acceptance of the technology in general. Initially targeting extremely intoxicated drivers could lead to greater public acceptance given fewer false positives. It would also allow the agency to focus on addressing the two-thirds of fatal alcohol involved crashes where one driver had a BAC of 0.15g/dL or higher. Of course, the downside to this approach would be that there would be certain drivers operating vehicles with BAC or BrAC levels above state legal limits, which would not be addressed in the initial standard.

3.5 An option could also be a system with primary and secondary indicators within a driver impairment algorithm. For example, a system could incorporate a zero or low (.02 g/dL) tolerance BAC detection technology to initially sense whether alcohol is present in the vehicle. This would serve to "wake up" a driver impairment algorithm. Since this could be hand sanitizer or alcohol on a person's clothing, a second confirmation of driver impairment from a driver monitoring system would be needed. Driver performance measures, such as eye gaze, lane weaving, etc. would be the primary indicators of impairment. and utilize evidence of alcohol as a supplementary indicator for alcohol impairment. Given this approach, would such a system allow a vehicle to better distinguish between alcohol impairment and other forms of impairment that have similar indicators (i.e., the percentage of eyelid closure can be an indicator of both drowsy and drunk driving)? NHTSA notes that it has not identified any passive, production-ready, alcohol-impaired driver detection technology capable of accurate detection at .02 g/dL and seeks comment on the status of such technology.

This approach is not aligned with the potential near-term readiness of technologies and does not focus on the greatest safety needs. Detecting lower impairment levels is more challenging for all systems being researched. This approach is also dependent on the desired mitigation strategy and whether a driver should be able to start the vehicle above a certain impairment threshold. For active intervention systems that prevent operation, the proposed approach does not make sense as it would appear to be more straightforward to simply measure level of impairment if a breath-based sensor is already required. Introducing a two-step process could extend the total time needed for the system to classify impairment.

Although there is potential for detection performance improvement (potential reduced sensitivity), false positives will likely not reach zero because of differences in physiology between individuals and sensor performance limitations when alcohol is detected at such low levels. While the indicators of impairment for drowsiness and drunk driving are similar, the detection algorithms defined in regulation (based on objective measures of impairment [including statistical models based on multiple variables]) must be sufficiently robust to distinguish between the two. This is necessary for ensuring the correct mitigations strategy is used. Incorporating BAC to "wake up" a driver impairment system may provide some indication as to the presence of alcohol, but unless the sensor is sufficiently accurate in determining when the driver reaches a 0.08g/dL, this may only provide a single data point upon which to make a decision.

4 Prohibiting Driving at the Start of the Trip

4.1 How would an alcohol-impaired person react to their vehicle not starting, and how can/should this be considered? Would some individuals decide to walk to their destination in the road, increasing their risk of being hit by another vehicle? Would they get a sober person to start their vehicle and then take over the driving task themselves? Are there countermeasures to discourage this practice by shutting down the vehicle for a period of time after two failed attempts? NHTSA seeks comment on potential research designs to develop better information in this area.

A person's reaction to an unanticipated lock-out (whether justified or not) is likely to be significant. Extensive studies, including surveys and focus groups, would be required to understand the reaction of members of the general public to an alcohol interlock system on their vehicles. Many of the coping mechanisms used may be observed in limited alcohol interlock installations (such as from offender programs or fleet fitments), and an overview can likely be found through research on such use. However, this may not provide a representative view of how drivers will respond if these systems are required on new vehicles. Behaviors will also need to change in response to a potential lock out requirement, so it is critical for the Agency to develop programs to also change public sentiment and support acceptance.

If a subset of the driving population finds the mitigation unacceptable, they will be more inclined to bypass or disable the system. Individuals finding the mitigation appropriate may consider other forms of transportation (if available or otherwise accessible to that individual and their traveling party). Further analysis is also needed to understand potential actions taken by sober drivers that experience a false positive result.

4.2 What are the pros/cons of an ignition interlock as opposed to a transmission interlock prevention method for internal combustion engine vehicles? Is one superior to the other? Should both be acceptable compliance options if considered for an FMVSS? How would this differ for electric vehicles and what issues specific to electric vehicles should NHTSA consider?

