June 5, 2023

Ms. Ann Carlson
Chief Counsel
National Highway Traffic Safety Administration
1200 New Jersey Avenue, S.E.
Washington, D.C. 20590

RE: Request for Comments; CISS Expansion

Dear Ms. Carlson,

The Alliance for Automotive Innovation ("Auto Innovators") appreciates the opportunity to provide comments in response to April 6, 2023, Federal Register Notice and Request for Comment on the agency's planned efforts to upgrade the Crash Investigation Sampling System (CISS) by adding data collection sites, expanding the scope of crashes investigated and using on-scene investigation protocols.[1,2]

Auto Innovators members have made significant investments in advancing the safety performance of vehicles. This includes the development of advanced restraint systems and vehicle structural improvements to further enhance occupant protection in the event of a crash, as well as innovative crash avoidance technologies that can help prevent or reduce the impact severity in certain precrash scenarios.

Robust data is essential for informing these continued innovations as it can help provide insights on how well countermeasures are performing in the real-world, and where residual safety challenges still exist. Similarly, data is critical for informing government policy decisions, as standards, regulation, and guidance can have a significant impact on vehicle design. We are therefore supportive of the agency's efforts to further enhance the CISS data collection efforts as this will help in achieving our shared goal of reducing roadway injuries and fatalities in the United States.

We also urge the agency to move expeditiously to implement changes to maximize the availability of current funding levels and to demonstrate the continued utility of expanded data collection efforts to justify further investment in the agency's data analysis capabilities.

In general, we are supportive of the stated objectives of the proposed expansion:

[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] 88 FR 20207

- **Increased Data Collection Sites:** The increase in data collection sites is important for increasing the number of crashes investigated, allowing for both increased confidence in the statistical analysis of the crash population as well as increasing the potential sample size for in-depth case analysis.
- **Expanded Scope of Crashes Investigated:** Expanding the scope of the crashes investigated as part of the CISS program will provide the opportunity for greater insights into crashes not typically captured within the CISS data, but nonetheless appear in other NHTSA databases such as the Fatality Analysis Reporting System (FARS) or Crash Report Sampling Systems (CRSS) albeit with less detail.
- **Utilization of Rapid Response Protocols:** Initiating crash investigations sooner can help address issues related to the degradation of on-scene or related post-crash evidence. Efforts to improve response times in terms of crash identification will only serve to improve the quality of data collected.

Auto Innovators Recommendations

As noted in the RFC, NHTSA has requested stakeholders provide "comment on the types of crashes to include in CISS, propose new data elements for new crash types, make suggestions on the improving timeliness of investigation protocols or notification and identification of crashes, and make any other suggestions they feel NHTSA should consider in an attempt to improve crash data collection." The following sections outline Auto Innovators recommendations on each of these areas.

1. *Considerations for the types of crashes to include in CISS.*

Auto Innovators is supportive of NHTSA expanding the scope and types of crashes that are captured as part of the CISS program. Currently the criteria for inclusion in the CISS sample is limited to certain "*police-reported motor vehicle crashes on a trafficway involving passenger vehicles towed from the scene*."[3] While this is important for maintaining the robustness and representativeness of the sample and ensuring that individual crashes can be weighted to project the number of similar crashes on US roadways more accurately, the criteria means that the dataset does not include robust information on other impact types that fall outside the scope of data collection – which are typically captured in other NHTSA datasets.

We support efforts to provide flexibility within the CISS program to collect more real-world data – both cases and data elements – to identify and understand potential emerging safety questions. These include, but are not limited to:

- Pedestrian and bicyclist impacts (including not in traffic collisions).
- L2+ ADS equipped vehicles.
- Electric Vehicles.
- Motor vehicle crashes involving powered two-wheelers (inc. motorcycles and micromobility).

[3] Crash Investigation Sampling System 2021 Analytical User's Manual, DOT HS 813 398, December 2022

These emerging issues highlight the need for both an expansion of cases and an improvement of data quality. However, expanded data collection efforts should prioritize more meaningful data, as opposed to simply ramping up the number of cases. In other words, more case detail is preferred over any sizable increase in statistical strength of the sample. Although more cases can lead to improvements in the representativeness of the overall sample, additional data, and the ability to conduct more in-depth individual case analysis also provides significant insights into more specific countermeasure development. Recommendations for suggested new data elements are provided below.

