Connected and Automated Vehicles (CAV's)

Minnesota House Transportation Finance & Policy Committee
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Safety First

Minnesota

   395 traffic fatalities estimated in 2020 (up from 364 in 2019)

United States

   36,096 traffic fatalities in 2019

 Worldwide

   1.35 Million Deaths in 2016

More than 90% percent of crashes caused by human error

http://resourcesforhistoryteachers.pbworks.com/w/page/138517074/The%20Rise%20of%20the%20Automobile%20and%2021st%20Century%20Self-Driving%20Cars

Did COVID Impact CAV Development?

- Maybe – but by December 2020

| Recent News Perspectives		
Topic	**Key Information**	**Other Information**
Autonomous Vehicles	• Cruise: Driverless testing in San Francisco • Motional: Driverless robotaxi service in 2023 • Nuro autonomous goods delivery service • Zoox robotaxi introduction • Mobileye video: AV drive in Munich, Germany • Baidu Apollo: 210K passengers in 3 cities • WeRide: $200M funding from Yutong • Apple AV speculations	• Cruise robotaxi services getting closer • With Lyft; Las Vegas is first city • In San Mateo & Santa Clara, California • Special purpose vehicle for robotaxi use • 1-hour drive with safety driver backup • Expansion plans to 30 cities in 3 years • Chinese bus maker → future bus AVs • BEV-AV instead of AV software only?
AV acquisitions	• Aurora acquired Uber ATG • Nuro acquired Ike Robotics	• AV platform battle to consolidation stage? • Ike AV software used Nuro AV software
AWS & auto industry	• BMW & AWS: IT services in 100+ countries • BlackBerry & AWS: Connected car sensor data • NXP & AWS: Connected car apps & data	• AWS becomes BMW's IT server farm • Cloud apps development & use analytics • Cloud apps development & use analytics
Source: Egil Juliussen, December 2020		

https://www.eetimes.com/wp-content/uploads/Egil-Dec.-2020.jpg

Recent Regulations

- ## Automated Vehicle Comprehensive Plan

- https://www.transportation.gov/av/avcp

- ## NHTSA Rule on AV Safety Standards

- https://www.nhtsa.gov/document/ads-barriers-final-rule

Automated Vehicles Comprehensive Plan, January 11, 2021, Washington, DC.

Automated Vehicles Comprehensive Plan builds upon the principles stated in AV 4.0, the plan defines three goals to achieve this vision for Automated Driving Systems (ADS):

1. **Promote Collaboration and Transparency** – USDOT will promote access to clear and reliable information to its partners and stakeholders, including the public, regarding the capabilities and limitations of ADS.
2. **Modernize the Regulatory Environment** – USDOT will modernize regulations to remove unintended and unnecessary barriers to innovative vehicle designs, features, and operational models, and will develop safety focused frameworks and tools to assess the safe performance of ADS technologies.
3. **Prepare the Transportation System** – USDOT will conduct, in partnership with stakeholders, the foundational research and demonstration activities needed to safely evaluate and integrate ADS, while working to improve the safety, efficiency, and accessibility of the transportation system.

https://www.nhtsa.gov/press-releases/rule-to-modernize-driverless-vehicle-safety-standards
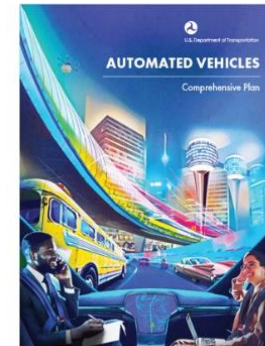
← NEWS

NHTSA Announces Historic Rule to Modernize Driverless Vehicle Safety Standards

Historic step removes unnecessary barriers to motor vehicles equipped with automated driving systems

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January 14, 2021 | Washington, DC

The U.S. Department of Transportation's National Highway Traffic Safety Administration today issued a final rule to modernize numerous Federal Motor Vehicle Safety Standards and clarify ambiguities in current occupant protection standards for vehicles equipped with automated driving systems that are designed without traditional manual driver controls.

"One thing I've learned about this technology is that if you put a date on it, it will happen earlier."

Frank Douma, University of Minnesota

Minneapolis Star Tribune, December 12, 2017

Minnesota Activities

- 2017-18, automated shuttle bus demonstration
  - Tested in winter weather conditions at the MnROAD facility
  - Public Demonstrations
    - Super Bowl
    - U of M
    - Rochester

- Platooning test allowed

- Governor's Advisory Council on Connected and Automated Vehicles, 2018, 2019-present

Autonomous Micro-shuttles

- Last mile transit gaps and campuses
- Max speed: 25 mph
- Capacity: 12-15 Passengers
- No steering wheel or brake pedal

https://kjzz.org/sites/default/files/styles/special_story_images_aspect_switcher/public/Olli_Alpha_LeftRear_DoorClosed_2-20191022.jpg?itok=oCLqLnHU

http://cms.ukintpress.com/UserFiles/4_%20Keolis%20
Navya%20Arma%20shuttle.jpg

http://stmedia.startribune.com/images/ows_1
50553932025970.jpg

http://www.autocar.co.uk/car-news/motor-shows-geneva-motor-show/volkswagen-sedric-concept-previews-self-driving-pod-vehicle
http://www.dailymail.co.uk/sciencetech/article-4287010/VW-unveil-self-driving-car-post-dieselgate-shift.html
http://www.telegraph.co.uk/cars/news/geneva-motor-show-2017-vw-group-unveils-sedric-prototype-driverless/

https://morningbrew-oslo.s3.us-west-2.amazonaws.com/1579703995.jpg

Zoox.com/press

https://nuro.ai/product

"The point is that we are gradually witnessing a coalescing toward one kind of specialty of a self-driving car, essentially a pod-on-wheels"

"Spoiler Alert . . ." *Forbes Magazine* Jan. 22, 2020, at https://www.forbes.com/sites/lanceeliot/2020/01/22/spoiler-alert-three-key-ways-that-the-new-and-electrifying-gm-backed-cruise-self-driving-car-minivan-might-have-some-heartburn/#41305149172d last accessed Jan 16, 2021

In other words, your first meaningful encounter with a CAV will NOT be in your garage

What's Next

- Improved Transportation for all
  - Improve equity and accessibility
  - Provide affordable transportation options
  - Address driver shortages
  - Especially in Greater Minnesota
- Private sector – a new and necessary partner
  - New market opportunities
  - Opportunities in the freight industry
    - Improve supply chains?
    - Address driver shortages?
- Get CAVs in front of the general public and show people that this technology is real and viable in their communities.

Thank you!

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- For more information: https://tpec.umn.edu/research/technology/