

Submitted by the expert from OICA

Informal document GRVA-19-37/Rev.1
19th GRVA, 25 June 2024
(For review during the
Troy meeting 20-24 May 2024)
Agenda item 4

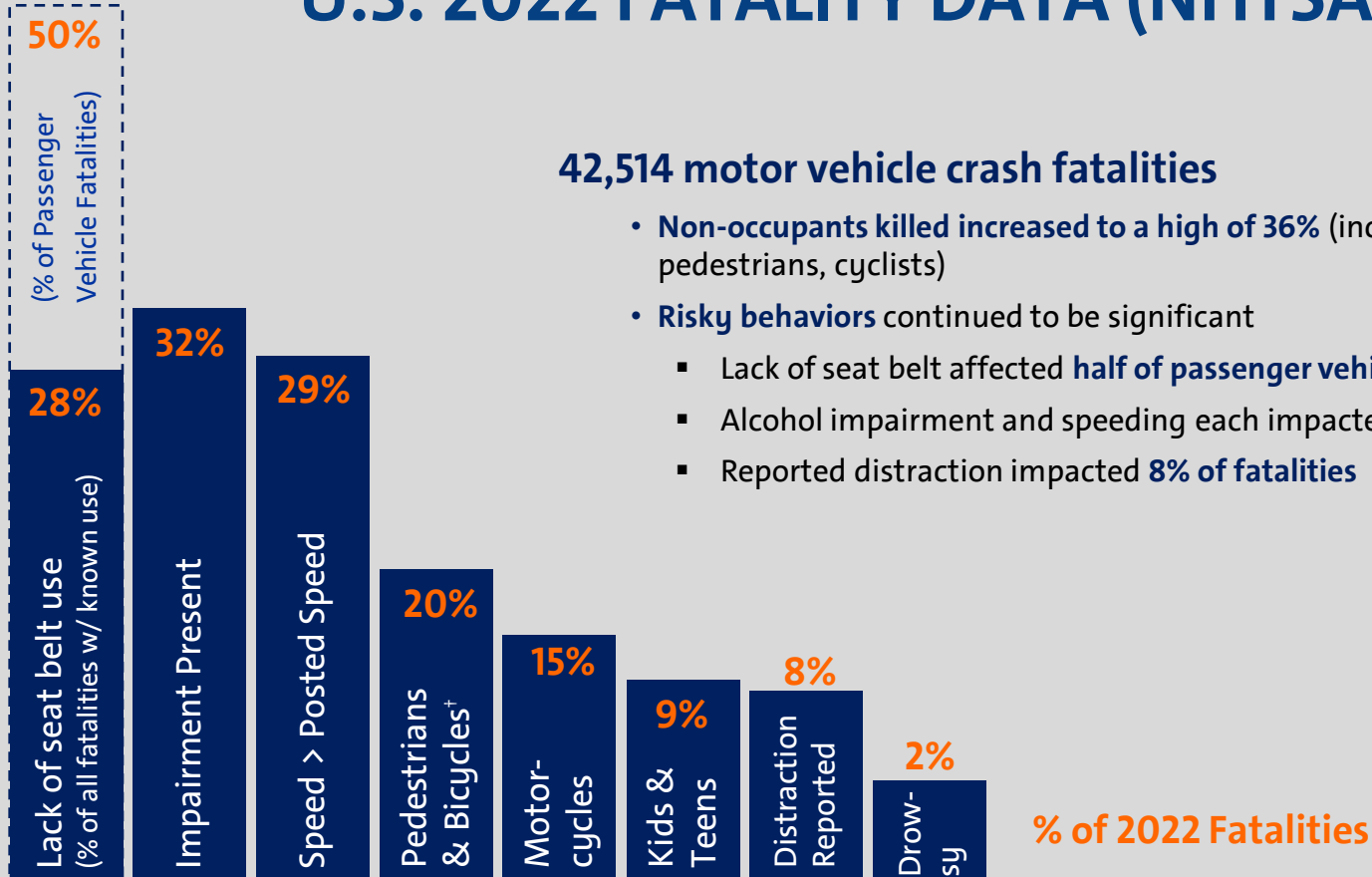
Some OEM Perspectives on Vehicle Regs



John Capp

**Director - Global Vehicle Safety Technology, Strategy & Regulations
General Motors**

U.S. 2022 FATALITY DATA (NHTSA FARS)