To ensure both meaningful and representative data, NHTSA may need to be more targeted in addressing gaps in the data that currently prevent certain safety related issues from being explored in more detail. For example, expanded sample sizes could be used to target important segments related to electric vehicle (EV) or pedestrian safety. The agency may consider using data from the Fatality Reporting Analysis Reporting System (FARS) or Crash Report Sampling System (CRSS) to identify these priority areas.

As a general matter, it is important to ensure that case weights are meaningful. Every year there are cases with excessively large weights (e.g., 20,000+) that have the potential to skew analysis results. Research using CISS data inconsistently addresses this issue, leading to confusion and in some cases incorrect conclusions. We are hopeful that the collection of additional cases will help "level out" some of these higher weighted incidents.

To expand upon the pedestrian example above, there is currently no publicly available data with CISS-level detail on vulnerable road user (VRU) crashes. Understanding the prevalence of such cases (including pre-crash scenarios), specific injury outcomes and involved physical components (IPC) is critical to developing countermeasures (including ADAS and infrastructure changes). If CISS is expanded to include VRU cases, a methodology needs to be developed to reflect the representativeness of cases. This should consider methods for measuring exposure for VRUs.

NHTSA could also consider expanding the scope of crashes investigated to include real-world data for certain *injury only* crashes (perhaps above a certain AIS threshold) that do not involve a vehicle tow away or airbag deployment. This may provide additional insights for understanding emerging safety issues identified in other datasets. While this may result in certain cases again being excluded from the sample, the insights from the investigation can be nonetheless helpful, and could be viewed as an extension of NHTSA special crash investigations.

2. *Recommendations for new data elements*

In addition to expanding the scope of crash modes to be investigated as part of the CISS program, it is also important that the data collected for these incidents supports in-depth analysis to help better understand the pre-crash conditions, impact characteristics, and post-crash injury outcomes. As a result, we suggested additional data elements or, where necessary, new data sets to capture data on the following. Please note these elements have been categorized using generalized heading and this is not intended to capture how best the information would be captured within the actual CISS dataset structure.

- ***Vehicle***
  - [Related to pedestrian protection] Information regarding vehicle profile beyond vehicle type, model year, etc. This could include information such as bonnet leading edge height, bumper height, etc.
  - Collect data on occupants of other vehicles (vehicles which are not towed) regarding age, height, weight, BMI, injury severity (at least MAIS level). This could provide insights for addressing questions regarding compatibility and injury outcomes.
  - Enhanced classification of impact type based on the impact direction and engagement with underlying vehicle structures.[4]
  - Delta-v information is not coded in all cases. We recommend leveraging increased availability of EDR records across the US fleet to shift away from well-documented shortcomings of the WinSMASH algorithm for estimating delta-V, toward a more accurate assessment of EDR-based crash dynamics. In addition, documenting velocities for each impact event (initial velocity, collision velocity, Δv, relative velocity) would provide useful information for understanding more detailed crash characteristics.
  - To support more in-depth analysis of vehicle damage, more detailed information on measured intrusions is needed.
- ***ADAS***
  - The presence and degree of intervention provided by available ADAS (including information on whether systems were turned on/off at the time of collision). To the extent possible, any complementary information should also be included in the EDR file where available.
- ***Restraint Systems***
  - Belt reminder system characteristics.
- ***Driver/Person Information***
  - Functional Capacity Index Scoring (FCI) additionally to AIS coding (*AIS2015 code incl. localizer*).
  - Specific Driver Distraction Coding (*to the extent this can be reliably coded*)
  - Mapping of each single injury to an event of the crash to support understanding of occupant kinematics (*e.g., for an occupant with eight injuries, it could be determined that injuries No. 1-3 were induced by 1st contact event, injuries No. 4-7 happened at the 2nd "most severe" contact event, injury no 8 happened at event No. 3*). This would support an assessment of the event(s) with the highest injury severity for each participant.
  - Additional driver demographics information inc. general information on driver history. This does not need to include Personally Identifiable Information, but could include general information about whether previous citations had been issued, crash history, years of driving experience (based on number of years since license issued), etc.

