



NHTSA

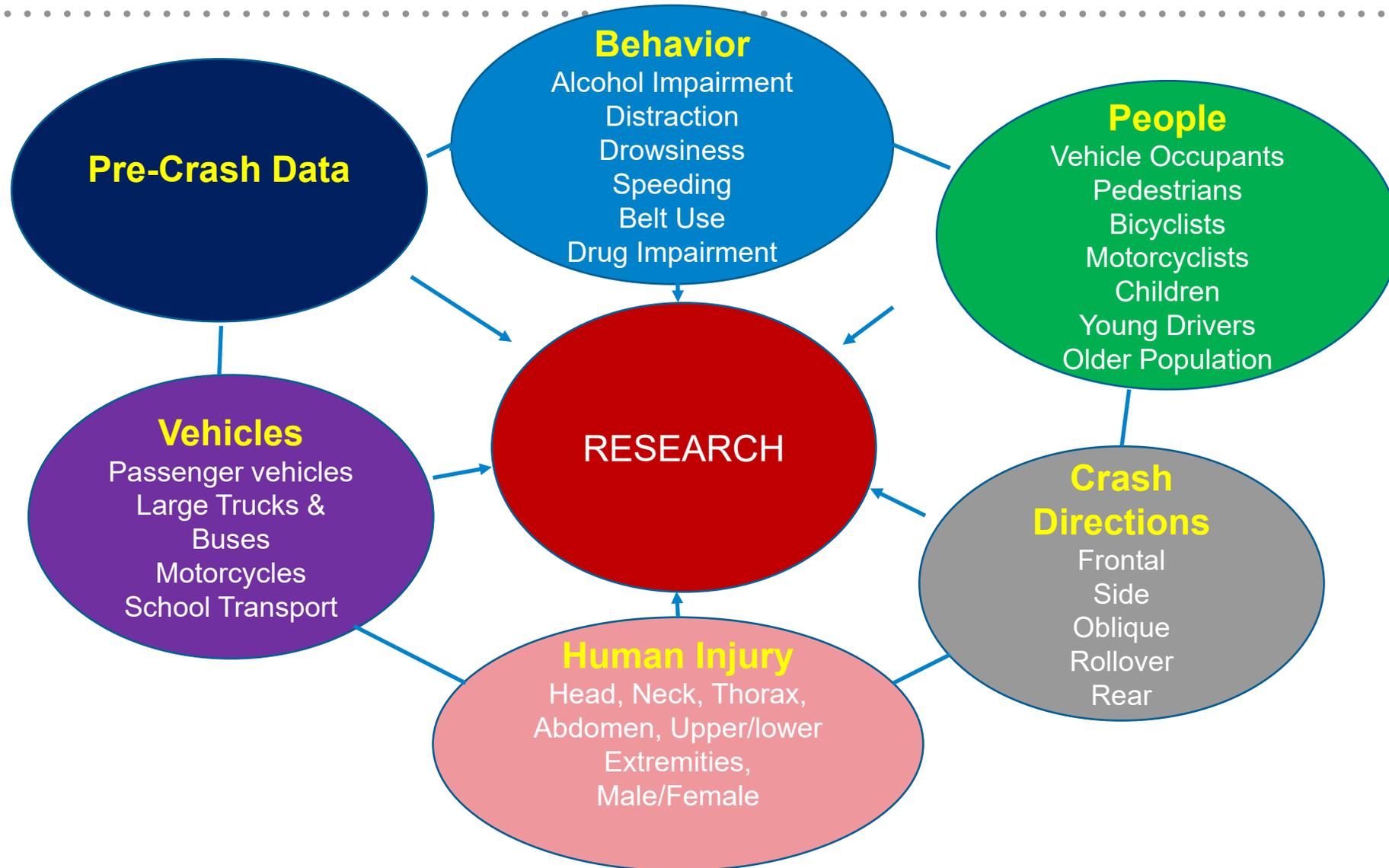
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