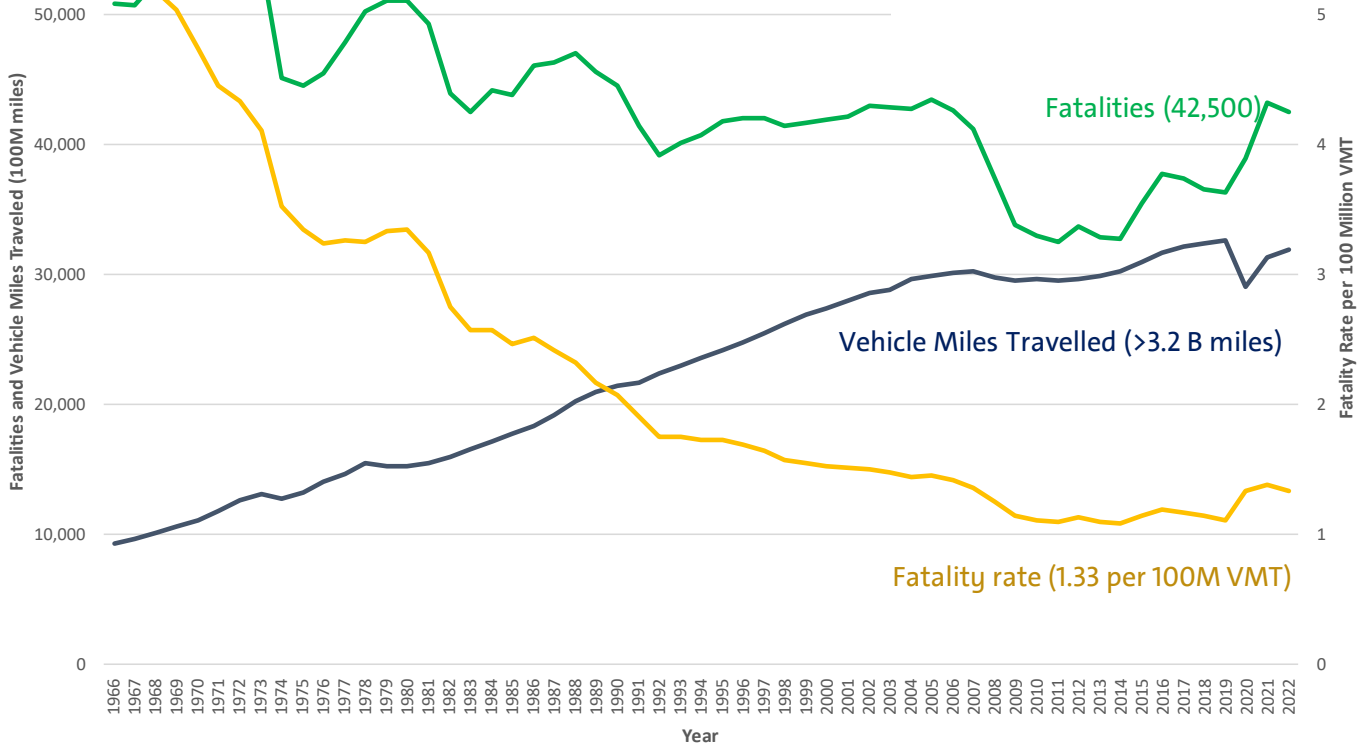


42,514 motor vehicle crash fatalities

- **Non-occupants killed increased to a high of 36%** (including motorcyclists, pedestrians, cyclists)
- **Risky behaviors** continued to be significant
 - Lack of seat belt affected **half of passenger vehicle fatalities**
 - Alcohol impairment and speeding each impacted **30% of fatalities**
 - Reported distraction impacted **8% of fatalities**

U.S. FATALITIES AND MILES TRAVELLED

(FROM NHTSA FARS DATA)



Harmonization → Safety



- Harmonization of standards can enable emerging safety technologies more quickly.....whereas unique standards can also slow progress, even if they derive from good intentions and sound rationale.
- Our goal must be working together to create technology-neutral standards that will help keep people safe.....while enabling newer and better technologies to emerge.
- AV technology “ups the ante” - congestion, productivity, independence for disabled, environmental, and safety.
- Specific comments on:
 - ADS GTR and UN R
 - DSSAD Data Elements
 - **ADAS/DCAS Hands-Off Driving**

ADS: GTR and UN R Considerations





ADS: GTR and UN R Considerations

- Encouraged by UNECE decision to work in parallel on both UN Regulation (UN R) and Global Technical Regulation (GTR) with a 2026 goal.
- Impressive accomplishment of guidelines delivered by FRAV-VMAD to serve as basis for the ADS GTR and UN Regulation.
- A common Global Regulatory Framework can enable successful development, testing, and deployment of ADS equipped vehicles from different manufacturers and jurisdictions worldwide.
- Important to avoid design restrictions – Tech and design neutrality enables creativity and flexibility necessary to advance evolving technologies. (It's still very early!)