Additional consumer research is needed to understand consumer preferences. However, a transmission interlock (where the vehicle can be started but not physically move) would have the advantage of allowing the impaired driver access to systems such as climate control even if the vehicle could not move. From a safety perspective, this could be critical in extremely cold or extremely hot ambient temperatures. For electric vehicles, if you allow the driver to turn on the power but disable the ability to initiate forward or reverse movement, it will be similar to locking the transmission of the internal combustion engine. In addressing this issue, NHTSA will also need to consider any potential conflicts with the anticipated Automatic Shutoff and Keyless Ignition standard that is the subject of a separate ongoing rulemaking proceeding.[4]

4.3 NHTSA seeks comment on any adverse consequences of an impaired driver being unable to drive his/her vehicle. For example, this could result in an alcohol-impaired person being stranded late at night for hours and susceptible to being a victim of crime or environmental conditions (e.g., weather). Or an alcohol-impaired camper may need to use his/her vehicle to escape from a rapidly approaching wildfire or environmental conditions (weather). How often would such incidences expect to occur (assuming full fleet implementation)? Are there logical strategies for mitigating the negative effects? What if the vehicle owner wishes to drive their vehicle on private land (i.e., not on public roads)?

Understanding adverse consequences requires extensive study to understand the nature and frequency of potential scenarios that a person may encounter.

4.4 Given the previous examples, should there be an override feature for emergencies? Should the maximum speed of the vehicle be limited during override? How could an override feature be preserved for extreme situations and not used routinely when alcohol-impaired?

There is no way for the vehicle to know if it is an emergency in a specific instance or if usage of an override (if specified by NHTSA) is the choice of the driver. Should there be an override with a limited

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[4] https://www.reginfo.gov/public/do/eAgendaViewRule?pubId=202310&RIN=2127-AK88

maximum speed, this override would significantly increase the vehicle availability for any emergency use. However, knowingly allowing an alcohol impaired driver to operate the vehicle introduces significant liability concerns. There are also technical challenges that may need to be addressed in terms of implementing a speed limiter in certain scenarios including the prevention of unintended risks in highway settings. The agency should prescribe exactly how a vehicle is required to operate under such conditions.

4.5 If a system detects alcohol impairment prior to the start of a trip and an interlock is activated, should retest(s) be allowed, at what elapsed time interval(s), and why? NHTSA especially seeks comment on test/data analysis methods for determining an optimal retest interval strategy. Finally, should data be recorded on the vehicle if retesting is permitted?

Any vehicle mitigation will need to make the vehicle available for normal use again at some point. There are several strategies that may be considered. These include retesting after a specified period (e.g., x seconds), collecting more data over an extended period to increase the accuracy of classification, or introducing logic systems (such as seat/door sensor to detect changing driver/exiting and entering the vehicle) to trigger a retest.

5 Vehicle Warnings Once Impairment is Detected

5.1 NHTSA is aware of many vehicle manufacturers using visual/auditory warnings (e.g., a coffee cup icon) and encouraging drivers to take a break from the driving task. There are also visual/auditory/haptic warnings to identify distracted driving or hands off the steering wheel while Level 2 driving automation systems are engaged. NHTSA is interested in any studies to support the effectiveness of these warnings, including designing against defeat strategies. NHTSA also seeks comment and studies on whether similar warnings may be effective for alcohol-impaired or incapacitated drivers or would additional interventions be needed. The system attributes that enhance a system's effectiveness are of particular interest to NHTSA. Are there any unintended consequences from these warnings? If so, what are they?

Based on individual OEM analysis, drivers typically perceive vehicle warnings to a high degree. This is also confirmed in studies of drowsy drivers. However, the choices made subsequently by the driver are to a great extent influenced by the relative efforts required to address the situation. If a warning is contextually relevant for the driver, it will typically be well perceived. Increasing its conspicuousness will have limited influence on subsequent choices made. Drunk drivers receptiveness and the choices they make upon receiving warnings must still be studied.

The Agency should also assess potential impairment prevention requirements against the approach proposed in the seat belt reminder NPRM. Not wearing your seat belt and driving drunk are both leading contributors to roadway fatalities in the U.S. Nonetheless, the Agency is proposing to implement stronger and more persistent seatbelt warnings as opposed to a lockout, which was received with substantial consumer backlash when it was previously implemented in the 1970s. Research has shown that stronger and more persistent seatbelt warnings were similar in effectiveness to a lockout. We encourage NHTSA to conduct research to determine the most effective warning or intervention approach for impaired drivers, including the possibility of escalating warnings as part of an overall intervention strategy. If this research provides similar outcomes for impaired drivers, in particular alcohol impaired drivers, it will provide important context for the consideration of multiple technology solutions for this rulemaking.