How Data Informs NHTSA's Vehicle Safety Research Program

Reducing Fatalities: Biggest Needs Part 1

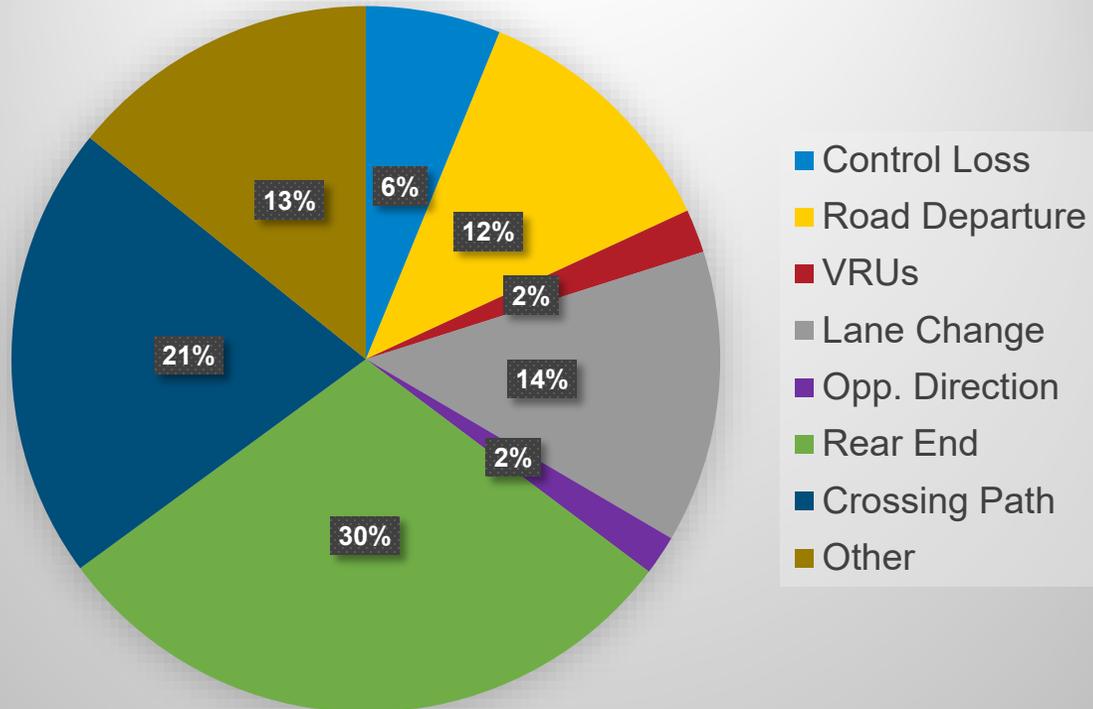
January 17, 2024

How Data Informs Vehicle Safety Research

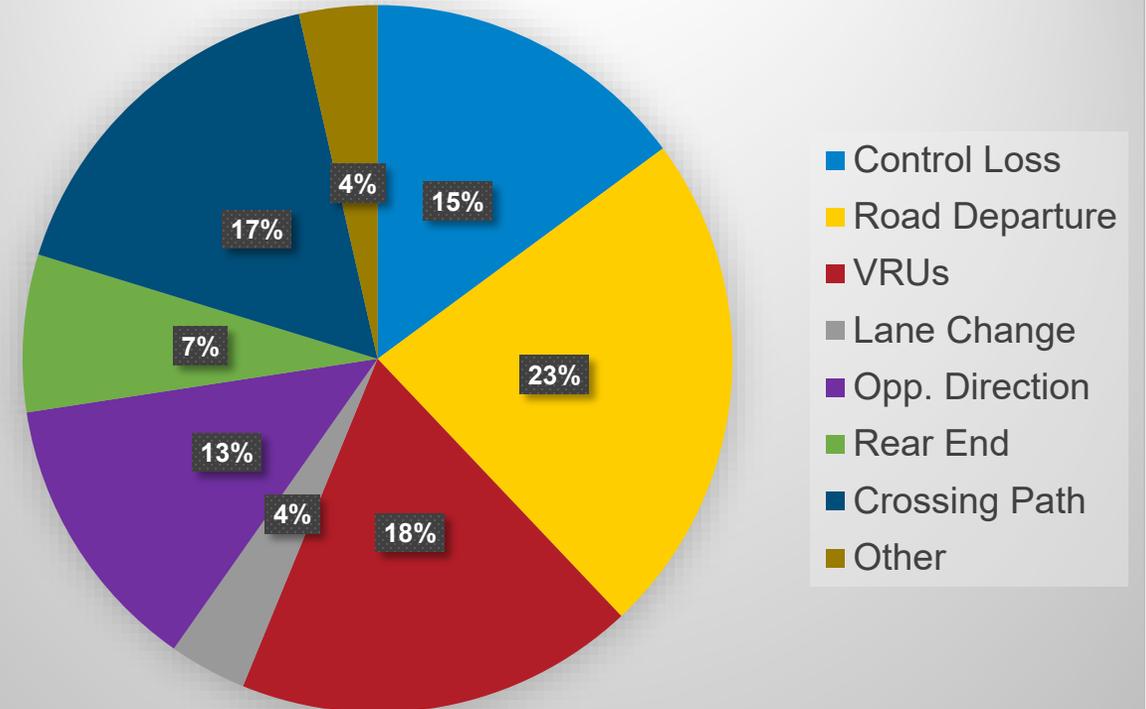


Pre-Crash Scenario Data

% All Crashes (LV)



% Fatal Crashes (LV)



Annual Average Crash Frequency where a **Light Vehicle** was involved in the Critical Event (2016-2020)

Pre-Crash Data - ADAS Research

Active Safety Systems

- Electronic Stability Control (ESC)
- Forward Collision Warning (FCW)/Automatic Emergency Braking (AEB)
- Lane Departure Warning (LDW) / Lane Keeping Support (LKS)
- Pedestrian AEB (PAEB)
- Blind Spot Warning (BSW) / Blind Spot Intervention (BSI)
- Intersection Safety Countermeasures

ADAS: Control Loss/Run Off Road - ESC



[Continental Automotive Systems USA](#)



Light Vehicle:

Prevent crashes due to loss of control

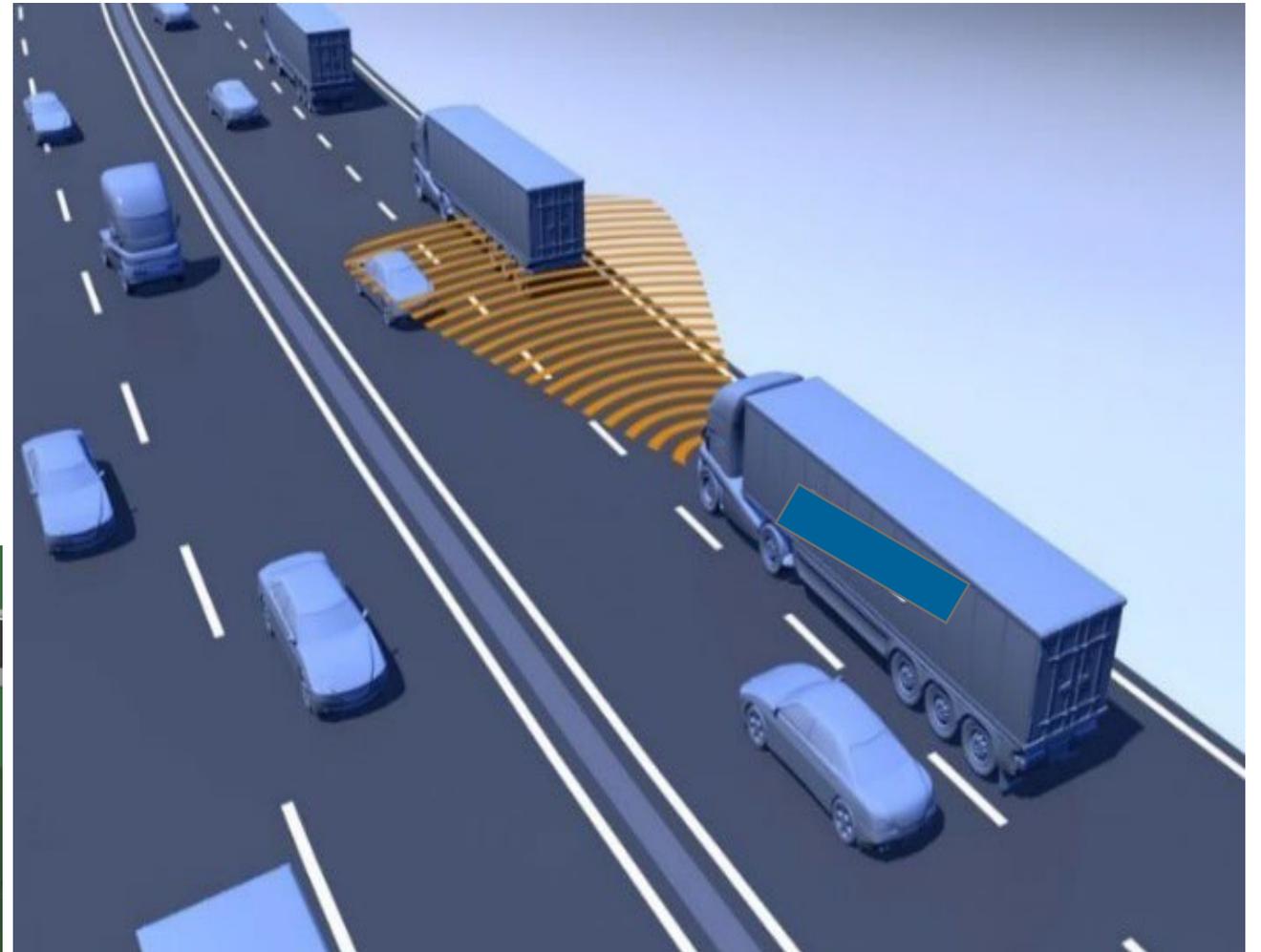
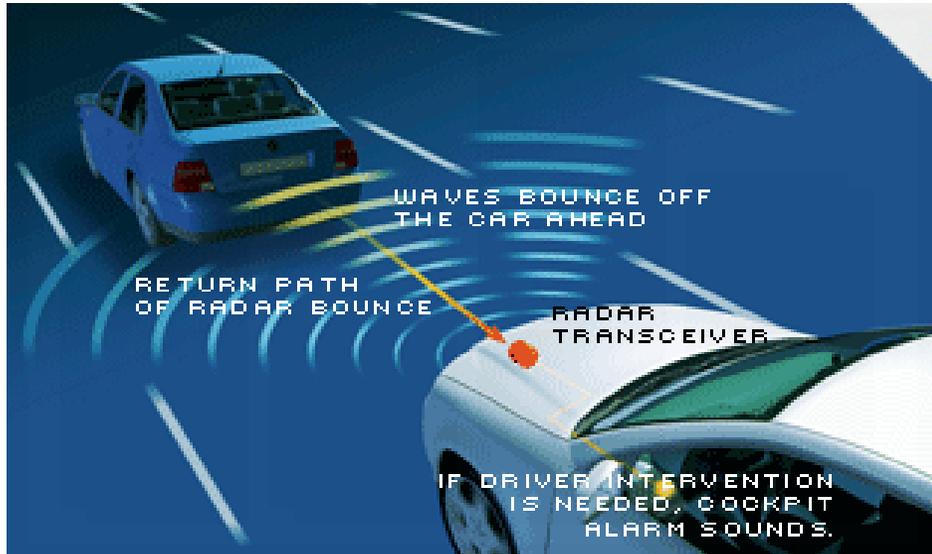
Mandated via FMVSS No.126

