

Empirical ADAS Truck Crash Analyses Using Onboard Safety Monitoring Systems

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Federal Motor Carrier Safety Administration

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SAFETY
RESEARCH
FORUM

VIRTUAL EVENT



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- **Background**

- ADAS have the potential to mitigate or prevent crashes and associated injuries and fatalities.

- **Objectives and Goals**

- Determine the safety benefits and efficacy of ADAS from real world driving data.

- **Process and Methods**

- Virginia Tech Transportation Institute reviewed 3 years of data from SmartDrive OBMS to measure ADAS safety benefits.

- **Anticipated Outcomes**

- The crash risk difference among trucks with and without ADAS, including:
 - Forward Collision Warning (FCW) - Automatic Emergency Braking (AEB)
 - Lane Departure Warning (LDW) - Pedestrian Collision Warning (PCW)

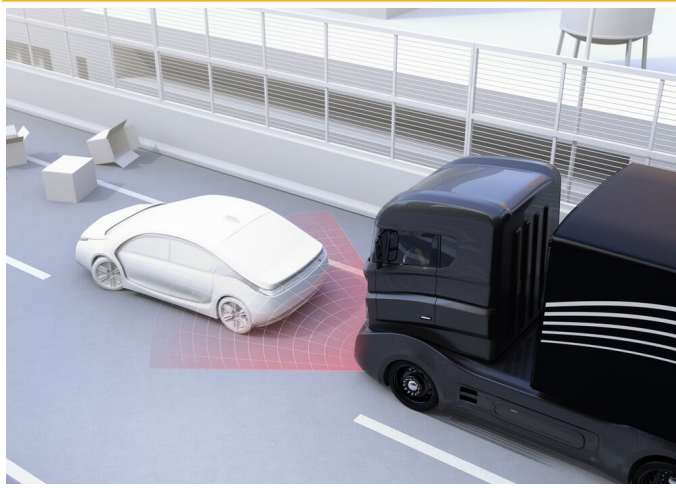


Onboard Monitoring System

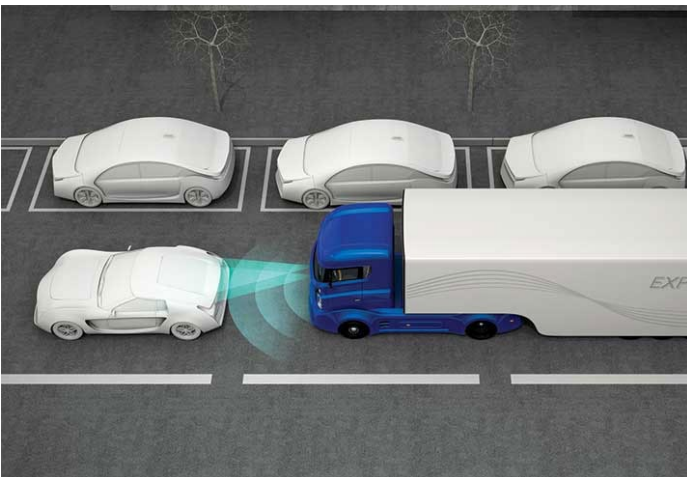
- The SmartDrive OBMS is a system to monitor and collect driving data
 - Driving exposure (miles, time of day, road type) is recorded
 - Multiple camera views
 - Triggers: ADAS activation, hard-deceleration, swerving ...
 - Uploads 20 second videos/data of the trigger event to cloud servers



Study Focus

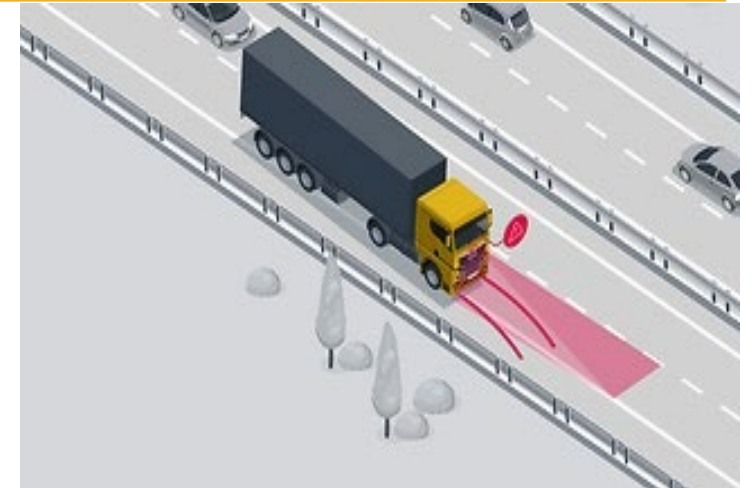


FCW



AEB

- Empirically assess ADAS safety benefits through OBMS data
- Explore the relationship between crashes and near-crashes



