



NHTSA

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

NHTSA Crash Investigation Sampling System Event Data Recorder Data Element Benchmarking Study

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2025 SAE Government Industry Meeting*



Background

- An event data recorder (EDR) is a device or function in a vehicle that records the vehicle's dynamic time-series data just prior to/during a crash event
- EDR data is used to support vehicle safety research, crash investigations, regulatory development, and safety equipment performance
- The purpose for this study is to gauge which data elements manufacturers are reporting to their EDRs and compare these elements to existing EDR standards and best practices

Methodology

1

Query 2022 Crash Investigation Sampling System (CISS) case year

2

Evaluate EDRs for newest Model Year (MY) vehicles per OEM

- 2022-2024 MY
- 15 OEMs
- 18 Vehicle Models

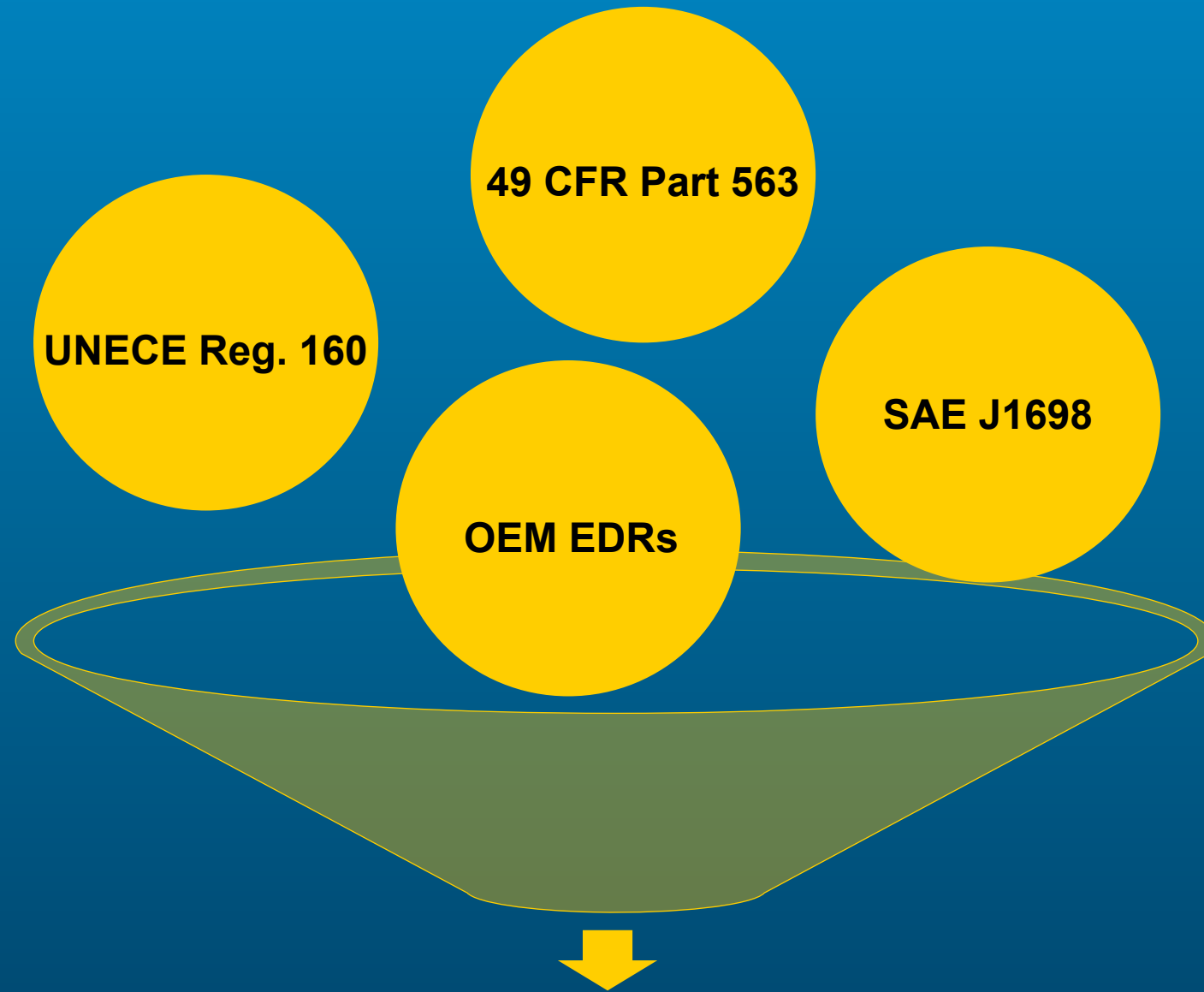
3

Categorize Data Elements per EDR:

- 49 CFR Part 563
- UNECE Reg. No. 160 Rev. 1
- SAE J1698/1
- OEM Specific

4

Analysis & Observational Findings

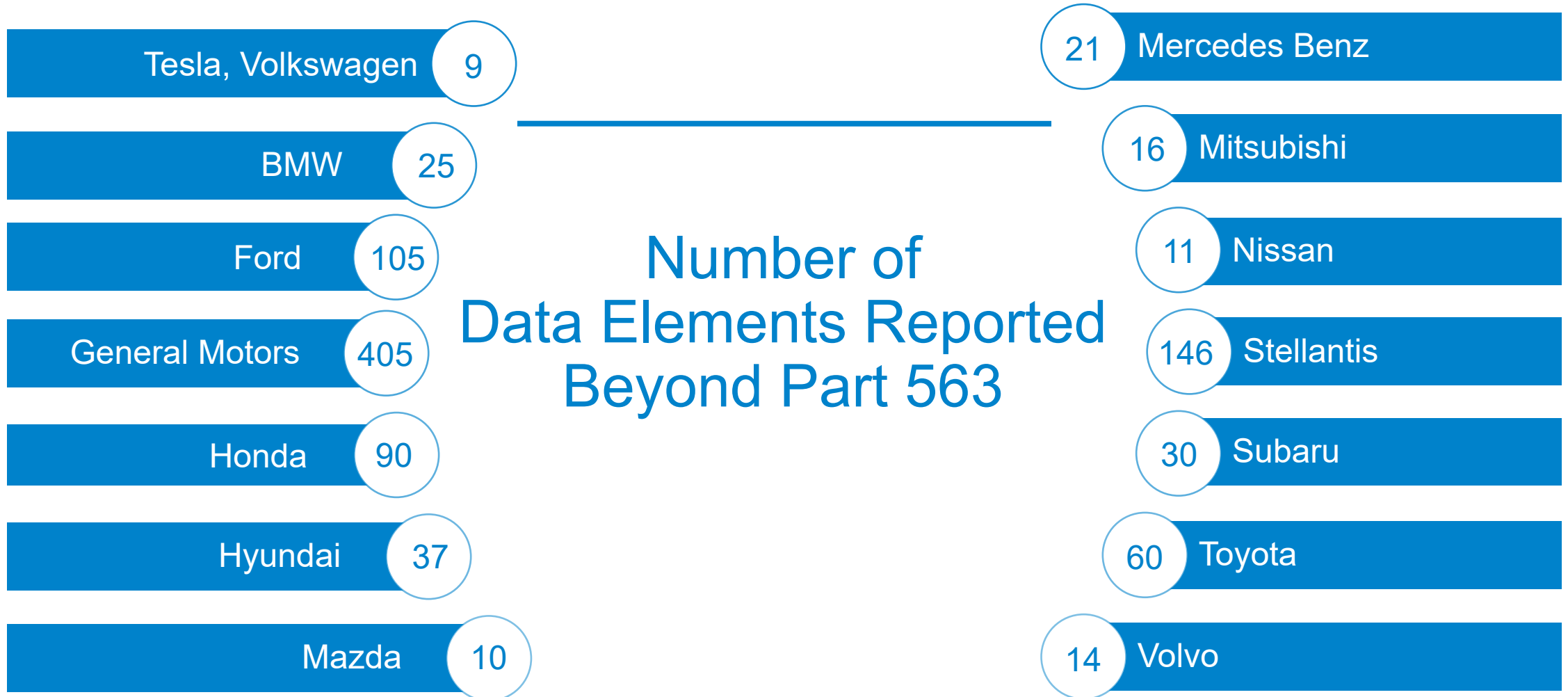


EDR Data Element
Benchmarking Study

SAE International J1698/1

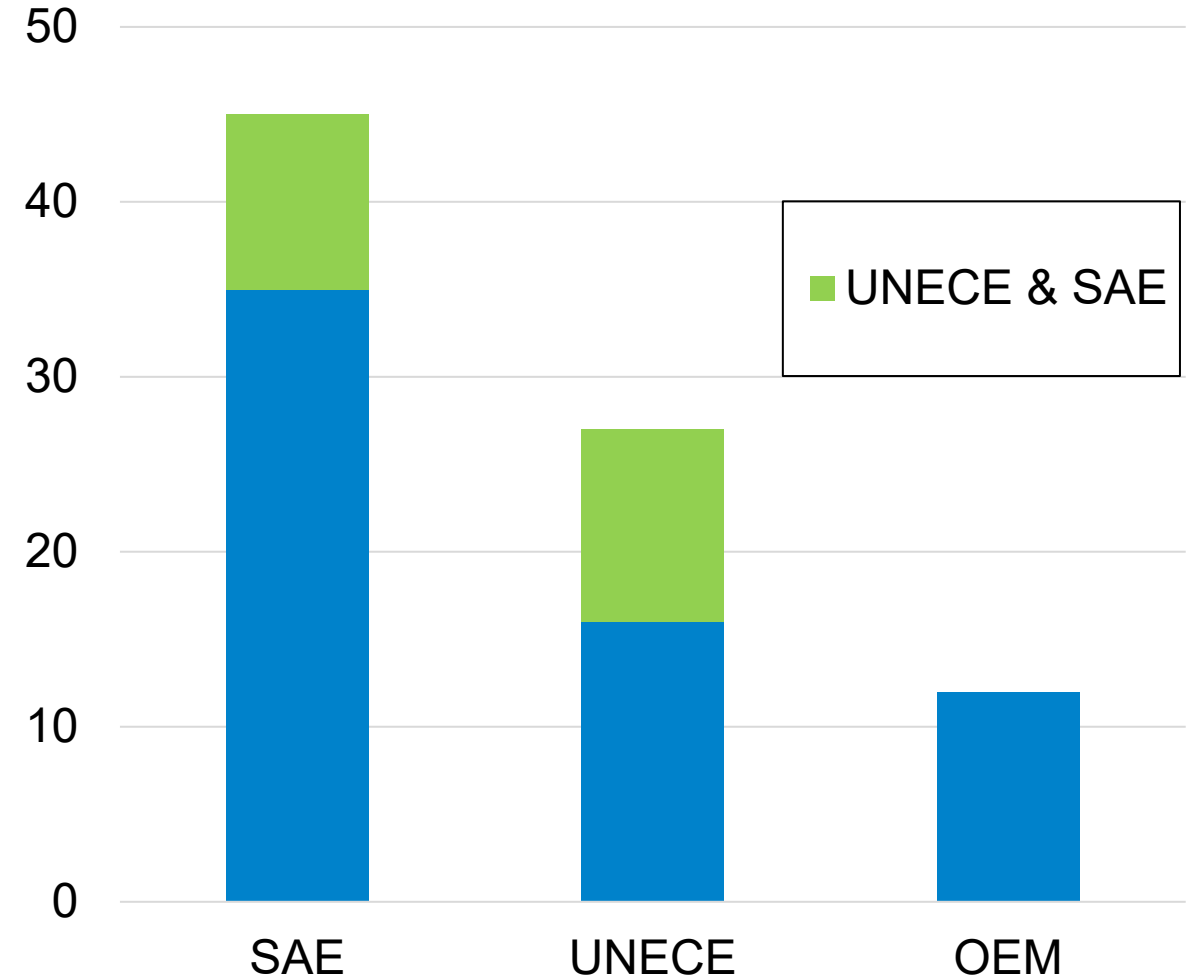
- The SAE Recommended Practice for Event Data Recorders revised J1698/1 in January 2023
- SAE acknowledges “...individual manufacturers may incorporate unique hardware in vehicles which require modified data element format, range, units, and sampling rate. (...) the format may be altered to capture the most appropriate content.”
- There are 44* additional data elements identified by SAE J1698/1 that are not specified by 49 CFR Part 563