Heavy Vehicle

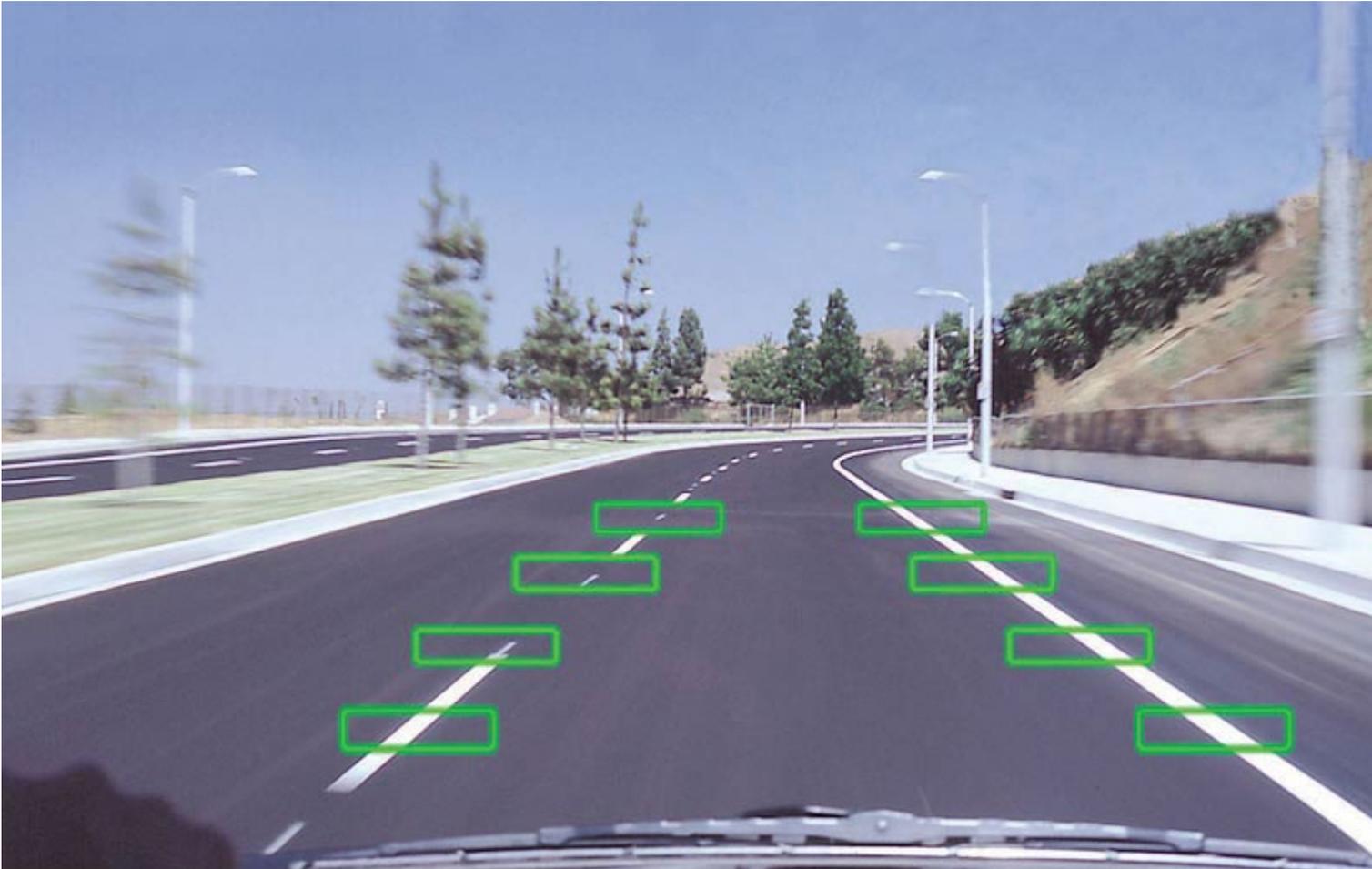
Mandated via FMVSS No.136 for tractor semi trailers and motorcoaches