DSSAD* Data Elements Regulatory Considerations

- Focus on the inclusion of minimal and essential data elements that are key to understanding the safety performance system.....
- Avoid temptation to include an extensive (potentially burdensome) list of “what-if” data collection (that may be more suited for research, versus regulatory, purposes).





ADAS/DCAS* Hands-Off Regulatory Considerations

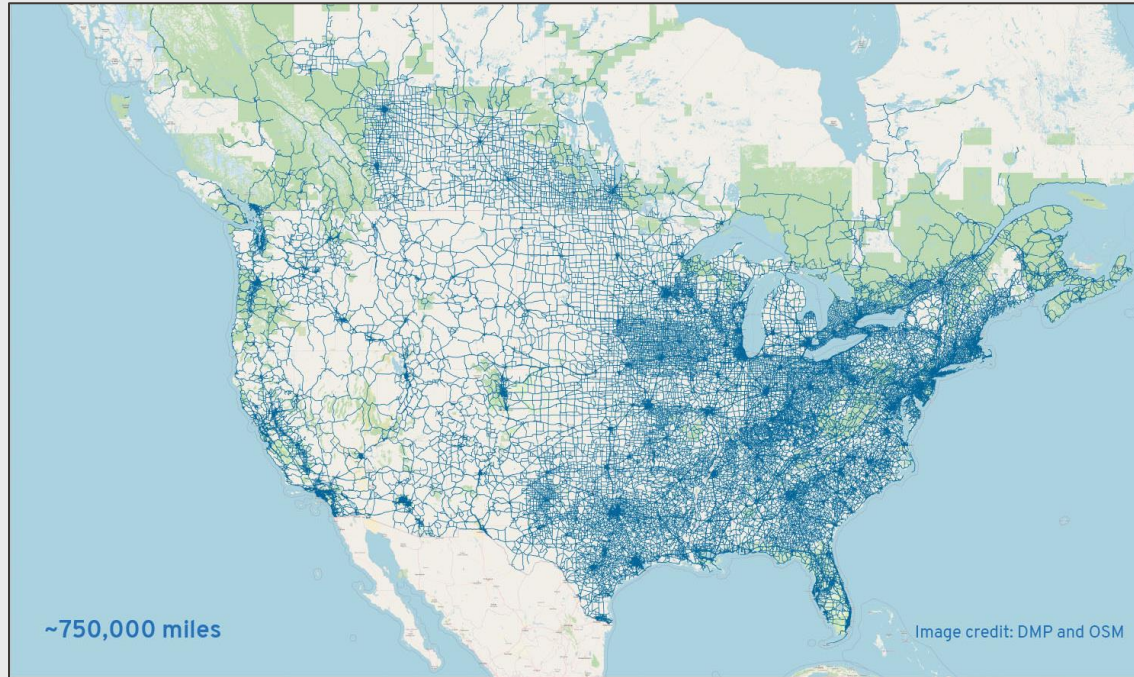
- **GM commends the efforts of UNECE for implementing the DCAS regulation**
 - **Endorsed by WP29 in March 2024; set to enter into force in September 2024.**
 - **Demonstrates a strong commitment to enhancing road safety while supporting deployment of advanced driver assistance systems.**
- **Ongoing advancements in Series 1 to support hands-off and system-initiated maneuvers:**
 - **Focuses on safety through use of Driver Monitoring System.**
 - **GM studies on HMI and Field Performance can help support.**

Super Cruise Hands-Free Driving



GM first launched Super Cruise in 2017 as the industry's first hands-free driver assistance technology. Now, more than 200 million miles hands-free and eyes-on...

Super Cruise Hands-Free Driving



Super Cruise compatible roads continues to grow in U.S./Canada. Currently ~450K miles expanding to ~750K over the next year ...