*SAE and UNECE have 10 similar data elements listed beyond current 49 CFR Part 563



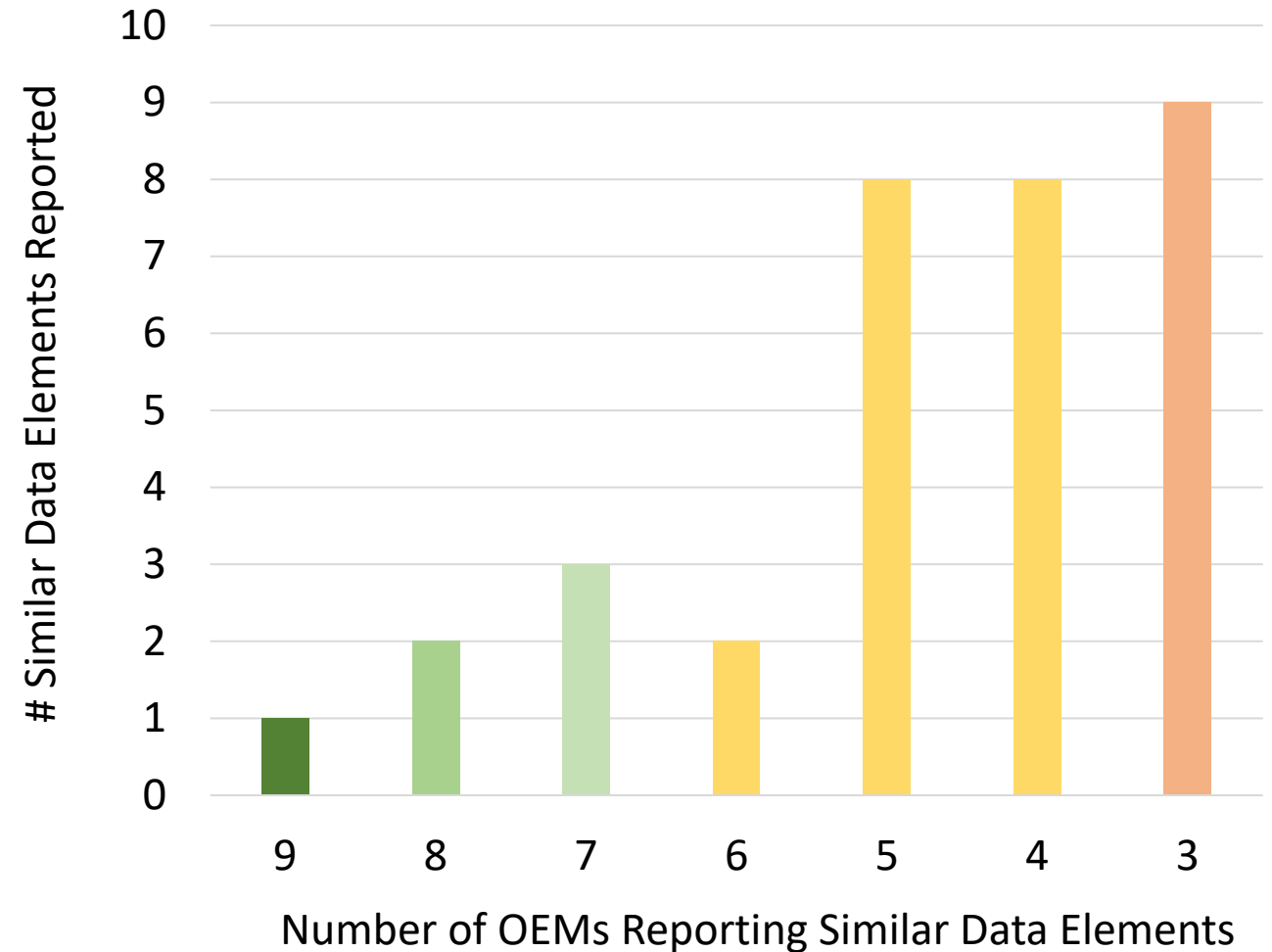
Beyond 49 CFR Part 563

- UNECE and SAE have identified **62** data elements for inclusion in EDR reporting – **10** are similar between UNECE and SAE
- OEMs are reporting **12** similar data elements across OEMs to EDRs that are not identified by current regulations or best practices



OEM Alignment of Data Elements Not Included in Part 563

- For the 15 OEMs assessed:
 - 9 report “Knee Bolster Air Bag Deployment”
 - 7-8 report data elements related to advanced driver assistance systems
- Opportunities for harmonization



Highest Data Element Frequency Across OEMs

Data Element

Knee Bolster Air Bag Deployment, Driver and Front Passenger

9

Adaptive Cruise Control Status

8

Cruise Control Status

Automatic Emergency Braking System Status

7

Safety Belt Status, Rear Passengers

Gear Selection Status

Vehicle Roll Rate

6

Brake System Internal Pressure

Frontal Collision Warning Alert Status

Yaw Rate

Pretensioner, All Seating Positions

Diagnostic Trouble Codes (Ignition Cycles Since DTCs were Cleared)

5

Data Elements Not Currently Reported by OEMs*

	UNECE	SAE
Data Element	Accident Emergency Call System Status	Braking Request (By Driver or Vehicle)
	Automatically Commanded Steering Function Category (A, B1, B2, C, D, E) Status	Ignition Button Counter per Power Cycle
	Steering Intervention Status	Mass Airflow
	Corrective Steering Function Status	Minutes in Operation at Event