Additional Research for Medium/Heavy Duty Straight Trucks

ADAS: Rear End Crashes - AEB



ADAS: Road Departure Crashes – Lane Keeping Assist

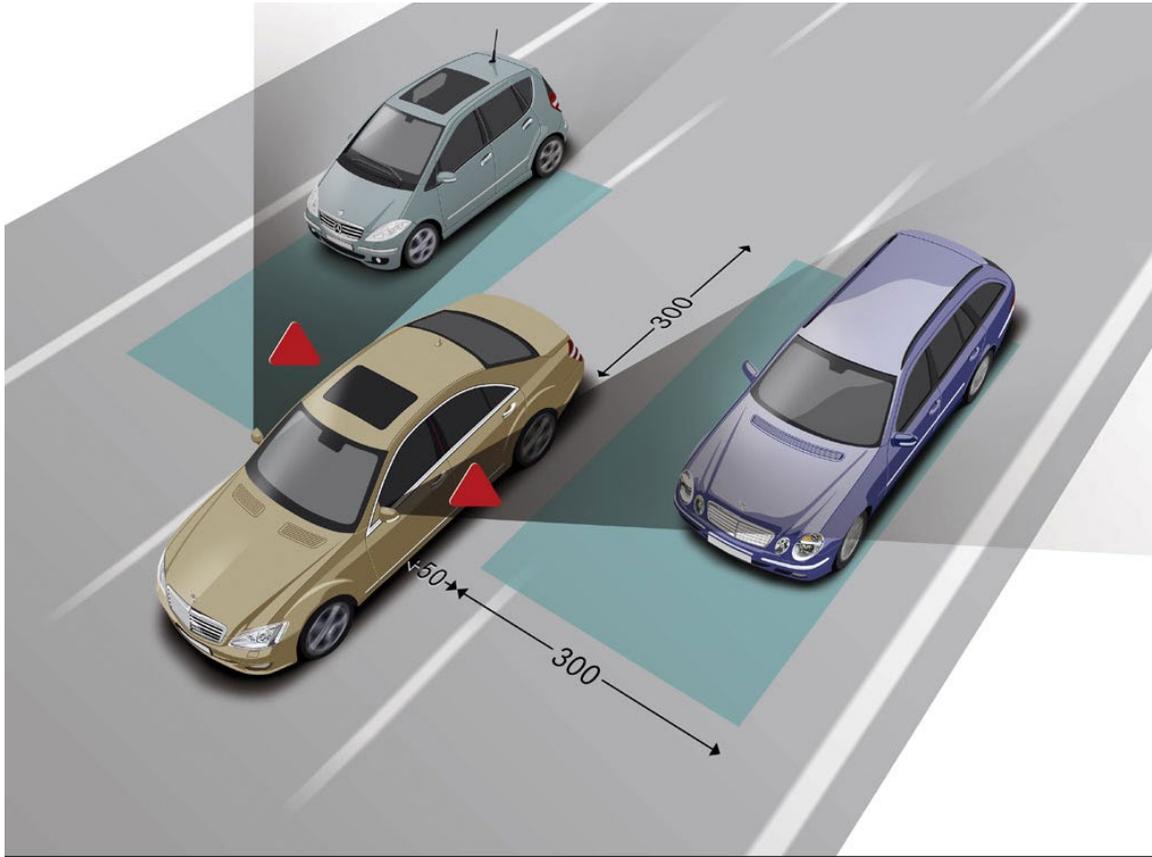


Camera's view of the road ahead as it tracks lane markings

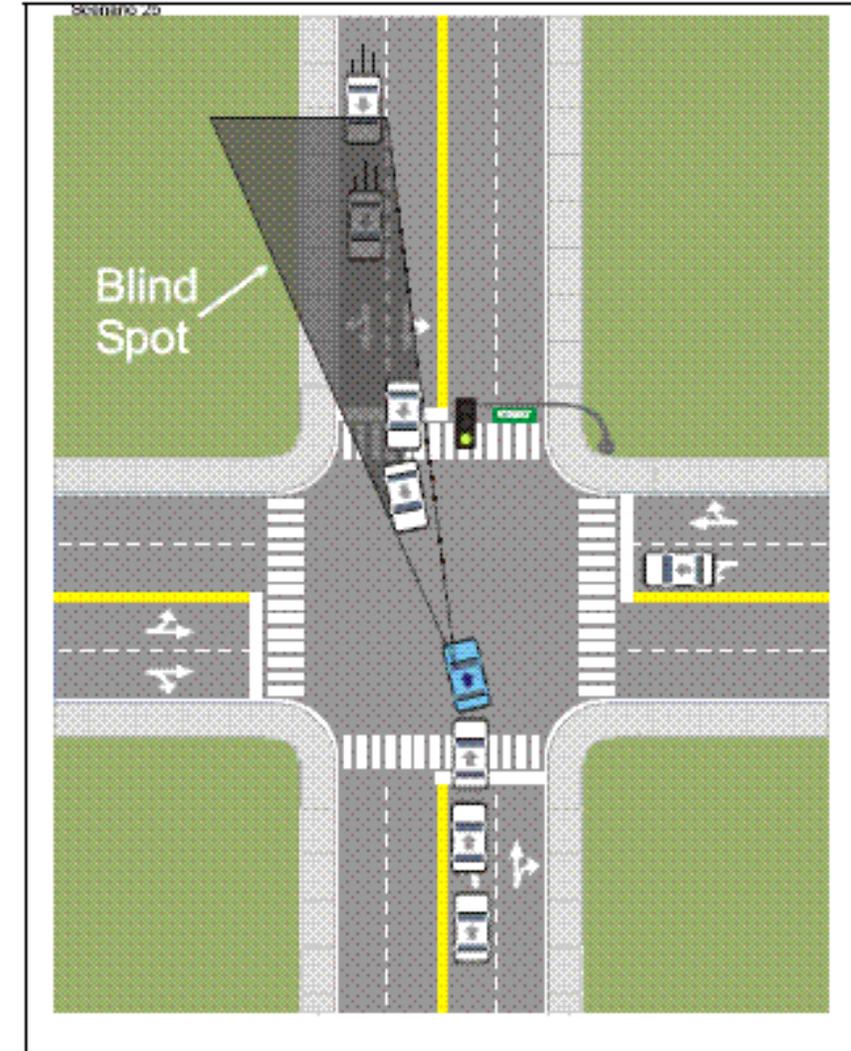
Vehicle Research:

- Review lane/road departure data (e.g. curved roads)
- Review existing and emerging LKS technology, market penetration, review and evaluate existing test protocols

ADAS: Lane Change/Merge – Blind Spot Intervention



ADAS: Intersection Safety Assist (crossing path)



Behavior – 2021 Data

- Alcohol Impairment – approximately **12,600 fatalities** caused by alcohol impairment

(Advanced Impaired Driving Technology ANPRM, January 5, 2024)

- Distraction – **12,400 fatalities** due to distraction

(Advanced Impaired Driving Technology ANPRM, January 5, 2024)

- Drowsy Driving – Led to at least **648 fatalities**

(Advanced Impaired Driving Technology ANPRM, January 5, 2024)

- Speeding – **12,330 fatalities** in speeding-related crashes

(Traffic Safety Facts DOT HS 813 515 October 2023)

Behavior - Alcohol Impairment

Driver Alcohol Detection System for Safety
(DADSS) Program www.dadss.org



Behavior - Distraction



Research:

- Methods to assess the prevalence of driver distraction on the roadway
- Current/emerging in-vehicle displays
 - Secondary task engagement - changes in duration over time/effects on safety-related driver outcomes
- Portable electronic device interfaces & modern voice control interfaces

Driver Monitoring Systems

Applications

- Alcohol Impairment
- Distraction
- Drowsiness
- Driving Automation

Vehicle Research

- Driver Monitoring Systems (DMS)
 - Drowsy, distraction, and alcohol applications
 - DMS Performance/Test Procedures
 - DMS Strategies in SAE L2 driver support systems

Behavior - Speeding

driving faster

could lead to

DISASTER



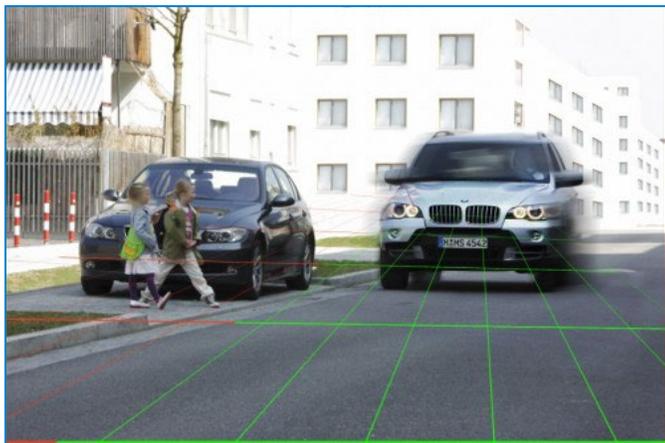
**SPEEDING CATCHES
UP WITH YOU**



Vehicle Research (planned)

- Intelligent Speed Assistance focusing on capabilities and limitations of available technologies and user acceptance

People - Vulnerable Road Users – Crash Avoidance



Fatalities:

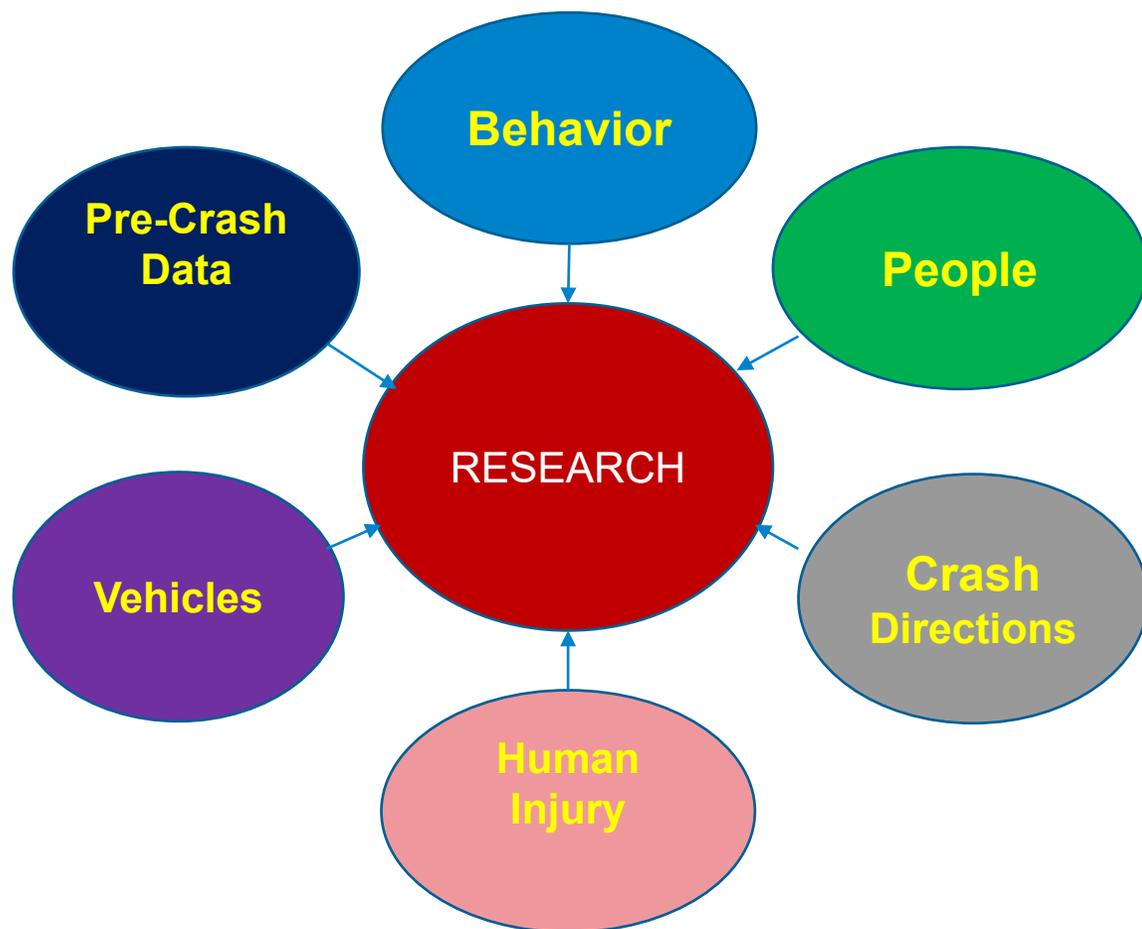
- Pedestrians (7388)*
- Bicyclists (966)*
- Motorcyclists (5932)*
- Wheelchair users

Vehicle Research:

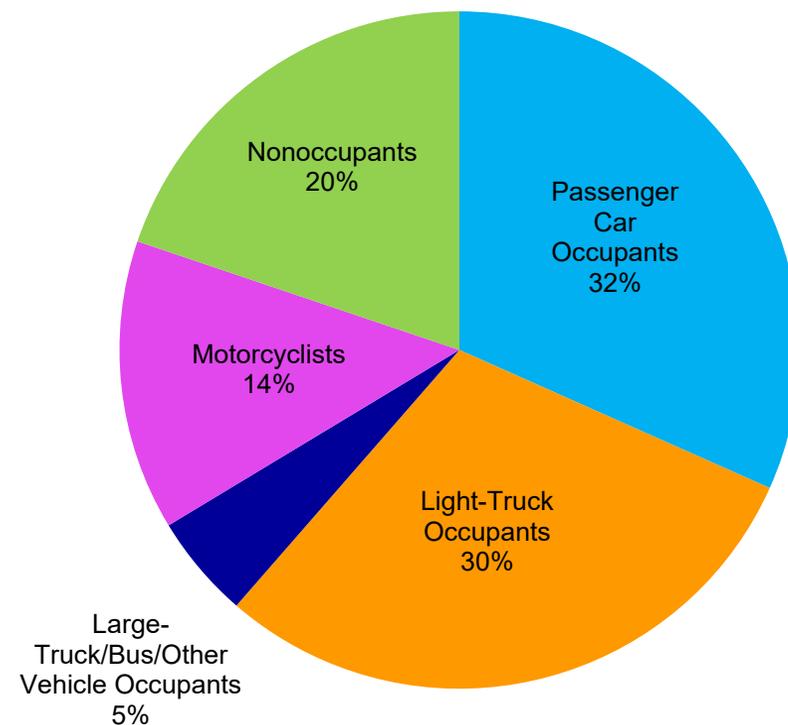
- Pedestrian AEB
- Bicycle AEB
- Motorcycle AEB, BSW/BSI, ABS, ESC
- Wheelchair occupant restraint research