5.2 NHTSA's research suggested that indicators of alcohol impairment are often also potential indicators of other conditions, such as drowsiness. Hence, the preventative measures of each condition may need to be addressed differently. For example, distracted drivers can quickly return their attention to the driving task, and drowsy drivers can recover with adequate rest as an intervention, but drunk drivers may need a much longer recovery time as alcohol metabolizes. NHTSA therefore requests research and information on what warning strategy would effectively encourage both drivers that are alcohol-impaired and drivers that have a different impairment to improve their performance in the driving task (e.g., by resting, getting a caffeinated beverage)? Or is there research to support that a warning would only be effective for a distracted driver or a drowsy driver, but may aggravate an alcohol-impaired driver? Are there other adverse consequences from using warnings to address multiple types of impairment? If so, what are they?

Additional research is needed to understand the effectiveness of potential alert-based strategies for addressing impaired driving.

5.3 NHTSA seeks comment on how manufacturers balance multiple alerts in response to different impairment detections. Given the many forms of impairment, if systems are developed that can distinguish effectively between alcohol impairment and other forms, is it practicable to employ a variety of different responses? Will multiple warnings (auditory, visual, or haptic) or other interventions for different forms of impairment only serve to confuse drunk drivers and lessen effectiveness for responses to drunk driving?

Regulations should provide flexibility in how manufacturers prioritize visual, auditory, and other alerts to the driver. There is limited space available in the instrument panel for providing visual alerts. In addition, given the number of potential audible warnings that a consumer may encounter during the course of trip, rigid requirements in this area may conflict with the ability to address other safety concerns in real-time.[5]

In determining the alert type, NHTSA should consider the temporal nature of certain forms of impairment (i.e., persistent, gradual onset, or momentary) and the extent to which a warning may require an immediate response from the driver versus situations where an alert can be reasonably delayed (i.e., the precise timing for a drowsiness alert seems less critical than the timing of a distraction alert). It should also consider other warning requirements found in existing regulation or being proposed in other contexts. For example, there is a very plausible scenario in which there could be three or more warnings at once if a driver is not wearing his or her seatbelt, is distracted, and is drowsy. If NHTSA were to require a warning when either distracted or drowsy driving was detected, the distracted driving warning could be prioritized between the two since a more immediate, momentary response is likely required. In a case which may result in overlapping alerts (e.g., one for distraction, one for drowsiness, and one for failure to use a seat belt), a distraction alert may be reasonable to reengage the driver's attentiveness, including to other reminders (for drowsiness and seatbelt usage).

However, a distraction alert may not be the only alert required in a given moment. For example, there could also be a driving event that occurs while a driver is distracted that triggers an Automatic Emergency Braking (AEB) warning. It would be reasonable to place AEB warning over the distraction warning.

5.4 NHTSA seeks comment on how warnings, especially multiple warnings, may impact drivers with an auditory or sensory processing disability. Would multiple warnings distract some drivers?

[5] https://www.regulations.gov/comment/NHTSA-2023-0032-0048.

Before addressing *this* question, it is important to first consider the usefulness and efficacy of providing multiple alerts, and the extent to which alerts may be provided intermittently or temporarily overridden to support a clearer prioritization of driver warnings. This could potentially be informed by the temporal nature of the conditions precipitating the need for an alert, and the extent to which a warning can help address the type of impairment that was detected.

We recommend additional agency research prior to developing standards in this area. One question the agency may research is the level of drowsiness at which a driver is at risk of falling asleep so that warning should be prioritized over another one, for instance a distraction warning. The agency should work to ensure that any approach it takes is supported by research and allows flexibility for manufacturers in prioritizing how warnings are communicated in the context of the overall in-vehicle cabin design. This includes flexibility in terms of alert modalities (visual, audible, haptic), warning location, audible characteristics, and related symbols or text.

Similarly, manufacturers should not be prohibited from prioritizing the communication of crash avoidance information. For example, if an AEB/CIB/FCW warning is triggered at the same time distraction impairment is detected.