Super Cruise Hands-Free Driving



**Driver attention
management is key to
safety...**

GM Published Super Cruise Related Studies



1. Llaneras, R., Glaser, D., and Glaser, Y. “Do Drivers Pay Attention during Highway-Based Automated Lane Change while Operating under Hands-Free Partially Automated Driving?” SAE Technical Paper 2024-01-2396, 2024, doi: 10.4271/2024-01-2396.
2. Glaser, Y., Kiefer, R., Glaser, D., Landry, S. et al., “Approaches for Developing and Evaluating Emerging Partial Driving Automation System HMIs,” SAE Technical Paper 2024-01-2055, 2024, doi:10.4271/2024-01-2055.
3. LeBlanc, D., Leslie, A., Bogard, S., Peterson, C. et al., “Field Study of the Level 2 Super Cruise Using Telematics Data,” Proceedings of the 27th International Technical Conference on the Enhanced Safety of Vehicles, Paper Number #23-034, 2023.
4. LeBlanc, D., Kiefer, R., Flannagan, C., Leslie, A. et al., “Large-Scale Telematics-Based L2 Super Cruise Field Evaluation,” Presented at SAE International 2022 Government/Industry Meeting, Jan. 2022.
5. Leslie, A. J., Kiefer, R. J., Flannagan, C. A., Owen, S. H., & Schoettle, B.A. (2022). Analysis of Field Effects Associated with the GM Super Cruise System. University of Michigan Transportation Research Institute. UMTRI-2022-3.
6. Llaneras, R. E., Cannon, B. R., and Green, C. A., “Strategies to Assist Drivers in Remaining Attentive While Under Partially Automated Driving: Verification of Human-Machine Interface Concepts,” Transportation Research Record, 2663(1), 20-26, 2017, doi: org/10.3141/2663-03.

WCX April 16-18
2024



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Detroit, Michigan, USA



Approaches for developing and evaluating emerging partial driving automation system HMIs

Yi Glaser, Ray Kiefer, Dan Glaser, Steven Landry, Susan Owen, *General Motors*

Eddy Llaneras, *Virginia Tech Transportation Institute*

Dave LeBlanc, Andrew Leslie, Carol Flannagan, *University of Michigan Transportation Research Institute*



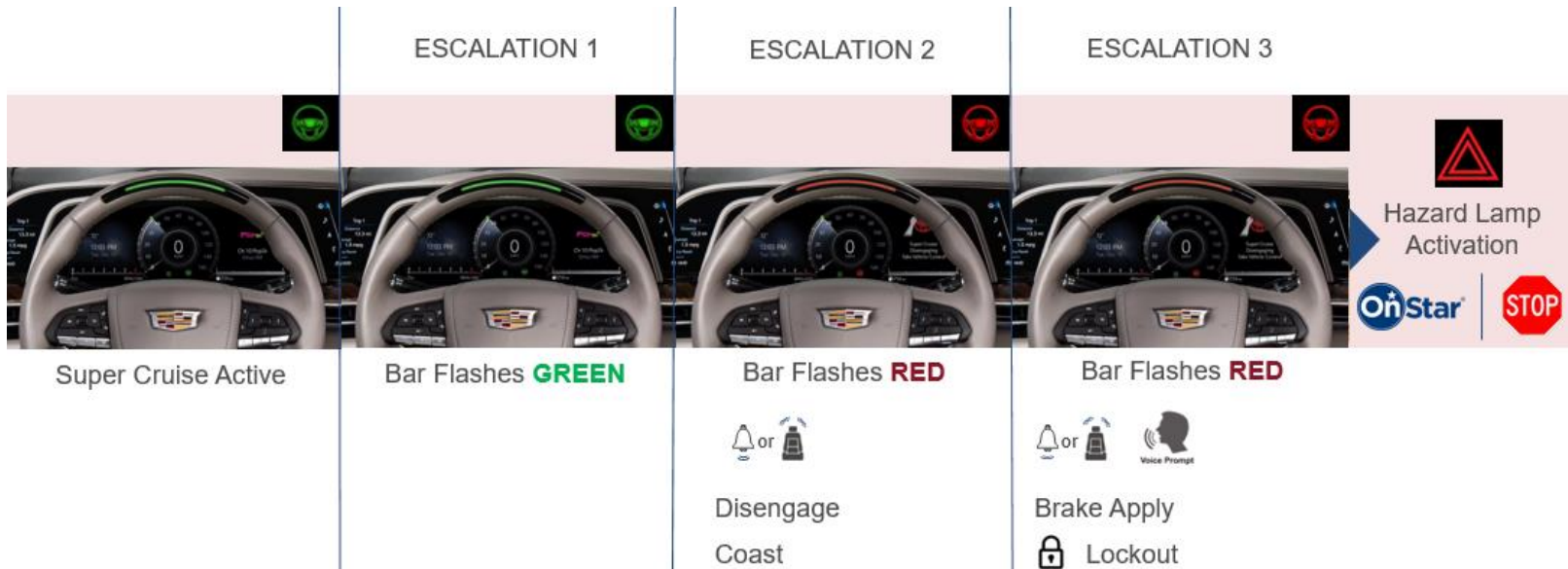
Countermeasures to Address Unintended Consequences