* 2021 FARS data

Crashworthiness



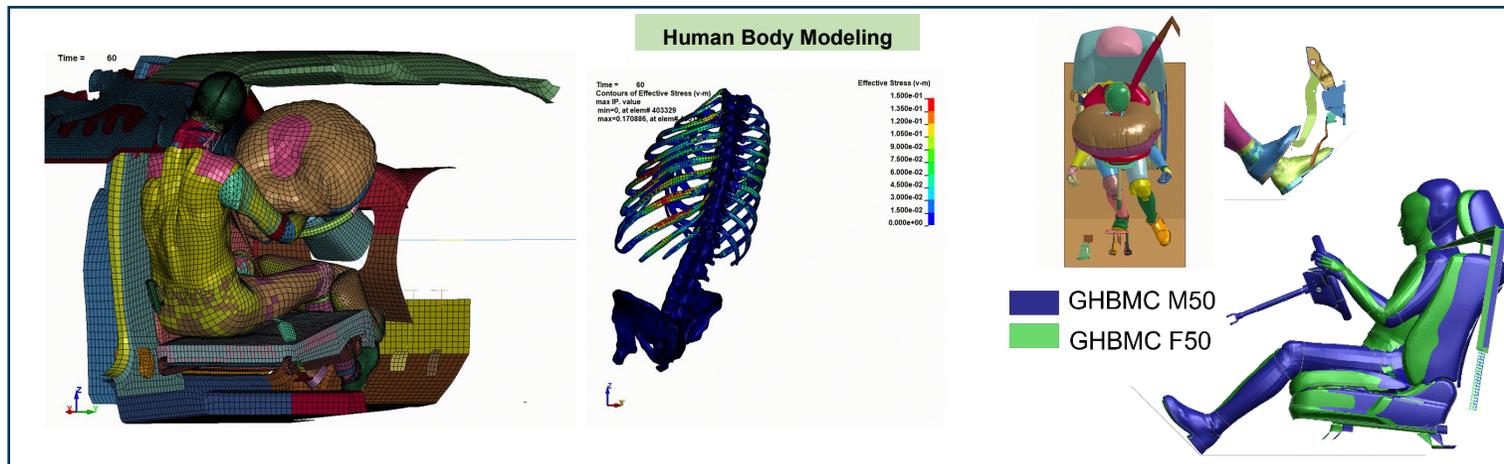
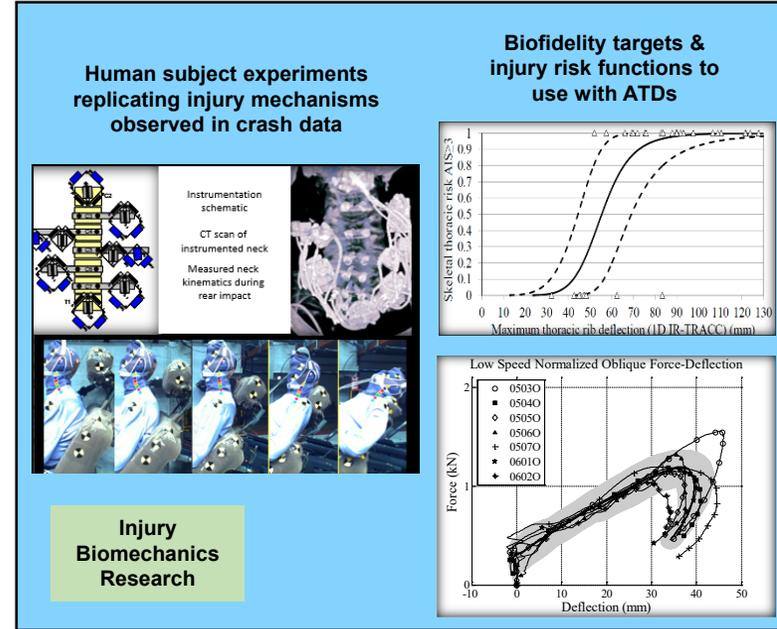
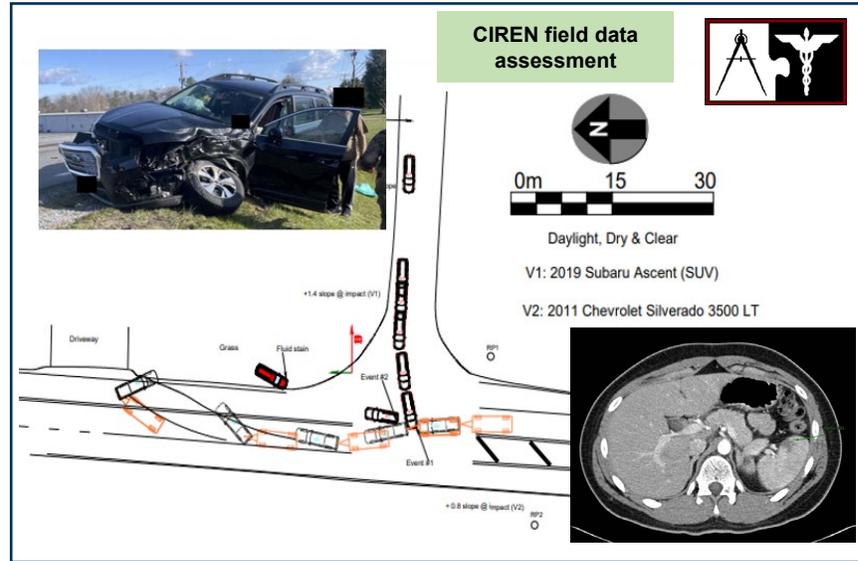
2021 Fatalities



Source: NHTSA Traffic Safety Facts (2023), "Summary of Motor Vehicle Traffic Crashes," DOT HS 813 515.