5.5 NHTSA seeks comment on how systems react if the drowsy driver (or other inattentive or impaired driver) does not respond to warnings? What types of warning escalation strategies (timing, perceived urgency, and frequency) are used in industry and are they consistent among manufacturers?

At present there is no standardized approach for drowsy driver warnings and countermeasures often vary by manufacturer. However, mitigation strategies employed by OEMs can range from simple alerts (*when driver drowsiness is inferred based on certain metrics*), to escalating warnings where it is anticipated that drivers are either unaware of, or otherwise disregarding, the alerts that have been provided over time. If the agency seeks to standardize the approach for alerting drivers when drowsiness is detected, including through the use of escalating warnings, the agency should conduct foundational research to further understand potential differences in how consumers are responding to systems in the market today.

6 Vehicle Interventions Once Detected (on-road)

6.1 What types of vehicle interventions are in use today for SAE Level 2 driving automation systems when the system detects the driver is incapacitated? What prevents their use in being coupled with driver impairment or BAC detection technology? What is the feasibility of using these interventions without engaging Level 2 driving automation?

As noted previously, vehicles with Level 2 functionality may limit the reliability of metrics upon which an impairment determination is made. For example, if the vehicle is providing combined speed and lane keeping assist, drivers exhibiting poor response characteristics may not be as easily identified unless operating in manual mode. While we appreciate the agency's question on the potential for Level 2 systems to provide interventions when a vehicle is operated by a driver (without automated support), it is important to note that such L2 systems are designed on the basis that a "fallback ready user" is monitoring and available to resume control of the vehicle. They are not designed to support, or in any way facilitate impaired driving and we strongly oppose misuse of safety systems in this way.

NHTSA should not expand the scope of this regulation to require high levels of automation. The countermeasures for intervention after a trip have commenced are significantly more complex NHTSA must consider the extent to which strategies that may be more appropriate for an incapacitated driver (such as bringing the vehicle to a stop), are suitable for an impairment situation.

6.2 Stopping in the middle of the road could introduce new motor vehicle safety problems, including potential collisions with stopped vehicles and impaired drivers walking in the roadway. What strategies can be used to prevent these risks? How are risks different if the vehicle stops on the shoulder of the road? What preventative measures could be implemented for vehicles approaching the stopped vehicle? What are the risks to occupants involved in those scenarios?

NHTSA should carefully consider the circumstances in which a vehicle may limit a driver's level of access or control of the vehicle based on both the type and level of impairment detected, and whether the impairment was detected before or during a trip.

Given the agency's general concerns with vehicles stopping in the middle of the road for whatever reason, it is important that NHTSA consider potential countermeasure alternatives to help better ensure that the trafficway is not impeded in cases where impairment (that requires active intervention, if such an approach is adopted by the agency) is detected midtrip. The agency should consider and account for the fact that this may require that the vehicle maintain at least some minimal level of functionality so that the impaired driver is, at some level, capable of navigating the roadway environment to reach a location off of the main trafficway, for example. Any required interventions could be accompanied by warnings to inform the driver that impairment has been detected.

If the agency is considering requirements that advanced impaired driving technologies continuously monitor for changes in levels of alcohol impairment that may necessitate active intervention, it is important that the agency state in objective terms how the vehicle must respond, but also specify what countermeasures should be prohibited.

The agency should also consider potential supplemental countermeasures to alert other road users to the presence of a slower moving vehicle, or vehicle that was parked on the side of the roadway. For example, updating FMVSS to make it allowable for a vehicle to trigger the hazard lights in certain situations – at present a driver must initiate this function. This issue is currently the subject of at least one request for interpretation that has been under consideration by the agency since 2020.

6.3 What is the minimum sensor and hardware technology that would be needed to pull over to a slower lane or a shoulder and the cost?

Based on the levels of automation defined in SAE J3016, we anticipate that a vehicle with Level 4 automation (or higher) would be needed to pull over to a slower lane or shoulder. The rationale for this is that for vehicles with Level 3 automation (or below), require a "fallback ready user" is required to be available to respond to a request to intervene in circumstances where the Automated Driving System (ADS) is not capable of performing the Dynamic Driving Task (DDT). In cases where a Level 3 system is not capable of performing the DDT, control would then need to be ceded back to the impaired driver, which defeats the purpose of requiring the vehicle perform this function. While there are multiple sensor configurations that may be capable of supporting Level 4 automation, these types of vehicles are still in the research phase, so it is not possible to provide a reasonable cost estimation at this time – particularly given the unknown software costs involved. However, it is reasonable to assume that the cost associated with providing this proposed level of intervention will be significant.