	Emergency Steering Function Status	Number of Cycles Occupant/Pedestrian Protection System Warning Lamp Has Been On
		Occupant Protection Pressure Rate of Change
		Vehicle Yaw Angle
		Windshield Wiping System Status

*Based on the EDRs reviewed from CISS case year 2022. Note UNECE elements formalized in 2023

Summary

- This observational study reviewed CISS EDRs across 15 OEMs for 18 vehicles that are MY 2022 and newer
- OEMs are currently reporting data elements proposed by UNECE R160.1 and identified by SAE J1698/1 to their EDRs
- Data about the status of additional safety systems and advanced driver assistance systems are already reported by nearly 50% of OEM EDRs
- OEMs are reporting data elements beyond current standards and best practices



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Backup

OEM	Model Year	Model
BMW	2023	X3
Daimler	2022	C-Class
Ford	2022/2023	Escape, Bronco Sport, Edge
GM	2023	Escalade
Honda	2024	Civic
Hyundai	2022	Ioniq 5
Mazda	2024	CX-90
Mitsubishi	2022	Outlander
Nissan	2023	Rogue
Stellantis	2023	Grand Cherokee/ Pacifica/1500/Gladiator
Subaru	2024	Crosstrek
Tesla	2023	Model Y
Toyota	2023/2024	GR86/Rav4
Volkswagen	2022/2023	Q5/ID.4
Volvo	2023	CX60

Similar Data Elements for UNECE and SAE

Adaptive Cruise Control Status

AEBS Status

Lane Departure Warning System Status

Roll Rate

Safety Belt Status (Rear Passengers and Mid-position Front)

Traction Control Status

TPMS Warning Lamp Status

VRU Secondary Safety System Deployment Time

VRU Secondary Safety System Warning Indicator Status

Yaw Rate