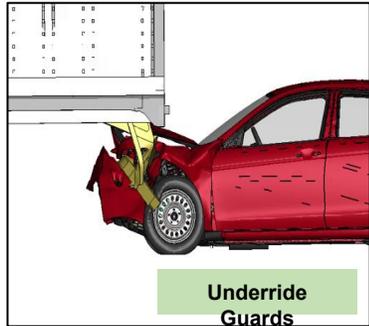
Crashworthiness – Injury Research

Crash data influences crosscutting injury research



Crashworthiness – Improved Tests & Tools

Data motivates the need for research to improve tests and tools



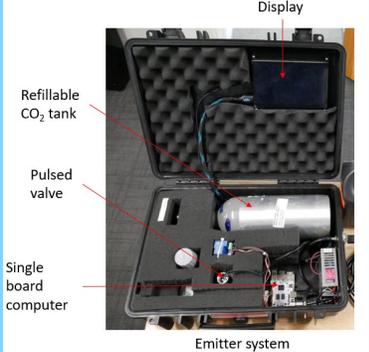
Crashworthiness – Child Occupants

Child occupants and associated research

Unattended Child Reminder Systems



For radar sensing



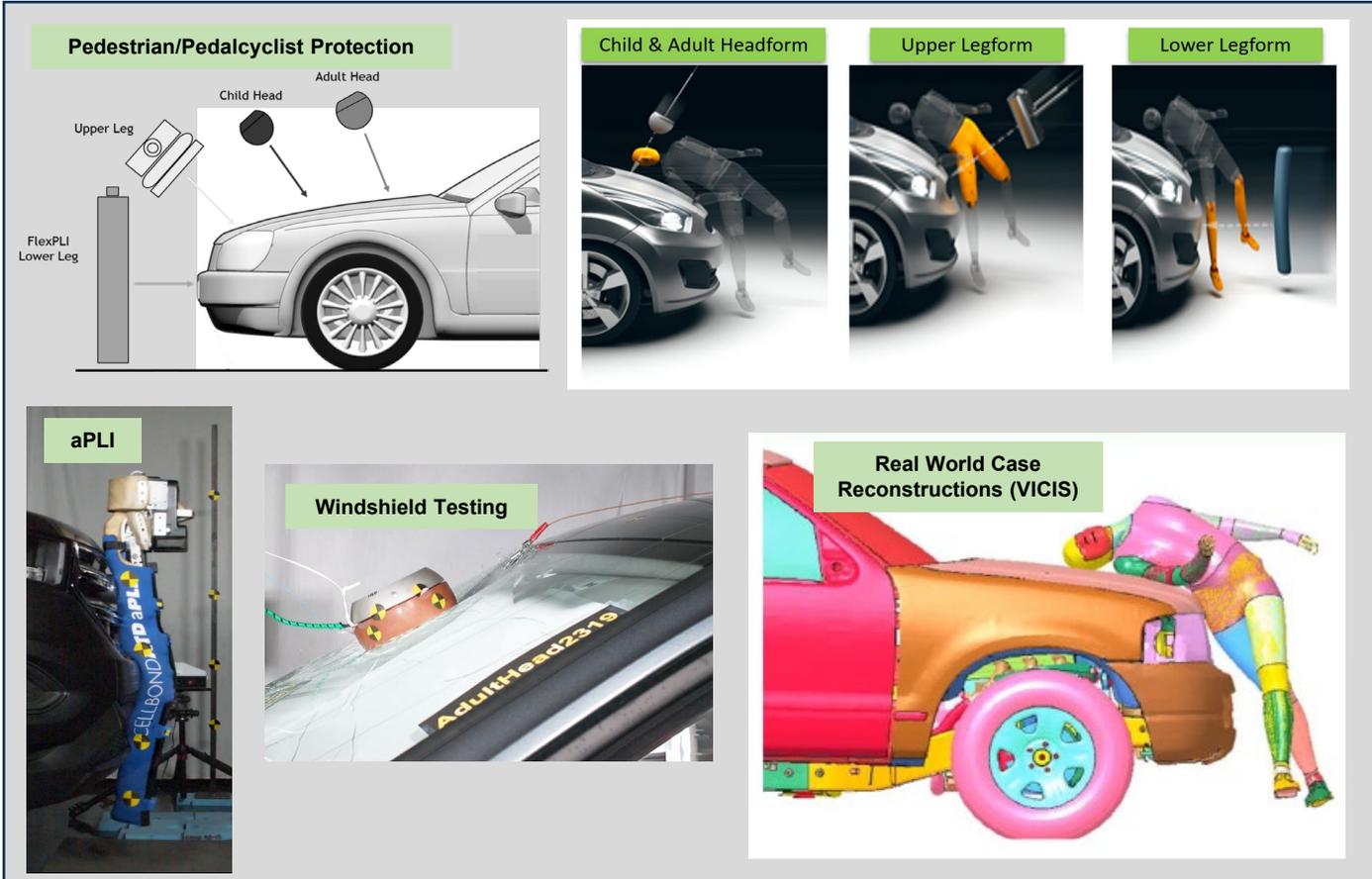
Display
Refillable CO2 tank
Pulsed valve
Single board computer
Emitter system

For CO2 sensing



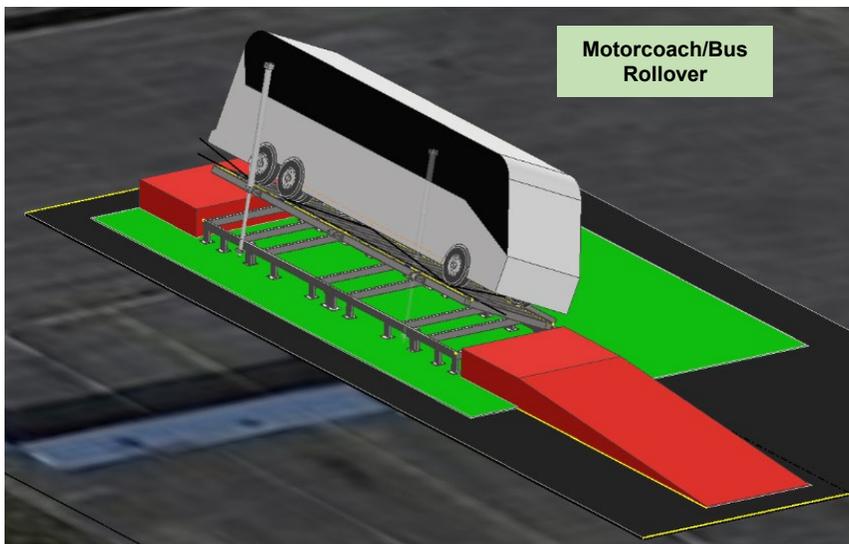
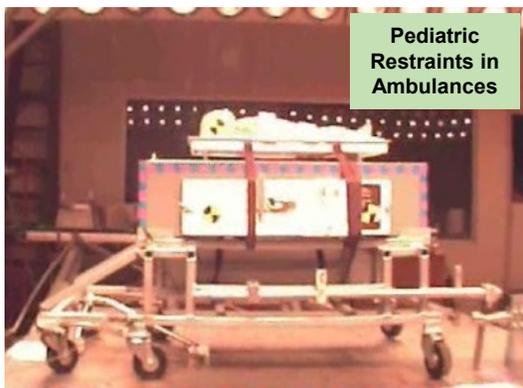
Crashworthiness – Vulnerable Road Users