Given the potential technology and cost limitations, it does not make practical sense for the agency to require this level of functionality as it would essentially be mandating that vehicles be equipped with

Level 4 capabilities. Such a requirement should be considered outside the scope of this regulation and addressed separately from this rulemaking to the extent the agency is seeking to regulate in this area. In addition, we argue that impairment technologies should not be required for ADS-dedicated Level 4 vehicles in the absence of a driver's designated seating position.

7 Other approaches to reduce impaired driving.

7.1 As vehicle technologies continue to develop with potential to reduce impaired driving, what steps or approaches should NHTSA consider now, including potential partnerships with States or other entities?

Auto Innovators supports the DOT National Roadway Safety Strategy (NRSS) that embraces a Safe System approach to roadway safety improvement. It remains critical for NHTSA and state/local governments to maintain targeted measures to prevent drunk driving. Addressing this issue requires changing public sentiment and societal acceptance of impaired driving and should not rely solely on vehicle technologies. Any efforts to address alcohol impaired driving through the use of vehicle technology should not be met with a near-term reduction in federal, state, and local efforts to address alcohol-impaired crashes through enhanced education, laws, and enforcement. Fleet turnover takes time, and it is important that agencies ensure that the appropriate resources are available to foster further reductions in impaired driving fatalities and injuries. The agency can help drive improvements by convening stakeholders to ensure consistency between all entities (especially government entities) on the expected outcomes of collaborative joint efforts.

7.2 Which best practices have States found most effective in reducing impaired driving? Have States found approaches such as sharing information about drunk driving convictions to be helpful in reducing impaired driving?

We encourage NHTSA to work closely with states to highlight awareness of programs the agency has identified as being most impactful in reducing impaired driving, including strategies highlighted in the recently published "countermeasures that work" report.[6]

8 Privacy and Security Considerations

8.1 NHTSA understands that personal privacy considerations are critical to the design of any system that monitors driver behavior or condition. Such considerations are also one component of consumer acceptance of systems described in this notice. NHTSA seeks comment on privacy considerations related to use and potential storage of data by alcohol and impairment detection systems and how best to preserve driver and passenger personal privacy. Are there strategies or requirements (e.g., prohibitions on camera based DMS from recording certain types of imagery) to protect privacy?

It is not possible to comment on the privacy impacts of this rulemaking without definitive information on the scope of the regulation and the measures of impairment used to make an accurate impaired driver assessment. In general, we have concerns if the agency were to develop requirements that might inadvertently restrict the use of certain sensors or limit the ability of consumers to access certain services due to prohibitions within regulation. Similarly, if the agency were to require that certain data be stored or transmitted, this creates potential challenges in managing control and security of the data.

8.2 Given the potential for different privacy impacts associated with different types of systems and information used in those systems, how should NHTSA weigh the different potential privacy impacts?

[6] https://www.nhtsa.gov/book/countermeasures/countermeasures-that-work

For example, how should accuracy be weighed against privacy? Do certain metrics result in less privacy impact than others while providing the same or more accuracy? If so, how?
It is not possible to comment on the privacy impacts of this rulemaking without definitive information on the scope of the regulation and the measures of impairment used to make an accurate impaired driver assessment.

8.3 What performance-based security controls should NHTSA consider including in its potential performance requirements for advanced impaired driving technology? Are there any industry or voluntary standards specific to these technologies that NHTSA should consider? If not, which standards do commenters believe would be most appropriate for these systems to comply with and why?
Cybersecurity should be considered outside of the scope of this regulation and addressed as a standalone policy issue. We have concerns that if the agency is to prescribe specific requirement that this may impact the ability to respond to emerging threats withing the cybersecurity space. It is also unclear how cybersecurity related requirements can be stated in objective, measurable terms within this FMVSS.

8.4 Are there any additional security vulnerabilities that these systems would present that do not already exist in modern vehicles (e.g., passenger vehicles that are equipped with various technologies such as automatic emergency braking, lane keeping support, and others)? If so, what needs to be done to mitigate those potential vulnerabilities?
It is not possible to comment on the potential vulnerabilities that may be introduced as a result of this rulemaking without definitive information on the scope of the regulation and the measures of impairment used to make an impaired driver assessment. These specifications ultimately inform the types of sensors needed and how these may be isolated or hardened when integrated as part of the overall vehicle.