LDW



PCW

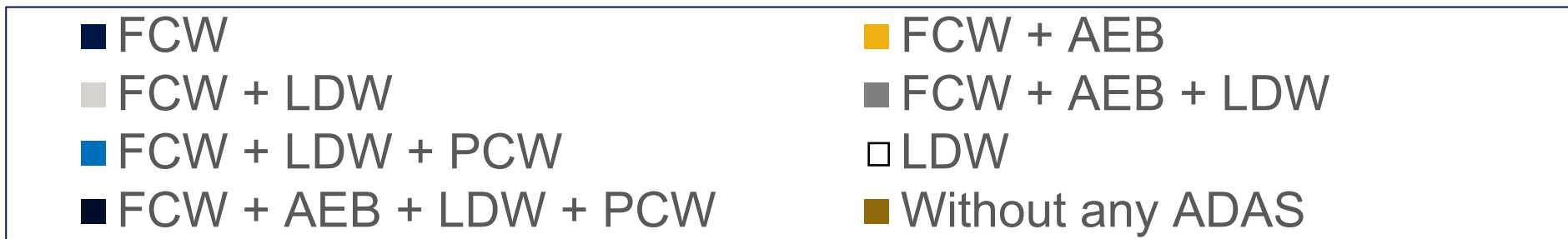
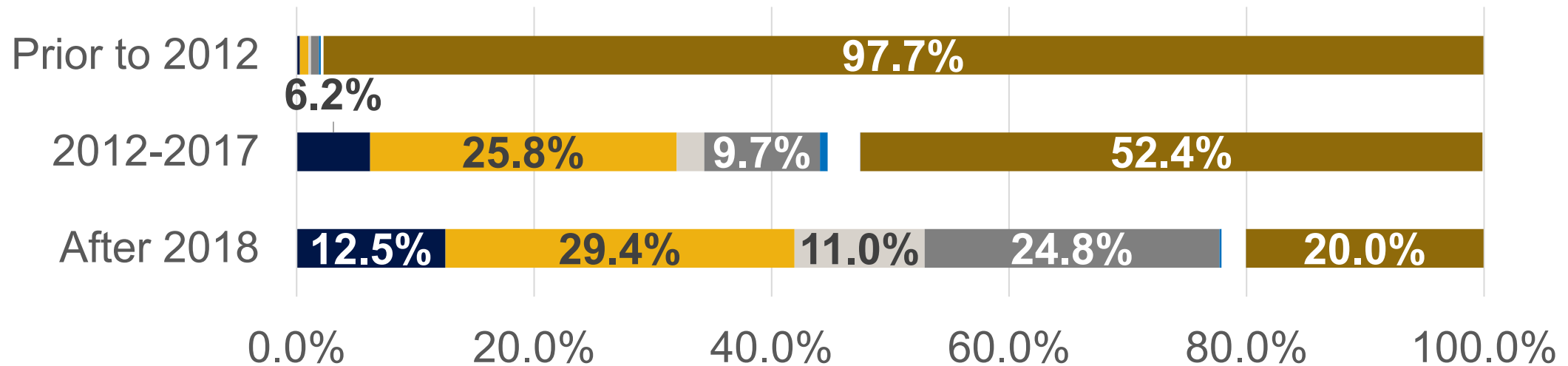
Truck Study Population

