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## TECHNICAL MEMORANDUM

### TxDOT IAC – Technical Support to the CAV Task Force

**DATE:** September 1, 2021

**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  
August 19, 2021, Meeting Notes

#### Attendees:

Andrea Gold	University of Texas Center for Transportation Research
Bart Teeter	TxDPS
Beverly West	Texas Department of Transportation
Brad Schlueter	Schlueter Group
C. Michael Walton	University of Texas Center for Transportation Research
Darran Anderson	Texas Department of Transportation
Ed Seymour	Texas A&M Transportation Institute
Gerardo Interiano	Aurora
Jackie Erikson	Edge Case Research
Jeff Peterson	First Transit
Julian Gomez	Julian C Gomez LLC
Kathleen Baireuther	Ford
Krishna Satti	Michael Baker International
Leighton Yates	Alliance for Automotive Innovation
Lori McMahan	Toyota
Mark Worman	Texas Department of Insurance
Richard Steiner	Gatik

Robert Brydia	Texas A&M Transportation Institute
Tony Reinhart	Ford
Zeke Reyna	Texas Department of Transportation

**I. Opening Comments/Roll Call – Zeke Reyna, TxDOT**

- Welcome to all subcommittee members, grateful for large attendance and readiness to contribute and comment.
- Roll call of members and attendees
- Introduced meeting facilitators.

**II. Chair Welcoming Statement – Bart Teeter, Texas DPS / Michael Walton, UTCTR**

- Eager to move forward on items we have already identified as well as keep options open to new items that surface during discussions
- Looking forward to the ideas coming from this group regarding:
  - Infrastructure associated with AVs
  - Accident Investigation and Emergency Response associated with AVs

**III. Review of Meeting Structure – Robert Brydia**

- Recap of last meeting – giving direction for this year’s focus
- Today’s Mural Board Overview
- Inviting open discussion from subcommittee
  - Opinions
  - Thoughts
  - Questions

**IV. 2021 Subcommittee Opening Facilitated Discussion – Robert Brydia**

- **TOPIC:** Identify the full breadth of infrastructure components that need to be addressed eventually for AV operations and determine current status and guidance.
  - What are the gaps? We all know certain things are needed. Is what we thought we needed still needed? Are there new things that are needed?
  - Are there other areas where we are lacking? Be sure to consider technology advances and new levels of comprehension of the software available.
  - Infrastructure also doesn't necessarily have to be restricted to things that are on the road
  - AV industry perspective: TxDOT should think about whatever is good for drivers today, will be good for the industry tomorrow.
  - More insight and visibility into the "things" that are changes taking place on the road. Closures for example.
  - While striping is a start, we need to move beyond that such as:
    - Interconnectivity
    - drop-off and pick-up lanes
    - works zones
    - how to connect to locomotive engines (example).
    - Interconnectivity with other modes--state agency will likely have to be the lead

- Changes in the way we build roadways may have impact on driver's license preparations
  - Maybe we should separate infrastructure into layers
    - Physical
    - Digital infrastructure
      - Digital twinning
      - Data sharing
      - Data exchange
      - V-2X for cooperative driving
      - Harmonization of geo-spatial data
      - Cyber security, Next gen traffic management system deployments
      - Data processing aspects. Edge, Fog, Cloud, etc.
    - Should infrastructure be its own subcommittee?
  - Look from a Regional Corridor perspective
  - Alternate Fuels build-out
  - Impacts on this area from the transportation bill will indicate priorities (such as resurfacing of lanes)
  - Does TxDOT have plans for how to spend \$\$ from the infrastructure bill (e.g., charging infrastructure)
  - Big spectrum. Break into groups. Bite size what can be done.
  - Money-making idea. Adopt-a-pothole!
  - AV developers may not be the ones causing for 6" lane lines. They need to be there.
    - Width not nearly as important.
    - Consistency is most important.
- **PRODUCT**
  - White Paper
    - Educational component may be the most important thing we can do.
    - Understanding what the different AV levels mean to people (they don't understand how much autonomy they actually have).
    - Helping developers with the definition of the ODD
    - We really need to get more public and CV members to contribute to this. It's not just about AV. There are many CV actions that could be recommended. Also, there is a lot of data collection that could be gained via V2X and TMS and broadly disseminated via data sharing work (data subcommittee).
    - When AV companies say consistency in lane striping, is that allowing for need for different striping techniques based on the pavement type and expected environmental conditions of the area? E.g., can't have just one unified striping nationwide, even statewide.
    - Regarding question on consistency, I don't think we are pushing against variations in striping where it serves a safety purpose, we just need some sort of striping there consistently and don't need anything special just for us. Some states have picked up a narrative that AVs \*need\* 6 in lane stripes and that isn't the case.
    - May need multiple products
    - How do we scale a rating system based on risk or exposure?

- Resources exist to start this conversation.
    - UL 4600 Chapter 8.2
  - Infrastructure Orgs may have policy ODD restrictions
  - Identification of trends and possible solutions to trends.
  - May need to classify types of vehicles involved in a crash. Crash investigation currently remains what is the fault.
  - Response from the standpoint of battery systems. High voltage and low voltage systems.
- Potentially Secondary Product: Policy Recommendations
- **WORK EFFORT**
  - Industry interviews
    - Interviews may be helpful to start putting items into workable groupings
    - Discover what products are best for what audience
  - Case studies
    - What can we learn from DPS?
    - Safety concern: electric vehicles: how DPS responds/deals with high voltage
    - Crash investigation
    - Track hazardous material incidents throughout the state
  - Federal information review
  - Review of other states
  - Pending infrastructure bill

#### V. **Wrap Up – Zeke Reyna**

- Thank you to everyone for all the input. Really good discussion.
- We will be considering how we can build this out a little bit as we set up our next meeting.

#### VI. **Closing Remarks – Bart Teeter, Texas DPS / Michael Walton, UTCTR**

- Appreciate the engagement and exchange of ideas from everyone

#### *Additional Comments in Chat:*

[11:40 AM] Can you provide (now or afterward) some of what might be the "seminal" references on this topic to date?

[11:41 AM] [http://users.ece.cmu.edu/~koopman/pubs/Koopman19\\_SAFE\\_AI\\_ODD\\_OEDR.pdf](http://users.ece.cmu.edu/~koopman/pubs/Koopman19_SAFE_AI_ODD_OEDR.pdf)

[11:41 AM] To your question on consistency, I dont think we are pushing against variations in striping where it serves a safety purpose, we just need some sort of striping there consistently and don't need anything special just for us. Some states have picked up a narrative that AVs \*need\* 6 in lane stripes and that isn't the case.

[11:41 AM] UL 4600 Chapter 8.2

[11:48 AM] Agree. I'd still like to see the research that that's based on. Last I heard it was incomplete research and part of a bigger study. But then it became someone's mantra.

[12:01 PM] Thanks for a great conversation!