8.5 What suggestions do commenters have regarding how the agency should go about educating the public about security and privacy aspects of advanced impairment and drunk driving detection technology?
It is important to ensure that any security and privacy related requirements are clearly defined with supporting rationale for why these provisions are included. In doing so, the agency provides a baseline upon which supplemental materials can be developed to educate both the public and media on what the rule seeks to address and also dispel any potential myths regarding the capabilities of required technology, and the ways in which privacy and security have been addressed (e.g., explain how systems do not rely on Personally Identifiable Information).

9 Consumer Acceptance

9.1 NHTSA requests comment on legitimate consumer acceptance issues related to advanced drunk and impaired driving technologies and suggestions for how the agency might be able to craft future proposed performance requirements to remedy any consumer acceptance issues.
It is paramount to recognize that impaired driving technologies intend to change intentional human behavior. In parallel to this rulemaking to propose vehicle-based technologies, the Agency should also conduct consumer awareness and education programs to influence public sentiment. Considerations for consumer acceptance should extend beyond the potentially undesirable interactions with system interventions or warnings. Consumers, including those that do not drive impaired, may also be unaccepting of carrying the substantial cost burden to implement these technologies to prevent those that do.

NHTSA should conduct detailed analysis on potential issues that may positively or negatively impact overall levels of consumer acceptance. This includes:

- Evaluating the extent to which consumers understand the overall safety problem.
- Consumer understanding of how driver and impairment systems work (for various forms of impairment).
- Expectations for how systems should perform (accuracy and reliability).
- Perceived effectiveness of active interventions versus warnings.
- The need for a means to address false positives.
- Potential likelihood that a person may seek to disable the system.
- Estimated cost that the consumer is willing to accept for the technology (as a frame of reference for the accompanying regulatory impact analysis)

Although NHTSA has requested comment on legitimate consumer acceptance issues, it may also be necessary to understand why consumers may be opposed to advanced driver impairment systems in the absence of any specific reason. This is important as it may inform potential education strategies or other policies that may be necessary to help avoid circumstances that undermine the effectiveness of this rulemaking. In addition, the agency should also consider potential acceptance issues related to how the regulation might impact perspectives on state laws (including what is permissible).

10 General Questions (Preamble)

10.1 NHTSA seeks comment on any reliability or durability considerations for alcohol impairment detection technology that may impact functionality over its useful life.

Given the lack of data is not possible to comment on reliability or durability. However, it is important that the agency considers these factors when setting performance requirements, particularly in cases where meeting the requirements will likely rely on sensors not yet in the marketplace. If NHTSA is to develop a standard based on technology that is likely to require replacement over the reasonable life cycle of a vehicle, this presents potential practicability concerns given the possibility for long term compliance challenges if vehicles were to no longer meet the requirements of FMVSS over time. Additionally, NHTSA should contemplate the need for routine maintenance and/or recalibration, especially for complex BAC or BrAC sensors. We urge NHTSA to include further discussion on this matter when issuing an NPRM or supplemental ANPRM.

10.2 NHTSA requests any information regarding the final installed costs, including maintenance costs, of impairment detection systems.

It is not possible to make an accurate assessment of the installation and maintenance costs of impairment detection systems in the absence of a clear proposal from the agency. That being said, there are a number of critical elements that NHTSA must consider in the development of a Preliminary Regulatory Impact Analysis.

First, the rulemaking scope must be clearly defined to include the measures of impairment that will be subject to this rulemaking notice. This should be done with consideration for the types of sensors that will be needed to acquire such measurements on the vehicle. As noted above, these costs could increase exponentially with each new criteria added for making an impairment determination. For example, measuring contact BAC will require a totally different sensor to the one used for tracking eye position/movement. Similarly, if external sensors are required (to track lane position), this will further add to the cost of implementation. In each case it is critical that the agency carefully consider the extent to which the addition of each new sensor meaningfully contributes to a more accurate impairment detection, or whether the addition of these new data points simply add cost with minimal benefit.

