

Preparing Virginia's Highways for Automated Vehicles

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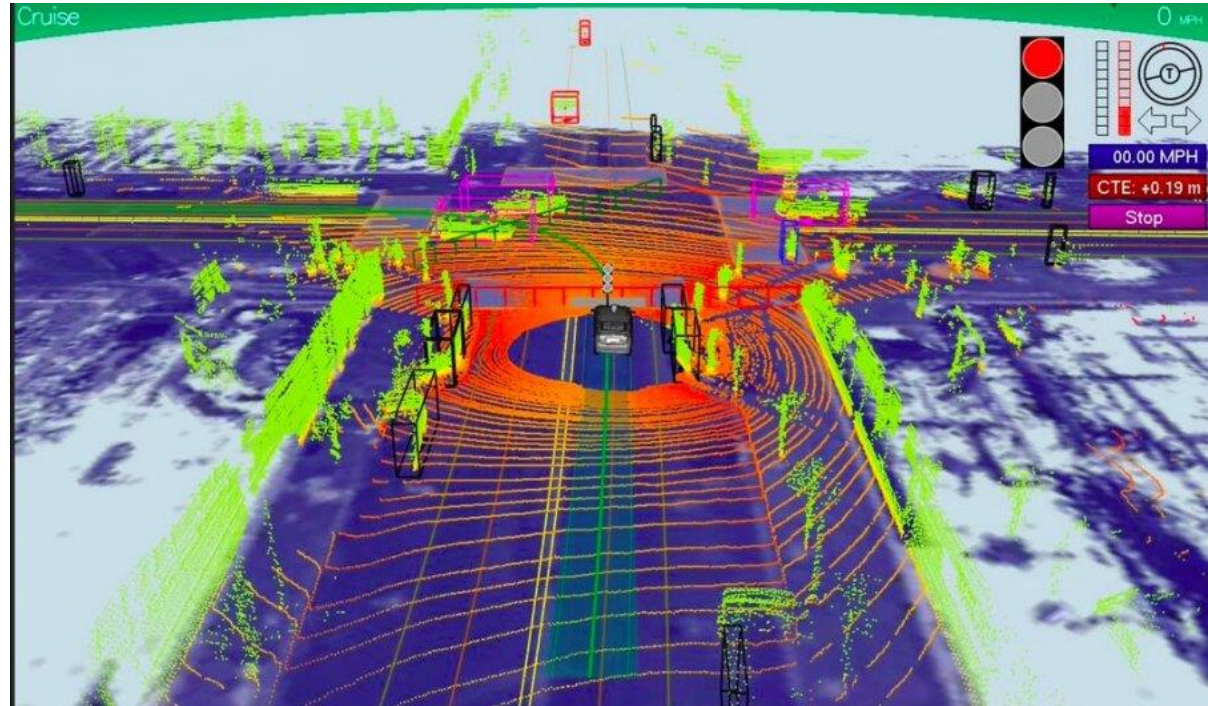
Vehicle Automation

- In development since the 1980s
- Regular, on-road testing since 2010
- Limited examples on road today
- Different levels of automation



How it Works

- Laser scanner
- Radar
- Stereoscopic video
- Electronic brake, throttle, and steering control
- Wireless transmission of detailed maps



DELPHI



Mercedes-Benz



TESLA

Google = 1.4 million miles



BOSCH



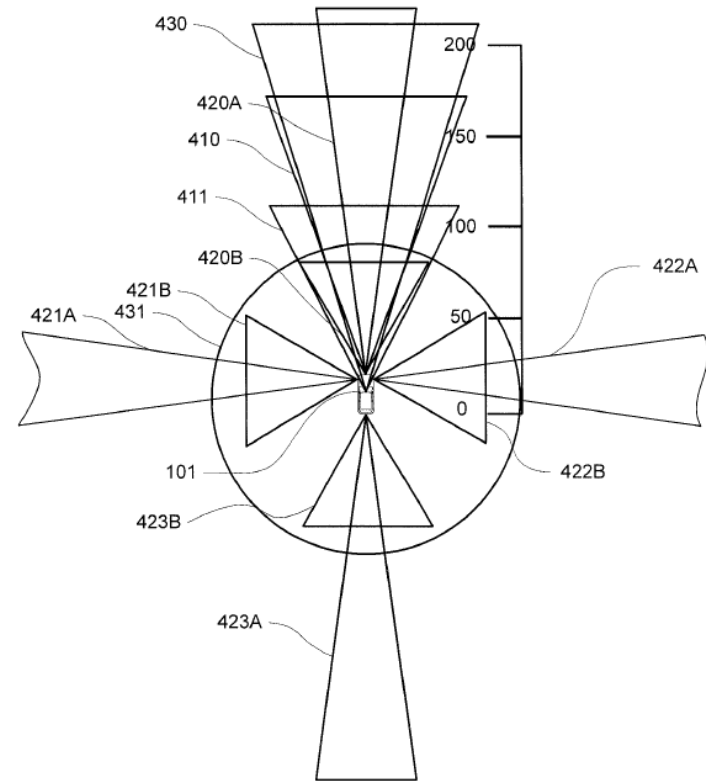
Should Improve Safety

Humans

- 90% of crashes partially due to human error
 - Inattention
 - Fatigue
 - Drug/alcohol impairment
 - Mistakes (over-correction)

Computers

- 360 degree sensing
- Better vision at night/fog
- More precise control
- Faster decision making



From: US Patent 8935034
*System and method for automatically
detecting key behaviors by vehicles*



Examples

- Tesla AutoPilot – Level 3
 - Combined steering and adaptive cruise control in limited situations



Examples

- Google prototype – Level 4
 - Will be fully self-driving, no input needed from passenger



Unconventional Vehicles



Activity in Virginia



Virginia Automated Corridors



Ongoing VDOT Policy Research

- These technologies may have profound impacts for VDOT over the next 20 years
- We need to plan for these impacts
- We need to investigate our regulatory framework in light of vehicle automation



Topics of Interest

- Regulatory and legal issues
 - Certification
 - Implications for Code of Virginia
- Security
 - Potential for cyber attack or manipulation
 - Potential use in criminal activity
- Human factors considerations
 - Degradation of driver skill and attention in semi-automated vehicles, their effect on safety, and potential policy countermeasures
 - Pedestrian/cyclist/human-driver interactions with automated vehicles



Topics of Interest

- Infrastructure impacts
 - Machine-readable signage, markings, and traffic control devices
 - Maintenance needs to support automated vehicles
- Travel impacts
 - Changes to travelers' value-of-time
 - Capacity impacts
 - Origin-destination changes with on-demand urban transit
 - Impact of automated vehicles on the last-mile problem in urban transit



Coordination in Virginia

- Department of Motor Vehicles
- State Police
- Virginia Unmanned Systems Commission
- Virginia Cyber Security Commission
- Virginia Tech Transportation Institute



Coordination Nationally

- NHTSA
- AASHTO
- American Association of Motor Vehicle Administrators
- TRB Vehicle-Highway Automation Committee (AHB30)
- CA, DC, NV, FL, and other states pursuing legislation



Questions?

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