[4] An example of a potential impact classification scheme is provided in the research paper by M. Brumbelow, Front Crash Injury Risks for Restrained Drivers in Good-rated Vehicles by Age, Impact Configuration, and EDR-based Delta V, IRCOBI 2019 (e.g., full frontal, moderate offset, small overlap, center impact, oblique corner, oblique center, perpendicular, underride, override, no under-/override)

- ***Event***
  - We recommend capturing additional event information, including coding of Critical Event, Critical Reason for the Critical Event, and Associated Factors so that results from NMVCSS (often quoted) can be updated.
- ***Pedestrian***
  - Expanded information on roadway characteristics to complement scene diagram information. This could include coded location information (*e.g., junction, roundabout, straight lane, access path, etc.*) and related characteristics (*e.g., no special location, bus stop, crosswalk, traffic light, distance from intersection, etc.*)
  - Consistent classification of pedestrian impact scenarios (*e.g., similar to those defined in the draft NHTSA PAEB system confirmation test*). More specifically, this could include details on vehicle moving direction (e.g., forward reverse) versus the pedestrian's movements relative to the vehicle (e.g., standing, walking in same direction, from left, from right, etc.)
  - Demographic information regarding involved/injured pedestrian (*e.g., age, height, weight, BMI, sex, injury severity, high-level clothing characteristics (light/dark)*).
  - Additional information on the pedestrian's interactions with objects that could impact their movements or shape profile should also be considered for collection (e.g., skateboard, skates, walking aids, shopping cart, etc.)
  - Pedestrian impact information -- similar to mapping injury contact points for vehicle occupants, mapping of contact points for pedestrian impacts would provide additional information on factors contributing to injury outcomes (*with x, y, z bonnet/windshield estimated coordinates [where available]*), pedestrian moving direction (forward, rearwards, standing), posture of pedestrian (*walking, standing, lying*), kinematics (*forward projection, roll over bonnet*), velocity, collision velocity, acceleration.
- ***Motorcyclists***
  - To support analysis of motorcycle-involved crashes, it would be helpful to understand more information to help identify potential countermeasures. This could include data on motorcycle ABS equipment, helmet usage of rider or users, additional rider/driver characteristics e.g., weight, height (no personal information). We also suggest more investigation with respect to reconstructed vehicle speed for each involved vehicle (or at least calculation of delta-V for crashes with trucks, parking vehicles and two-wheelers.
- ***L2+ ADS***
  - Status of L2+ ADS.
  - Driver monitoring system status.
- ***Enhanced scene information***
  - Crash scene diagrams could be further enhanced by including additional trajectory information (at least 5 sec before crash). A dataset that contains coded information that could be used as a basis for simulation would also be helpful. This could incorporate a similar format to those used in widely available simulation tools. More detailed infrastructure information would also support potential interagency studies with FHWA and others to evaluate the role of infrastructure design and approaches to minimize potential traffic conflicts as part of a Safe System approach.

3. *Improvements in the timeliness of investigation protocols or notification and identification of crashes*

In addition to the timeliness of investigations, it would be helpful if the agency could accelerate the timing of the CISS data release once the collection efforts have been completed for a given year. For CISS to be meaningful and provide more up-to-date information on evolving injury trends, the lag between crashes and data release should be reduced. Early crashes on current model year vehicles don't appear in CISS data until two years or more following those events.

4. *Additional Recommendations*

Auto Innovators also recommends the following general process improvements for the agency's consideration:

- For manuals and documentation, provide a more detailed description of changes in variables for each year.
- Additional information on linking data sets should be made available as this is not always a straightforward process. NHTSA should also consider the extent to which data sets could be consolidated to improve ease of use in analyzing the data.
- Finally, to improve usability of the data sets, CISS tables should include decoded data elements (or a means to readily decode data elements), as has been done with CRSS and FARS data in recent years. Historically, data elements undergo regular coding updates. This can lead to errors that could be avoided if decoded data elements were also provided. It would therefore be helpful to have a *table* of all variables with their labels in a readable format.