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The Honorable James Owens
Deputy Administrator
National Highway Traffic Safety Administration
1200 New Jersey Avenue, SE
Washington, DC 20590

Request for Comments on Agency Information Collection Activities; Submission to the Office of Management and Budget for Review and Approval: Driver Interactions With Advanced Driver Assistance Technologies, Docket No. NHTSA–2019–0037

Dear Deputy Administrator Owens:

The Insurance Institute for Highway Safety (IIHS) welcomes the opportunity to respond to the National Highway Traffic Safety Administration's (NHTSA's) request for comments on the agency's plan to collect information to further its understanding of driver interaction with advanced driver assistance systems (ADAS). IIHS supports the effort described in the notice, as there are many unanswered questions regarding driver assistance technologies, particularly Level 2 (L2) automation. The research design will yield insight about how drivers react to system alerts, how often drivers use the technologies, how behavior (eye glance, secondary task engagement) differs during segments driven with and without assistance, and how prior experience with the technologies influences system use.

An important feature of NHTSA's proposed method is to collect data associated with drives on public roads using model year 2018–2019 production vehicles equipped with commercially available driver assistance technologies. There currently are few studies of driver behavior associated with the use of driver assistance technologies in real-world settings, despite their growing availability to consumers over the past 5-plus years. IIHS believes the proposed effort by NHTSA is necessary for answering safety-critical questions about emerging technologies that are fundamentally changing the driver-vehicle relationship, and although IIHS is very supportive of the effort, the Institute believes that NHTSA should avail itself the opportunity to improve the quality and utility of the information collection by following our three suggestions, as follows.

Include multiple drives for participants. Technology use is largely influenced by trust in a system, and the notion of trust in driver assistance technology is at its core a developmental process. A forthcoming IIHS report based on field operational test data found that drivers inexperienced with ADAS who participated in a 4-week trial had increased odds of driver disengagement when using L2 driving automation compared with manual driving, but this disengagement from driving was only apparent in the final 2 weeks of the study (Reagan et al., 2020b). NHTSA's plan to recruit subsamples of drivers who own the same models proposed for use in the study and those who have never driven with driver assistance technologies is an appealing method to gain insight about the association between technology use and experience, but Reagan et al. indicates that a large change in behavior occurs in a relatively short period of time after initial system interaction. If NHTSA maintains the current method, then generalizations will be limited to experienced owners and drivers who are completely naïve to ADAS. The behavior pattern of such naïve drivers is likely to reflect a lack of trust (e.g., unwillingness to look away from the road or engage in secondary behaviors). The time course required for wariness about automation to dissipate may be relatively quick, particularly when an initial experience with the ADAS is perceived to be positive. Including a second and/or third trial for participants will allow a truer understanding of how differences in experience affect the behavior associated with system use. This suggestion would also help control for behavior motivated by the Hawthorne Effect or social desirability.

Capture participants' verbal reports of uncomfortable experiences with driver assistance in real time. It is unclear whether or not this technique is included in the data collection methods, but NHTSA should take the opportunity during data collection to have participants describe in real time any untoward experiences regarding the use of the ADAS during the experimental drives. The data-logging equipment could include an event-marking button that participants could press when they experience something uncomfortable associated with the ADAS. This would flag the data stream, and then coders could determine what system-related or environmental factors were associated with the event. Using this technique requires no extra time commitment by participants, and it provides a unique way to combine subjective driver experience with objective data. IIHS added this technique to a field operational test assessing driver experience with L2 technology and found it to be a rich supplemental source of data (Reagan et al., 2020a).

Use De Ward et al.'s "hands off wheel" coding scheme. The request for comments indicates that the data collection effort will include measurement of driver hand position to understand usability of ADAS interfaces and secondary task engagement. IIHS believes that NHTSA has an opportunity to improve the quality and utility of this data collection effort by planning an analysis of hands-on-wheel behavior when driving with and without the ADAS, particularly L2 automation. Reagan et al (2020b) identified a large increase in hands-off-wheel behavior associated with a "hands-on-wheel" L2 system. De Waard et al. (2010) developed a coding scheme that classifies hand position in terms of degree of manual control (no control, low control, medium control, high control) based on number and location of hands on the steering wheel, and this approach was extended by Morando et al. (2020), yielding rich information about the degree of manual control during use of L2 systems. Hands-off-wheel behavior is of particular interest when studying L2 systems designed with a hands-on-wheel requirement. Hand positioning has received little to no attention, but there are clear implications associated with resuming manual control when an L2 system reaches its limits. Serious concerns exist about how well drivers can stay in the vehicle control loop when lateral support is automated (Carsten et al., 2012), and records from real-world crashes involving hands-on L2 systems that indicate drivers did not have their hands on the wheel leading up to or at the time of the crash (NTSB 2017, 2019, & 2020) further underscore the need for more in-depth treatment of hands-off-wheel behavior.

In closing, IIHS supports the research proposed in this request for comments and acknowledges that it is a substantial endeavor. Given the need to understand behavioral phenomenon related to the use of driver assistance systems in the real-world, IIHS encourages NHTSA to take the opportunity to include our three suggestions into its collection procedures, to maximize the quality and utility of the proposed research.

Sincerely,

Ian Reagan, Ph.D.
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