- Large volume of data was analyzed



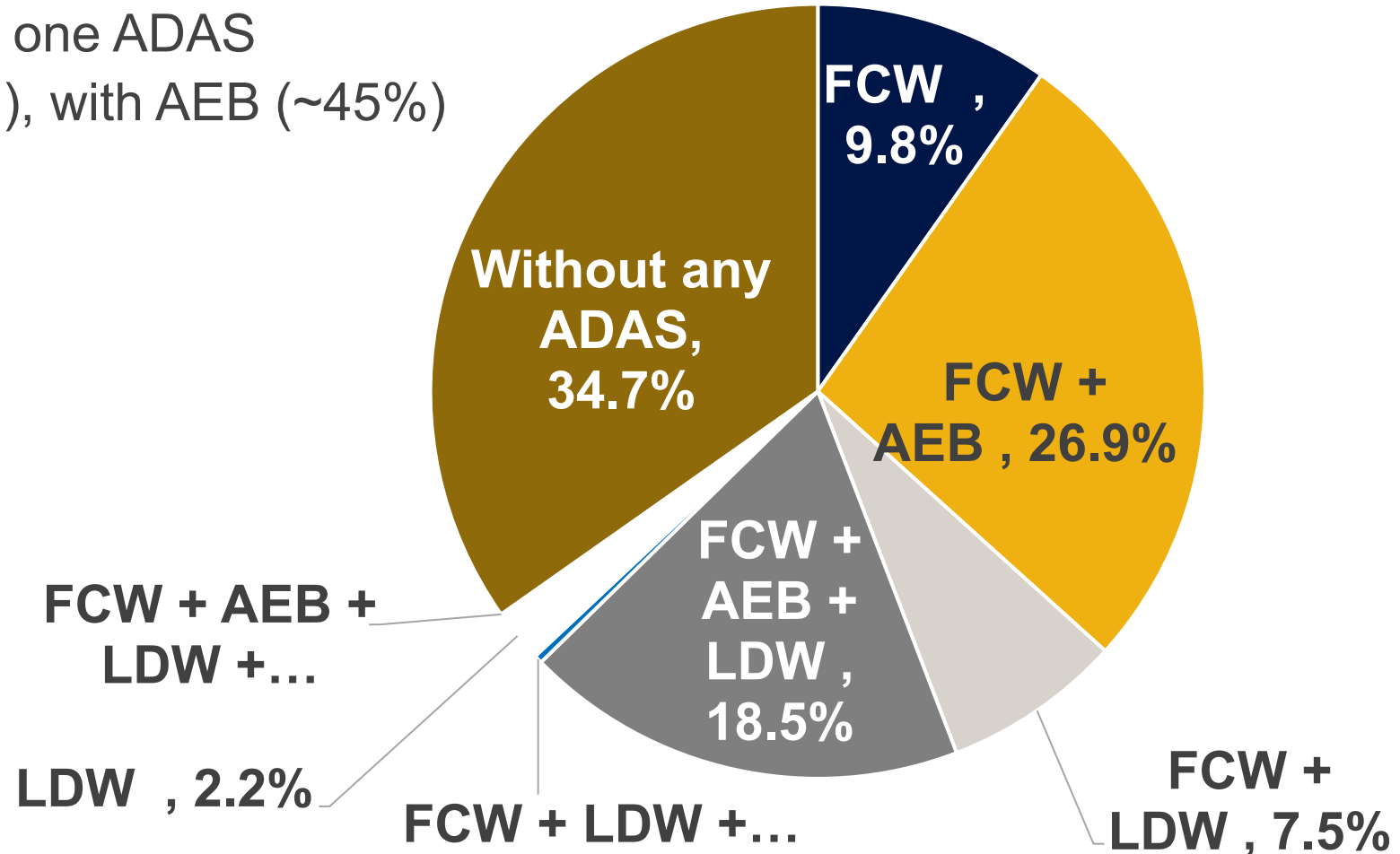
ADAS Composition by Truck Model Year

- ADAS composition of all trucks with known ADAS (41,329 out of 54,250 trucks, 76.2%)
 - ADAS composition varied by truck model year
 - Participating trucks had multiple types and generational versions of ADAS in model



Truck Population by ADAS Status

- Among trucks with known ADAS status:
 - 65.3% of trucks with at least one ADAS
 - FCW is most popular (~62%), with AEB (~45%)
 - PCW is rare



Key Takeaways

- Lower crash rate on trucks with ADAS for both overall crashes and ADAS-specific crashes.
- Compared to trucks without any ADAS
 - Trucks with FCW (no AEB) were associated with about a 30 percent lower crash rate
 - Trucks with AEB (+FCW) were associated with about a 40 percent lower crash rate
 - Trucks with LDW were associated with a 21 percent lower crash rate
- Conclusions are consistent with the literature and other research.



NOTE: The trucks participating in the study covered a range of model years from 2005 through 2021 and therefore represents a continuum of ADAS technology sophistication and are not representative of the performance expected on newer model trucks.

Partners



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VIRGINIA TECH 
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 **SCLERA** | SmartDrive
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