TECHNICAL MEMORANDUM

TxDOT IAC – Technical Support to the CAV Task Force

DATE: November 5, 2020

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: Data, Connectivity, Cyber Security, and Privacy Subcommittee
             October 9, 2020 Meeting Notes

Attendees:

Ashley Myers	Grace & McEwan
Beverly Kuhn	Texas A&M Transportation Institute
Beverly West	TxDOT Strategic Planning Division
Bobby Cottam	Burns and McDonnell
Brent Eastman	TxDOT IT Division
Brent Skorup	Mercatus
Brian Steiner	Cisco
Charlie Leal	Governor's Office
Darren Anderson	TxDOT
Erik Simpson	SeatsX
Gary Wallace	SiriusXM
Hannah Barron	Austin Transportation Smart Mobility Office
Jackie Erickson	Edge Case Research, Inc.

Jeff Stewart	AT&T
Johanna Zmud	Texas A&M Transportation Institute
Joseph Hunt	TxDOT
Kathleen Baireuther	Ford AV
Kellen Pucher	Panasonic
Kelly Curbow	AT&T
Matthew Smith	Michael Baker International
Monika Darwish	Embark
Rachelle Celebrezze	Cruise
Robert Brydia	Texas A&M Transportation Institute
Sam Dreiman	Argo.AI
Steve Pustelnyk	Central Texas Regional Mobility Authority
Steven Smith	McKinsey & Company
Sumeet Kishnani	Stantec
Thomas Bamonte	North Central Texas Council of Governments
Tom Black	Gartner
Tony Reinhart	Ford Motor Company
Zeke Reyna	TxDOT

I. **Opening Comments/Roll Call – Zeke Reyna, TxDOT**
- Zeke welcomed the group to the 4th Data, Connectivity, Cyber Security, and Privacy Subcommittee meeting.
- Appreciated everyone participating and eager to hear thoughts shared
- Will continue to use Mural today as the meeting is recorded

II. **Chair Welcoming Statement – Brian Steiner, Cisco**
- Appreciate everyone's willingness and engagement, looking forward to a good conversation today
- Thanks to committee members for taking time from your day to focus on this valiant effort and to the coordinators of this meeting and their preparations.

III. **Review of Task Force Web Site – Bob Brydia, Texas A&M Transportation Institute**
- Want to allow each sub-committee a chance to view and give feedback on the structure and information accessible via our new website developed by TxDOT and TTI which we hope to go live later this month.
- Preview website's four aspects
  - Activities of the Task Force
    - Information about each Sub-Committee
    - Future home of White Papers

- ▪ Meeting Minutes (notes are kept broad – feel free to review)
  - o Public
    - ▪ What is CAV?
    - ▪ What does it mean for them?
    - ▪ What does it mean for Texas?
  - o Industry (for those new to Texas)
    - ▪ For those coming into Texas who want to start CAV trials
    - ▪ How do they do that?
    - ▪ How do they get information to start?
    - ▪ Call out to those who want to share information to enrich others
    - ▪ Announcements in Texas
  - o Research
    - ▪ Map of Deployments Across Texas
    - ▪ Agencies involved in doing research (linked)
    - ▪ Continually developing resource
- Have FAQ section cross-linked and indexed (continuing to develop/living and active)
- Website is not fully populated yet.
- Please review current website and provide feedback to make this the best it can be
- Please do not share or forward this link.

IV. Review of White Paper Progress and Next Steps
- Initial Meeting
- Topic Discussion
- Voted on topics
- Developed an Outline
- Received Feedback on Outline
- Draft White Paper
- Under Review: this is where we are today
  - o We want to ensure that we get your feedback on the elements that included in the White Paper and how we can refine this document, enduring that it meets the objectives that were set out when we determined this topic
  - o On the Mural Board, you will see the main topics of the White Paper (Level 1 Headings)
  - o We will start with Introduction, as the front matter is fairly self-explanatory, and the Executive Summary will not be finalized until the rest of content is complete. But, do not feel that if you have a comment, we need to go in order of the headings.
- Opportunities

V. White Paper Draft – Facilitated Discussion
- Acknowledgements
- Disclaimer
- Texas CAV Task Force Charter
- List of Terms and Acronyms

