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TECHNICAL MEMORANDUM

TxDOT IAC – Technical Support to the CAV Task Force

DATE: December 7, 2022

TO: Zeke Reyna, TxDOT
Strategic Research Analyst, CAV

COPY TO: TTI_Reports@tti.tamu.edu
Tim Hein, Research Development Office, TTI
Ed Seymour, Executive Associate Agency Director, TTI
Robert Brydia, Senior Research Scientist, TTI

FROM: Beverly Kuhn Research Supervisor
Senior Research Engineer Texas A&M Transportation Institute

RE: Safety, Liability, and Responsibility Subcommittee
November 4, 2022, Meeting Notes

Attendees:

Andrea Gold	University of Texas Center for Transportation Research
Bart Teeter	Texas Department of Public Safety
Beverly Kuhn	Texas A&M Transportation Institute
Beverly Storey	Texas A&M Transportation Institute
Blake Calvert	Texas Governor's Office
Brenda Flores Dollar	Texas Department of Transportation
Brenna Lyles	Texas Department of Transportation
Brian Steiner	Cisco
Daniel Goff	Kodiak
Darran Anderson	Texas Department of Transportation
Ed Seymour	Texas A&M Transportation Institute
Jeff DeCoux	ATRIUS Industries, Inc.
Jeremiah Kuntz	Aurora
Julian Gomez	Julian C Gomez LLC
Kristie Chin	University of Texas Center for Transportation Research
Lauren Freriks	Texas Department of Transportation
Lori McMahon	Toyota

Maniel Vineberg	CAVWAY
Mark Worman	Texas Department of Insurance
Mikhaela Sample	University of Texas Center for Transportation Research
Robert Brydia	Texas A&M Transportation Institute
Sam Lott	Automated Mobility Services LLC
Tony Reinhart	Ford
Zeke Reyna	Texas Department of Transportation

I. Opening Comments– Zeke Reyna, TxDOT

- Welcome and roll call of attendance

II. Mural Board Discussion – TTI Team

- Introduction
    - Need to emphasize the education pieces to put forth for policy makers; short- medium- and long-term goals
    - Every single vehicle on the road is 100% autonomous with our carbon brain.
- Background
- Digital Infrastructure
    - Digital Twinning
        - need to contextualize the technologies as like-to-have but not necessarily need-to-have; vehicles need to be safe themselves and not necessarily rely on the infrastructure
    - Data Sharing/Exchange
        - No specific callout for sensing technology and associated AI to perceive from the infrastructure side; bullet list needs additional infrastructure-based sensing
        - Need to support the public-private data exchanges in the future
        - Vehicles need to be safe on their own accord without reliance on external data sources.
    - Geospatial Data
        - Need to get changes to the system (roadside, signs, pavement markings, etc.); needs to be shared by the government to the AV companies; increases the safety level
    - Cyber Security
        - Without having the infrastructure
        - Do we need separate conversation with homeland security? need an optimization in terms of mobility and national security infrastructure in place
    - Data Processing – Edge, Fog, Cloud, etc.
        - What happens when the camera failed, and the data service is not available? Be ready for less-than-100% level of service and the potential fallout from that
        - For consensus, we need the report to acknowledge the AV developers positions and allow for the value of the connected intelligent infrastructure to other uses. And if it proves valuable to AV, that will come too.

        - For that matter, if AV is using any kind of telematics connection to its platform, then they are using some form of communications backbone for that and is part of digital infrastructure even if it's not part of critical operations. But certainly, more and more OEMs are using digital infrastructure to engage their platforms.
- Physical Infrastructure
    - Notes:
        - Extreme conditions are more of a transportation problem and not specifically a CAV issue; might not be able to solve that challenge
        - Even if you leave Fully AV systems out of the context of need for infra, human-operated systems of all levels are using intelligent infrastructure, at least for cellular data.
        - Not all technologies are built on the reliance on the infrastructure and related support
        - State is responsible for maintenance of the network, licensing of vehicles and drivers, etc.; looking ahead, what are we trying to build for the citizens and commuters in Texas?
        - Would serve us to define what a goal architecture would look like; such as AV and related infrastructure (e.g., restricted access); what would we need for a safety-critical system? (similar to initial limitations of access to the interstate system)
        - Great video on the establishment of Interstate Highways: "We'll Take the High Road": https://www.youtube.com/watch?v=xTPgbePibWg
    - Operational Design Domain
        - The important is to focus on the areas where this technology is really being built out today (e.g., WZ data, law enforcement interaction / freight side) and specific applications where things are being done rather than blue sky topics
        - A vehicle with intelligent infrastructure can be precisely located and maintain the supply chain if the infrastructure is in place.
    - Pavement
    - Pavement Markings
    - Signage
    - Off-pavement
    - Maintenance
    - Drop-off and pick-up lanes
    - Works Zones
        - If the physical information related to a work zone is shared on platform / digital twin can be far superior to trying to replicate a human in a vehicle, key for resilience
- Interviews with CAV Industry Leaders
    - Notes:
        - Two major focus areas and perspectives from the leaders' perspectives; will have to work together
        - Scrub names and companies from next version
    - Digital Infrastructure Focus

    - Physical Infrastructure Focus
- Conclusion

III. Next Steps – Zeke Reyna

- If everyone would take some time to review the White Paper and send any further questions, comments, and/or recommendations to TxDOT or the TTI team
- As we move forward in development of a Final Draft, we will send it out to follow our voting process prior to assembling the Annual Report

IV. Closing Remarks – Zeke Reyna, Bart Teeter and Kristie Chin

- As a leader in this industry, Texas is setting the stage for adoption of best practices across the country
- Thanks to everyone for their time and participation
- Thanks to those who have given time and effort to the White Paper
- We are grateful to this committee for efforts to keep Texas a leader at the forefront of this industry