Given the significant number of alcohol-involved crashes and fatalities on US roadways, we anticipate that the agency's cost-benefit analysis will be highly unbalanced when compared to other recent rulemakings where the potential safety benefits were more limited in terms of the overall number of lives saved. However, the likely costs that can be afforded from a consumer acceptance standpoint may be more limited – particularly if it results in an excessive increase in the cost of a new vehicle. It is therefore important, for the reasons stated above, that the agency be prudent in its approach and ensure that any requirements are written efficiently, despite the potential justifiability of higher-cost requirements based on the Motor Vehicle Safety Act. As automakers strive to provide consumers with high levels of safety performance while maintaining affordability, we are concerned that the agency will not adopt the same philosophy. In the case of driver support systems for impairment, there is likely not a one-size-fits-all solution, so we encourage the agency to consider providing a range of compliance options supported by objective test procedures for each impairment type, where practicable.

10.3 Should NHTSA propose a standardized telltale or indicator (or set of telltales) indicating that impairment has been detected (and/or that vehicle systems have been limited in response)? Are there standardized industry telltales or indicators already developed for this sort of system that NHTSA should consider?

If the agency seeks to define telltales or indicators, we encourage outreach to SAE International to identify any ongoing activities in this area, and at a minimum benchmark current industry practices for communicating alerts to drivers. Any rule should also provide flexibility for manufacturers in defining corresponding alert sounds for each impairment type.

10.4 NHTSA broadly seeks comment on how to best ensure that manufacturers have the flexibility to develop more effective impairment detection technology while preserving a minimum level of accuracy and reliability.

As a general matter, regulation should not unduly limit future innovation. It is therefore important that the rule is developed so that it is technology neutral, and structured in a way that manufacturers can either integrate new or updated sensor technologies, enhance detection algorithms, or integrate additional redundancies as they deem necessary. The rulemaking should include clearly defined test procedures that enable the objective, repeatable, reproducible measurement of impairment, for each of the impairment types covered by the regulation.

It is also fundamental that the regulation include details on the expected levels of accuracy and reliability that must be achievable by systems in classifying covered impairments. As previously noted, an acceptable level of accuracy and reliability may vary depending upon the type of intervention required in response to the type of impairment being detected. For advanced driver impairment systems that limit the ability of the driver to operate the vehicle (i.e., interlock, reduced functionality) will likely require a much higher level of accuracy and reliability due to the potential issues raised when false positives occur. Alternatively, for systems that provide a warning, the acceptable level of accuracy and reliability may be lower as the driver may only be subjected to a momentary alert. That being said, persistent false positives will erode consumer trust and acceptance in the system regardless of whether it is a "warning only" system or not. The rule must therefore be robust, yet practicable enough that it will not result in a erosion of trust in new technology because performance criteria have not been set at a reasonable level. The rule should also include consideration for the frequency and potential escalation of alerts to avoid driver's becoming desensitized to alerts or seeking to disable the system.

10.5 Should NHTSA consider establishing a requirement that allows a vehicle's BAC detection threshold to be adjusted downward based on the BAC thresholds of local jurisdictions or fleet owners? Note, this technology would not be intended or designed to replace a State's enforcement of its own statutes.
We strongly recommend NHTSA set one level to avoid potential confusion and conflation with state laws. As noted in the main body of our comments, manufacturers should not be responsible for administering state laws. Similarly, including requirement that vehicles be capable of adjusting the BAC threshold based on local jurisdictions inappropriately expands the scope of and complexity of the regulation and raises a number of policy questions related to the use of geolocation data in FMVSS.

10.6 Earlier in this document, NHTSA noted that progress in reducing drunk driving resulting from many behavioral safety campaigns has plateaued. Should NHTSA devote more of its behavioral safety resources towards those programs and efforts that address underlying contributors to alcohol use disorder, including drunk driving, like mental health conditions? Are there effective behavioral safety campaigns or tactics NHTSA is not using?
Auto Innovators supports NHTSA efforts to address impaired driving through a safe system approach, and we recommend that the agency devote more of its behavioral safety resources to address alcohol impairment and the underlying contributors. While the ANPRM indicates that safety campaigns have plateaued to a certain extent in recent years, it is important that the agency also consider the extent to which other factors may have contributed to limited reductions in drunk driving related fatalities during that period. These include changes in levels of enforcement, notably due to the reported effectiveness of high visibility enforcement campaigns. We encourage NHTSA to continue and amplify its work with state partners to ensure countermeasures that have been demonstrated to work continue and are being successfully implemented.