

34th DBE Workshop & Secretary's Golden Shovel Awards
Pewaukee, Wisconsin - February 20, 2020

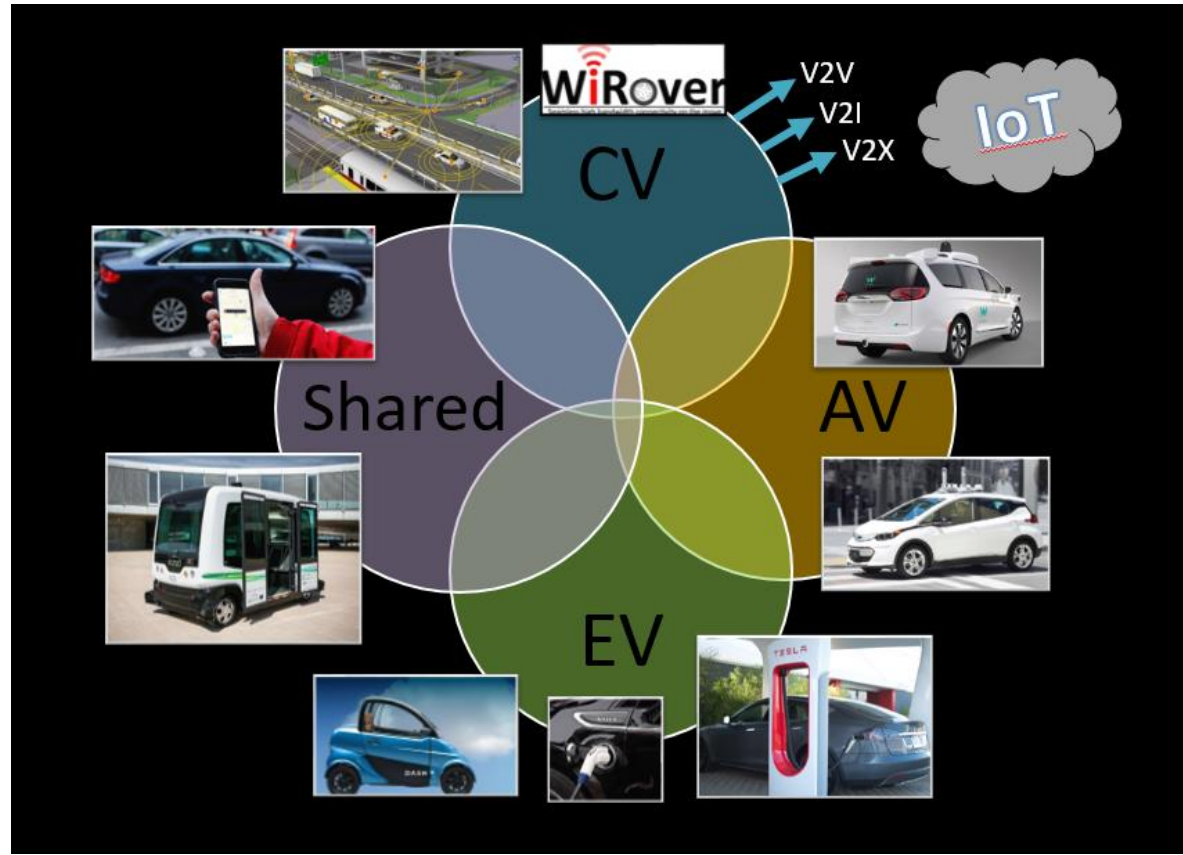
UW TOPS Lab Connected and Autonomous Vehicle Research

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Civil and
Environmental Engineering
UNIVERSITY OF WISCONSIN-MADISON

Automated, Connected, Electric and Shared

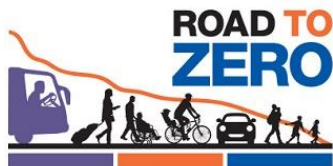


Trends, Implications, Motivations: Safety

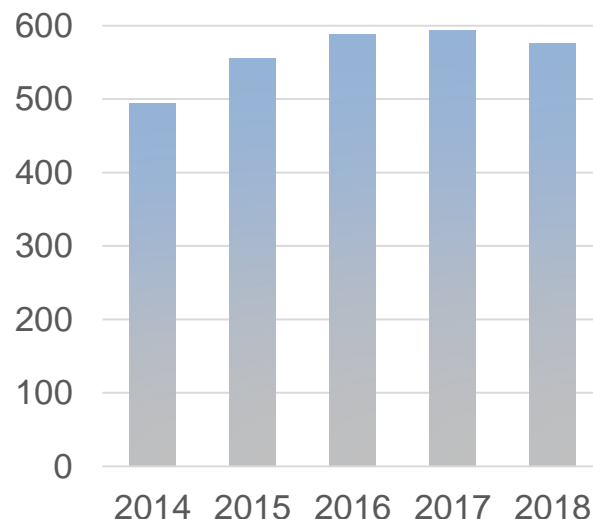
Traffic Fatalities Rising

Nationally:

- 2015-2016, Largest two-year increase in 50 years
- In 2017, 37,133 deaths
- 90+% Attributable to Human Error



Wisconsin:



Pedestrian deaths now up to 15% of all traffic deaths

Sources: NHTSA, NSC, WisDOT



SAE Levels of Vehicle Automation



0

No Automation

Zero autonomy; the driver performs all driving tasks.

1

Driver Assistance

Vehicle is controlled by the driver, but some driving assist features may be included in the vehicle design.

2

Partial Automation

Vehicle has combined automated functions, like acceleration and steering, but the driver must remain engaged with the driving task and monitor the environment at all times.

3

Conditional Automation

Driver is a necessity, but is not required to monitor the environment. The driver must be ready to take control of the vehicle at all times with notice.

4

High Automation

The vehicle is capable of performing all driving functions under certain conditions. The driver may have the option to control the vehicle.

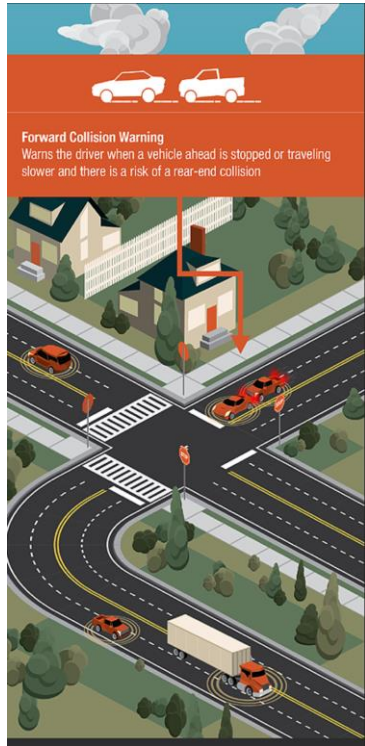
5

Full Automation

The vehicle is capable of performing all driving functions under all conditions. The driver may have the option to control the vehicle.



V2V / V2I Safety Applications



Forward Collision Warning



Motorist Advisories



Red Light Violation Warning



Pedestrian in Crosswalk



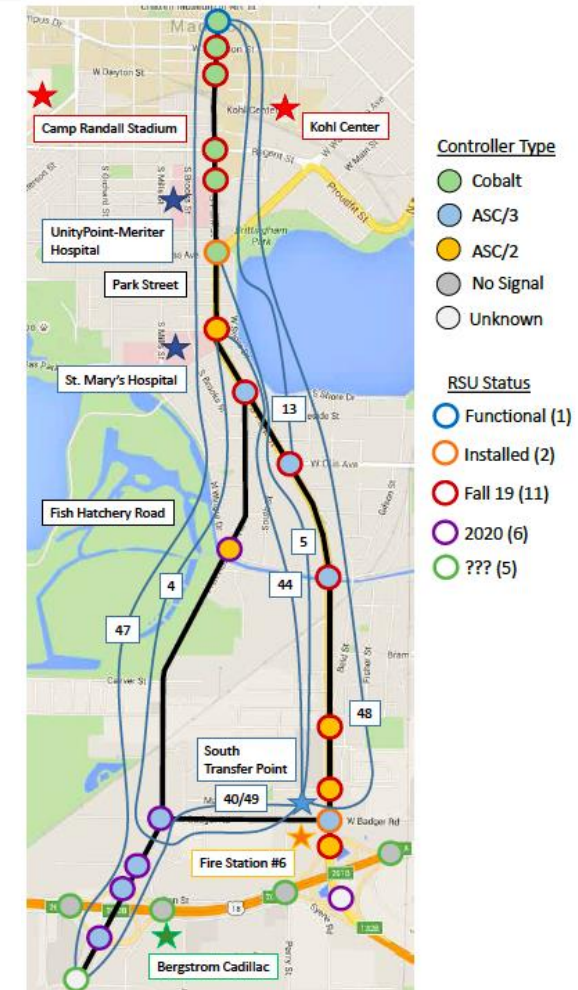
Wisconsin – MASSTO CAV Summit

- Held October 2019 at UW-Madison
- Region-wide conversation on how new CAV technologies have, are, and may impact state transportation systems
- Topics
 - MAASTO States CAV Initiatives
 - Strategy and Enforcement
 - Planning and Infrastructure
 - Truck Platooning
- AV/CV Demonstration



