Ford and Autonomous Vehicles

NCOIL 2018 Summer Meeting
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Details Matter: SAE Levels of Automation

SOCIETY OF AUTOMOTIVE ENGINEERS (SAE) AUTOMATION LEVELS

Full Automation —













0

No Automation

Zero autonomy; the driver performs all driving tasks.

Driver Assistance

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

2

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.

Conditional Automation

3

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.

High Automation

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

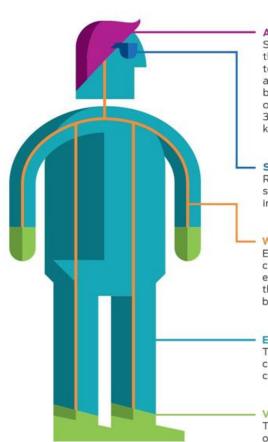
5

Full Automation

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



How a Ford Level 4-Capable Vehicle Works



Algorithms = Brain

Sophisticated computer algorithms process the sensor data enabling the autonomous vehicle to understand its environment. Cutting-edge algorithms – like neural networks that emulate the brain – help process information, learn and classify objects. Some technologies, such as high-resolution 3D mapping, offer autonomous vehicles foundational knowledge similar to the brain's memory.

Sensors = Senses

Radars, cameras and LIDAR act similarly to the senses of the human body to collect information 360 degrees around the vehicle.

Wiring = Nerves

Electrical signals move through the vehicle's controls to connect the computer to the engine, brakes and steering system to operate the vehicle, much as the body's nerves link the brain to muscles, hands and feet.

Engine, Brakes, Steering = Muscles

The engine, brakes, steering system: These comprise the muscles of the autonomous vehicle, creating movement just as in the human body.

Vehicle Platform = Body

The chassis of the vehicle acts as the skeleton, offering support and structure.





How Ford is Testing Level 4-Capable Vehicles

Ford in Miami

Ford and VTTI





Ford and Postmates





Ford and Domino's



What's Next for Ford?

- Ford anticipates deploying a Level 4-capable vehicle for ridehail and/or commercial use (such as package delivery) in 2021.
- In order for this to happen, policy changes – particularly federal law and regulation – are necessary.





Federal and State Policy

- Ford and other stakeholders believe the AV legislation being considered by Congress is necessary to facilitate AV deployment.
- In brief, that legislation is necessary because existing safety standards do not contemplate driverless vehicles and need to be updated, a timeintensive process.
- The federal legislation would provide a pathway to near and medium-term deployment through expanded use of exemptions, clarify that only NTHSA may set vehicle safety standards, and prompt a rulemaking by NHTSA to update existing standards.
- Importantly, existing state authorities, such as those related to vehicle registration, inspection, and traffic safety or "rules of the road," would be preserved.



Conclusion

- Ford looks forward to continuing to work with stakeholders to get policy right.
- Vehicle data is an issue your members care about, and we welcome ongoing dialogue to explore whether and how that data can be appropriately shared in the future.
- At this point, sharing mandates are premature because AVs are still being developed, as well as concerns about privacy and confidential business information.