Principles of driver state notifications and escalation:

- Easily perceivable and readily understood
- Visual alerts orient driver attention to road ahead

Super Cruise Example



Examining Field Effects of Super Cruise Level 2 System Safety and Usage

Police report-based crash data approach (Leslie et al., 2022)

Data from 12 US state databases:

- Examined impact of Super Cruise on lane departure and rear-end striking crashes using binomial exact tests and quasi-induced exposure logistic regression.
- Results across tests indicated **no evidence of a difference in system relevant crash risk** for Super Cruise-equipped vehicles compared to matched highly-ADAS equipped vehicle without Super Cruise

Large-scale telematics-based approach (LeBlanc, et al., 2022, 2023)

GM's OnStar system - 24 million miles of telematics data gathered with Super Cruise vehicles:

- Observed Super Cruise engagements on 72% of equipped vehicles and 18% of the driving distance on system-compatible roadways
- Found drivers tended to engage Super Cruise more often when there is less surrounding (free flow) traffic
- Showed drivers experienced frequent transitions in and out of Super Cruise engagement
- 91% of initial driver-attention related alerts were resolved without further escalation
- **Observed no Advanced Automatic Crash Notification events** on Super Cruise compatible roads



Analysis of the Field Effectiveness of General Motors Model Year 2017-2021 Advanced Driver Assistance System Features

Leslie, Andrew J.; Kiefer, Raymond J.; Flannagan, Carol A.; Owen, Susan H.; Schoettle, Brandon A. [\[less\]](#)
2023-01

View/Open

[UMTRI-2023-1.pdf](#)



(2.4MB PDF)

technical report

Publisher

UMTRI

Abstract

Over 11.2 million Model Year 2017–2021 vehicles were matched to police-reported crashes from 14 states to examine the effectiveness of GM ADAS features. The quasi-induced exposure method was used, with logistic regression used to adjust for 13 covariates. R... [\[more\]](#)

Description

Technical Report

Other Identifiers

UMTRI-2023-1



ON THE ROAD TO **ZERO** CRASHES

GM ADVANCED DRIVER ASSISTANCE SYSTEMS (ADAS) FIELD EFFECTIVENESS RESULTS



POLICE-REPORT ANALYSIS OF REDUCTIONS IN SYSTEM-RELEVANT CRASHES

Over 13.2 Million GM Model Year 2018-2022 Vehicles, 15 States, and 654,129 Matched Crash Cases

FRONT PEDESTRIAN CRASHES

31% FRONT PEDESTRIAN BRAKING

REAR-END STRIKING CRASHES

41% AUTOMATIC EMERGENCY BRAKING
(51% Inj.) with FORWARD COLLISION ALERT (all systems)

49% AUTOMATIC EMERGENCY BRAKING
(52% Inj.) with FORWARD COLLISION ALERT (fusion/radar systems)

40% AUTOMATIC EMERGENCY BRAKING
(51% Inj.) with FORWARD COLLISION ALERT (camera only system)

16% FORWARD COLLISION ALERT (camera only system)
(28% Inj.)

LANE CHANGE CRASHES

12% LANE CHANGE ALERT with SIDE BLIND ZONE ALERT



BACKING CRASHES

(Higher-level backing features generally include lower-level features)

83% REVERSE AUTOMATIC BRAKING

59% REAR CROSS TRAFFIC ALERT

48% REAR PARK ASSIST

34% REAR VISION CAMERA

ROADWAY DEPARTURE CRASHES

13% LANE KEEP ASSIST with LANE DEPARTURE WARNING
(19% Inj.)

SAME DIRECTION SIDESWIPE CRASHES

8% LANE KEEP ASSIST with LANE DEPARTURE WARNING

OPPOSITE DIRECTION SIDESWIPE CRASHES (INCLUDES HEAD-ONS)

10% LANE KEEP ASSIST with LANE DEPARTURE WARNING

Notes:

- (1) All feature effectiveness findings shown are statistically significant.
- (2) "Inj." refers to additional injury reduction effectiveness analyses that only considered crashes where police reported "suspected minor injury" or higher injury severities for anyone in the crash.



Thank You