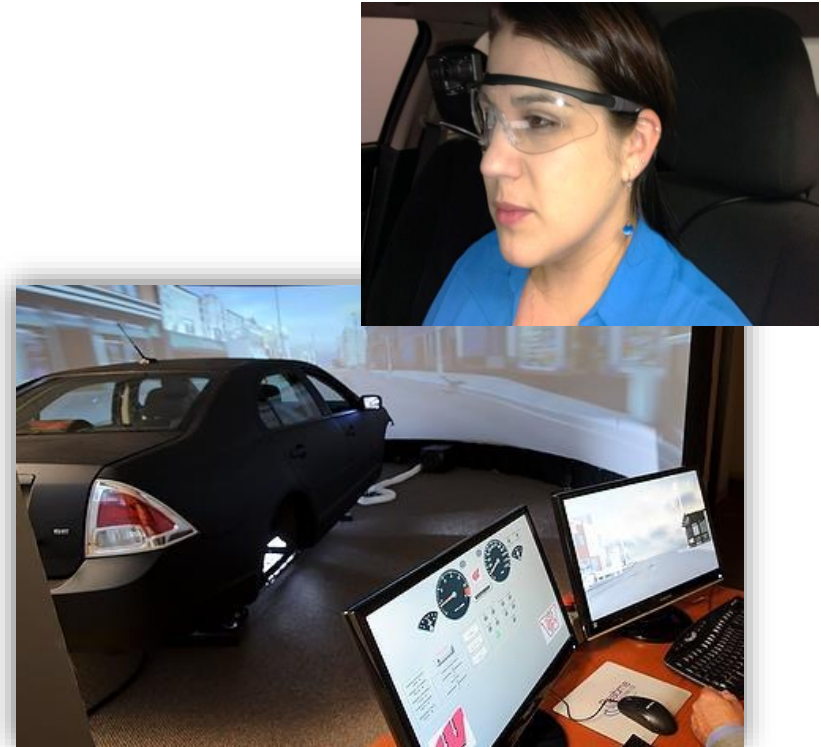
City of Madison Smart Corridor

- Satisfies SPaT (Signal Phasing and Timing) Challenge
- Goal: 26 DSRC deployment
- TSP/MMITSS application
- Transit/VRU interaction apps
- Red light violation warning
- V2I general testing
- Simulation-to-design
- Preparation for 5G



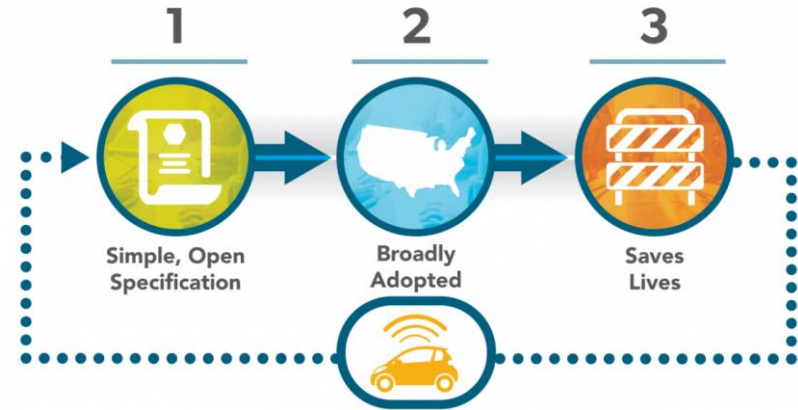
UW-Madison - Human AV Interaction (HAVI)

- Full-scale driving simulation
- Partial automation research
- Driver reengagement
- Disengagement scenarios
- Driver attentiveness / distraction
- ADAS/CV driver notification strategies
- AV interaction with human drivers
- Vehicle assertiveness



USDOT Work Zone Data Exchange (WZDx)

- Specification to enable ubiquitous access to real-time, harmonized work zone data
- Help automated driving systems (ADS) navigate work zones more efficiently
- Inspired by General Transit APIs (GTFS)
- FHWA grants forthcoming to jump start State Agency participation



Connected Automated Vehicle Highway (CAVH) Systems

“Simple Vehicle, Smart Road”

