



Technology Issues in Transportation

Testimony of

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Introduction

Good morning, and thank you for the invitation to appear before you today. I am Greg Winfree, Director of the Texas A&M Transportation Institute. It is my pleasure to address your interim study charge, “Study emerging issues in transportation related to technology and evaluate the state's preparedness for addressing challenges and opportunities posed by technological advances. Review the implementation of state and federal programs and legislation related to intelligent transportation systems, autonomous vehicles, unmanned aircraft systems (i.e. drones), and other technological changes.”

This topic is near and dear to my heart. At TTI we are fully invested in forward-thinking transportation technologies, and our developing RELLIS Campus will be a state-of-the-art showcase for research in this field. We are also working closely with the Texas Department of Transportation, the University of Texas Center for Transportation Research and the Southwest Research Institute on the Texas Automated Proving Ground Partnership designated by the U.S. Department of Transportation. This partnership puts Texas at the forefront of testing and eventually deploying connected and automated vehicles on Texas roadways.

State Preparedness

I would like to start at the end and work backwards. To a great extent, the free market and the disruptive nature of rapid advancement dictate the technologies available to us, but at what point do they enter the policy sphere and demand legislative attention?

If I may, I would offer for your consideration a series of criteria: safety, accessibility, resilience, redundancy, recovery, privacy, and cybersecurity.

Safety is the protection of our citizens who are using, are exposed to, or are affected by the technology. The Texas Legislature has a long history of responding to technological threats to safety, some of which may have been eclipsed by newer technology. For example, in 1983, as an anti-harassment measure it became illegal to make a phone call and intentionally not hang up.¹ In those days either party could keep the line open. Today, not so much, and that measure may have passed its prime but is still on the books.

The Texas Legislature has worked hard to stay ahead of technology. Today, the word, “online” appears in 110 different statutes ranging from Internet dating to securities law.

¹ Penal Code 42.07(a)(5), Acts 1983, 68th Leg., p. 2204, ch. 411, Sec. 1, eff. Sept. 1, 1983

Accessibility is an approach that addresses those who may not be able to avail themselves of an important advancement. An example would be how the development of Transportation Network Corporations has affected mobility for people with disabilities. This particular subject was initially addressed through the courts, has also been addressed in statute, and we are seeing transit authorities subsidizing TNCs to provide seamless service for people with disabilities.²

Resilience is a technology's ability to withstand disaster or interruption and continue in service.

Redundancy is one way to provide resilience should a system fail. **Recovery** is having a plan for when things go wrong. The recent erroneous notification of a nuclear attack on Hawaii comes to mind. **Privacy** covers a lot of ground, even in the transportation world, as vehicles collect more data about how they are driven and communicate that data to more receptors.

Cybersecurity needs no introduction at this point but consider how it applies to that vehicular data, to intelligent traffic signals, to toll systems, to passenger ticketing systems, and even to the electronic message boards in use on our streets and highways. We are now seeing car companies developing application programming interfaces, commonly called APIs, that allow third-party developers access to telematics data and status info, and the ability to manipulate vehicle functions remotely.³ It appears that cars will be joining the Internet of Things.

Potential Technology Issues

As you well know, the transportation arena is a hotbed of technological activity. Here are just a few issues of special note:

- In the rapidly developing field of technology inside vehicles that move people and goods, there is a continuum that starts with simple driver assistance, like cruise control, and proceeds to fully self-driving vehicles and whatever lies beyond. We refer to the vehicles on this continuum as Connected or Automated Vehicles, or CAVs. Last session, you laid a foundation of regulation for CAVs, and we are now beginning to see the application of those regulations. One area at the Legislature may want to consider is the interaction of this law with other laws. For example, the statute regulating neighborhood electric vehicles or NEVs, does not quite coincide with last session's automated vehicle legislation, and raises questions about what happens when an NEV is also an AV. One of the last projects undertaken by our former Transportation Policy Research Center was to brief this issue, and I would be glad to provide you with that brief.
- The pace of using blockchain technology for electronic ledger systems is developing quickly in shipment tracking, manifests, and commercial transactions. There is also a

² <https://www.bostonglobe.com/metro/2016/09/16/first-its-kind-partnership-mbta-subsidize-uber-and-lyft-rides-for-customers-with-disabilities/QDdHJgzg87JpwbOazyW14H/story.html>

³ <http://www.autoconnectedcar.com/2018/01/mercedes-benz-launches-connected-car-api-daimler-splunks-data/>

strong potential for using blockchain technology in vehicle data communications. Another Policy Research Center report goes into some detail on the blockchain applications in transportation and that report is likewise available to you.

- I predict that as Unmanned Aerial Systems – or drones—continue to advance in size, speed, payload, time aloft, and operational distances, you will see more piecemeal legislation addressing where they can take off, land, and fly, and what they can do while airborne. It might be prudent to identify minimal criteria and standardize the restrictions and penalties for drone flight. Also, federal rules in this area will continue to evolve as well.
- We have had some successes applying technology to traffic safety problems, for example wrong-way driving mitigation and connected work zones. Innovations are sorely needed to address fatalities and injuries, especially for pedestrians and bicyclists.
- And speaking of bicycles, creative entrepreneurs have married bicycles with the Global Positioning System and created dockless bicycles that can be rented and deposited almost anywhere for the next user. This innovation is going through something of a shakeout period, with complaints rising about the number and location of the bicycles.⁴ I am not suggesting that legislation is necessary, just that it is something to keep an eye on.
- GPS, typically a federal concern, has become so pervasive in our society that our citizens and transportation networks rely heavily on it. At the same time, technology has exponentially increased the vulnerability of GPS. For example, if you type “GPS jammer” into your favorite search engine, you will see what is easily purchased on the Internet. A truck driver installed one in his truck so the boss could not track him, which worked great until he drove past the Newark Airport and killed the air traffic control system, shutting down the airport.⁵ You might consider that this national system can have acute localized impacts, and potentially be a subject for state review.
- Hurricane Harvey schooled us on what an extreme weather event can do to the infrastructure and our citizens, both physically and mentally. There were several problems we did not anticipate; for example, roads being submerged for long durations, and the shortage of fuel availability, which was due in no small part to panic buying by consumers. This is an area that appears ripe for the application of technology in both disaster preparation and recovery.

⁴ <https://www.bicycling.com/culture/dallas-dockless-bike-share-clutter>

⁵ <https://www.cnet.com/news/truck-driver-has-gps-jammer-accidentally-jams-newark-airport/>

Conclusion

It is our privilege as a state agency and as a member of the Texas A&M University System to bring science to bear on the many and varied problems facing mobility today and tomorrow. We appreciate the opportunity to perform this research for you and to testify today. This concludes my formal testimony and I would be happy to answer any questions