Nonoccupant fatalities have been rising and influencing significant research



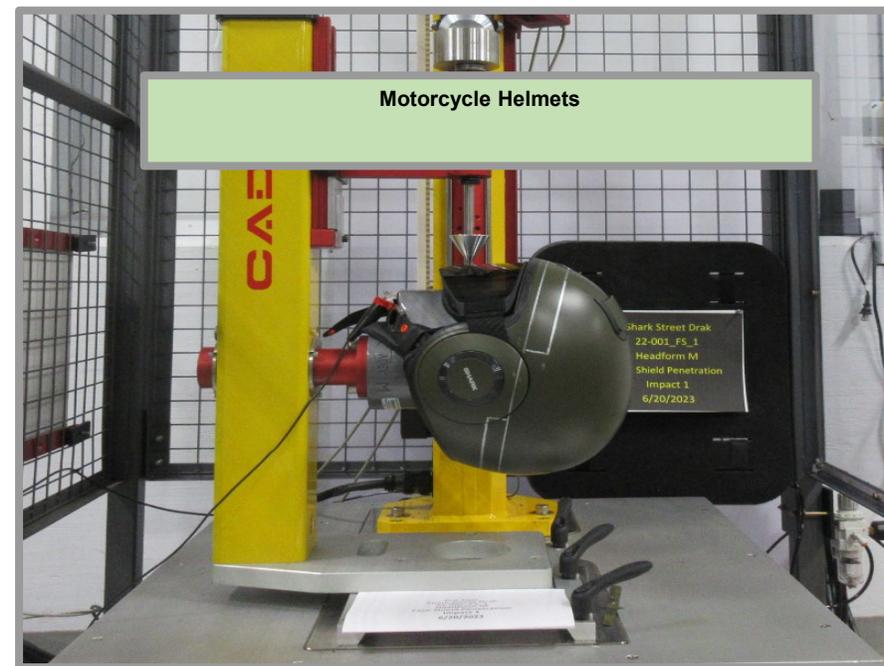
Crashworthiness Medium/Heavy Vehicles

Fatalities in medium/heavy vehicles (5%)



Crashworthiness Motorcycles

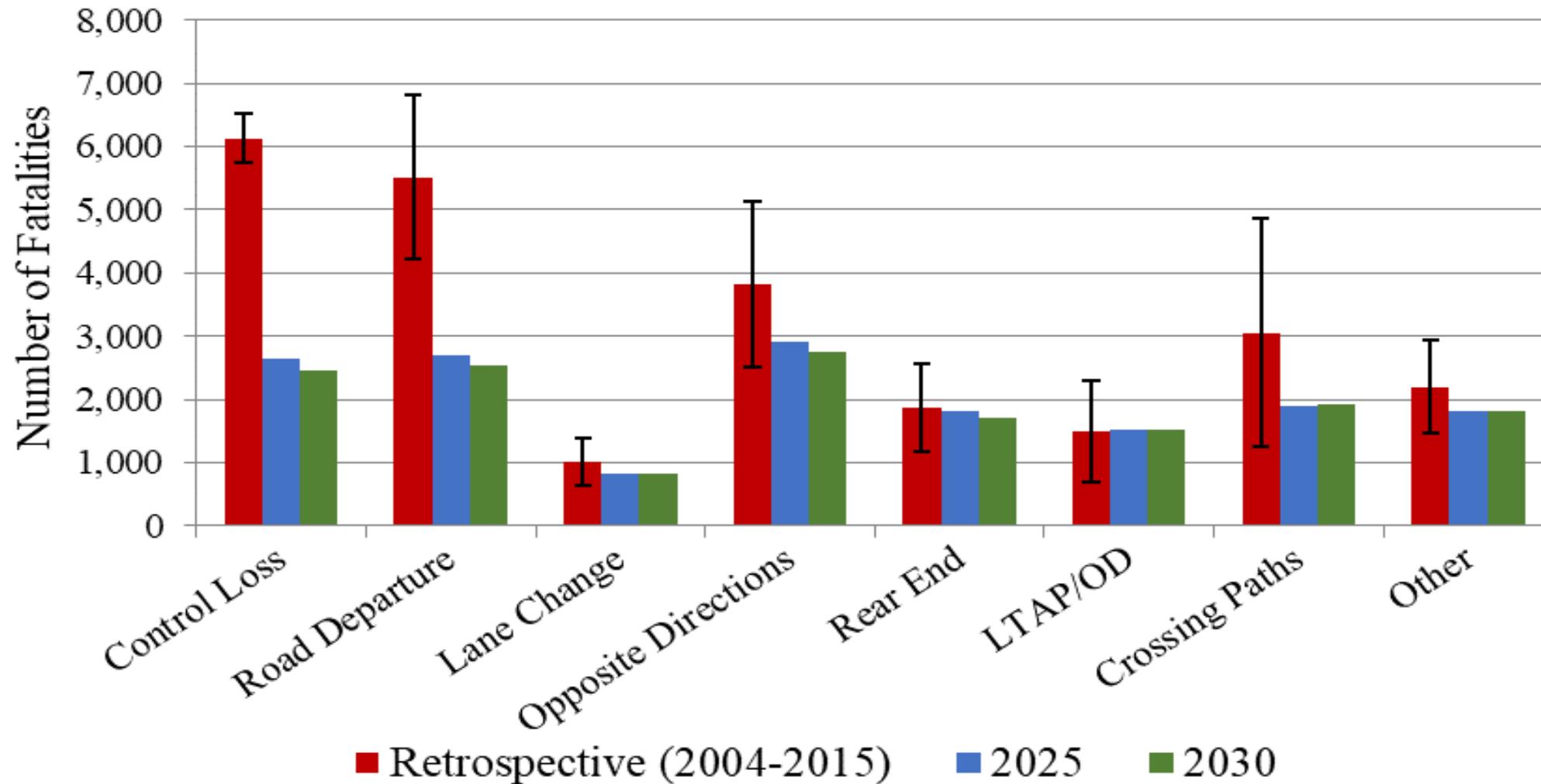
Motorcyclist fatalities (14%)



Using Data for Future Safety Projections

- Using retrospective data to project future crashes, injuries, fatalities, annual costs, etc.)
- Model developed: DOT HS 813 147, October 2021
- Projection Examples
 - Annual number of fatalities by pre-crash scenario
 - Annual number of fatalities by impact direction (frontal, side, oblique, etc.)
 - Attributable fatalities by body region (head, neck, abdomen, etc.)

Future Projection Example



Thank You!

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