Collaborative Sciences Center for ROAD SAFETY

Coffee and Conversation Speaker Series

Proceedings from "North Carolina's Automated Vehicle Proving Ground"
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Dennis Jernigan, PE
Director of Highway Operations, North Carolina Turnpike Authority (NCTA)
North Carolina Department of Transportation (NCDOT)

Dennis Jernigan, Director of Highway Operations for the North Carolina Turnpike, talked about the ways in which North Carolina is working with autonomous vehicle performance experimentation on the Triangle Expressway, the state's toll road.

Jernigan began by announcing the October 4, 2018, release of the report *Preparing for the Future of Transportation: Automated Vehicles 3.0 (AV 3.0)*, the latest set of guidelines from the National Highway Traffic Safety Administration (NHTSA) and the United States Department of Transportation (USDOT). This report updates the September 2017 *Automated Driving Systems (ADS): A Vision for Safety 2.0.*

Two to three years ago, no one in North Carolina was planning for AV performance experimentation, according to Jernigan. There have been proving grounds in other states since the 1991 Intermodal Surface Transportation Efficiency Act (ISTEA) speculated full automated roadways or an automated truck by 1997. "We are nowhere near this " in 2018, said Jernigan.

In San Diego, automated vehicles were able to test automated vehicle technology. The automation required magnets, there were more than 93,000 magnets on the road.
"We don't want to be replacing magnets," said Jernigan.

America's Transportation Act 2016 (FAST ACT) specified a growing demand at the federal level for more testing to meet the needs of automakers and private individuals working to improve the technology. There is a recognition about the potential for economic and safety improvements with AVs.

- Improved road safety
- Decrease in pollution
- Reduced public transport spending
- Less waiting time, Productivity boost
- Decreased cost of mobility
- Equitable access to mobility

- Increased trade efficiency
- Freed up space

Some of the ways in which experts project these improvements is in the decreased space between cars by 67%-80%.

Currently, there is an estimated 40,000 deaths from vehicle crashes and that number is rising. “Technology is getting better and yet we as humans are doing a terrible job in staying safety,” said Jernigan. This is why testing is so crucial to bringing AVs to market.

Manufacturer goals and government goals are slowly aligning. Jernigan estimates that “as early as 2025, with one of these automakers, you are going to have to buy an electric vehicle if you want to buy a vehicle.”

Developing a set of permissions for testing AVs is something all states are grappling with. In California, for example, in order to drive an AV, one has to obtain a permit. Then the driver is required to issue reports on the AV performance so that the government can collect the data. .

This led to December 2016, when the USDOT began looking for proving grounds. North Carolina was one of 10 proposals chosen out of 64 proposals. The Triangle Expressway was the first all-electronic toll.

As of October 2018, however, USDOT no longer recognizes designations of ten "Automated Vehicle Proving Grounds. Congress is going to designate $60 million for funding where previously it was not going to be funded.

North Carolina remains an important proving ground because of its electronic tolling system. Tolling system potentially provides a wealth of anonymous data: m

- (Axle counts)
- Vehicle make/model
- Highly accurate travel time
- Speed profile
- Tag penetration rate: How many people are using the transponder vs. mailing in.

Some of this information can be useful in incorporating an overall data strategy in development and testing. One of the technologies the state is working on is Digital Short-Range Communication (DSRC) whereby the vehicle can communicate with the infrastructure and vice versa.

On the Triangle Expressway, Jernigan notes, “we have power connection every half-mile.”

Recent legislation is also showing promise for the state's interest in AVs. House bill (HB) 716 legalizes truck platooning is legal. Two or more vehicles in a convoy and they talk to one another. Breaking and the accelerating is done by the lead truck. Effective August 1. HB 469 defined fully autonomous vehicles, made them legal, and formed DOT Committee to study them.

Jernigan demonstrated that these state laws in North Carolina have passed with almost unanimity. This is key in demonstrating the state's commitment to providing experimentation infrastructure. "When we go to someone we can demonstrate unanimous support. You have to submit a testing plan. If we approve we will let you test on the Triangle Expressway and if it tests well then we can allow it. And maybe they keep coming back."

A recent program includes the CT6 Super Cruise (valued at $80,000) tested on the triangle Expressway in February 2018. The resulting testing report was 475 pages. NCTA has partnered with General Motors for testing, including a loaned 2018 Cadillac CT6 with SuperCruise.

In conclusion, planning for autonomous vehicles will require that stakeholders focus on safety while continuing to innovate and test features and design.