- o Would this be better served at the end as an appendix to put the focus on the executive summary?
- Executive Summary
- Introduction
  - o first 10 pages appear to be background content; do we need a background primer with all of the white papers starting with the specifics?
  - o Any white paper that the group feels needs the foundational information on the basics of what CAV is, it needs to be in each document. This is the best so far. Need a common approach in each document.
- Connected Vehicles (CVs)
  - o CV appears to be vehicle connecting to an RSU; overlooks vehicles that are connected to the cloud via standard cellular data; CV services offered by OEMs
  - o Not clear enough what is a CV and what is an AV; CAV could be confusing; global suggestions to distinguish between the two
  - o Expand on why latency is so problematic for CVs
  - o Clear distinction between CV and AV
  - o Are these descriptions still not simplified as well as the could be for the common reader?
  - o Not all CVs will be AVs; not all AVs will be CVs -- so need to make distinction. The paper seems focused on CVs, so make that clear.
  - o Right now, it appears to be an academic analysis and conceptual issues related to data; need to bring it back to the roles of agencies with respect to CAV data
  - o Make sure this is a 2-way conversation with regard to data; what does TxDOT and the companies care about with regard to data and how is that documented; what is conversational and what is debatable
  - o Last paragraph (right before AV paragraph) p. 7: in lieu of the first sentence, rewrite, saying there are existing industry standards regarding the transmission of BSMs. Is this the FMVSS standard that is currently proposed?
  - o Do we want to be detailed on the two options? Make this more general since all have not agreed as to whether those are the only 2 options (use 2 primary technologies rather than options)
- Automated Vehicles (AVs)
  - o First sentence could be more descriptive in distinguishing CVs from AVs. One is about communication and the other is about driving (perceiving, planning, and reacting.)
  - o List of examples indicates that things like back up or blind spot cameras are automation. This isn't accurate because they aren't involved in the driving task. These are non-automation related safety functions. Refer to SAE J3016 for examples
  - o In the sentence after the first list, it references that most developers are at level 2.5. The levels aren't really degrees and SAE says they should only be referred to by whole numbers. Some developers would also say they are already at level 4
  - o Add information on open data standards to make the fusion efforts easier; discuss what is emerging from industry

- o There are announced intentions of Level 4; perhaps use the term ADAS (Level 2-3: still a driver in the vehicle);
- Government Regulation of CAVs
  - o Re: the Federal / National Efforts subsection--it may be worth recognizing the current FCC activity on the 5.9 GHz band: Also influencing the development of CVs, the FCC has proposed changes to the rules for the 5.9 GHz band currently allocated for enabling V2X communications (FCC NPRM in Docket No. ET 19-138). The proposal would reduce the amount of spectrum allocated from 75 MHz to 30 MHz and change the technology permitted to be used in the band from DSRC to C-V2X (PC5). If ordered, these rules will reduce the amount of data the band can carry via V2X communications, for both CVs and AVs, and may impede voluntary deployment of communications using the band.
  - o It might be worth including in the "Federal/National Efforts" section re: ITS funding: The National Highway Performance Program (~$23 billion annually) allows funding for "infrastructure-based intelligent transportation systems capital improvements, including the installation of vehicle-to-infrastructure communication equipment." 23 U.S.C. § 119(d)(2)(L). The Surface Transportation Block Grant Program (~$11 billion annually) likewise allows for "construction of . . . infrastructure-based intelligent transportation systems capital improvements, including the installation of vehicle-to-infrastructure communication equipment." 23 U.S.C. 133(b)(1)(D).
  - o The coinciding development of 5G wireless technology, autonomous vehicles, and smart city applications is creating commercial demand for vehicle-to-infrastructure
  - o Govt reg of CAVs - distinguish between CVs and AVs; other sentence (3rd that starts with although): begs the question of whether there is something that we need to be doing; subheading on Federal/National efforts describes AV 1.0 - AV 4.0. There are differences between AV and CV rulemaking which will make a difference with respect to ITS funding; when we are talking about these things, precision is important because the audience might not be as well versed in this; funding could be complicate; talk about what USDOT is doing to be different than what Congress is doing and the next highway authorization bill. The new self-drive act, which was reintroduced but likely stalled might need to be added.
  - o Pilots in Vegas tracking GPS over time, you could get enough data from varying sources to support accurate lane keeping
  - o Callout of GPS data (p. 8) might be an issue since it is only accurate to 1 meter; might want to mention real-time kinematic data which would be needed for lane-keeping;
  - o Theme of how things are presented: is there an opportunity to talk about public agency or infrastructure-generated data (e.g., transit data that can be consumed); can talk about what is generated on the public side that can be useful CAV data; 2-way flow of data and for us to be successful in the PPP, it is critical to work together and understand what OEMS are generating and how they interact with the community around them; from an industry partner

perspective they will want to know it is not a 1-way street; Table 3: Agency-Generated Data for CAV;

- Texas Context
    - First Paragraph under Policies: overall theme is that TxDOT wants the task force to produce white papers to document what the group is bringing to Texas as a whole in terms of knowledge related to CAV; want the Task Force to serve as a focal point to engage and inform the legislature; want to be careful not to offer up a lot of seeming need for regulation or specific recommendations for legislation (the paragraph suggests that the laws might need to be revived; not necessarily the case); would like to delete this section and mention the most recent bill related to PDDs that passed last session
    - USDOT discussion on the CV Pilots vs. ATCMTD grants, which are also specifically connected; need to be specific on the two and ensure that Texas is included with regard to the 3 ATCMTD grants
- CAV Data-Related Ownership and Privacy Principles
    - Last paragraph in this section, pertaining to the industry privacy principles -- suggest modifying first two sentences to read: "These privacy principles are enforceable against the signatory OEMs by the Federal Trade Commission. However, their impact on consumers regarding data ownership and ultimate data privacy protection is untested."
- CAV Data Use and Data Generation
    - 30 terabyte data generation seems like it needs more context highlighting this point to me would scare readers about network capacity to transmit
    - On p. 13 - discussion on privacy principles: no detail on how the vehicle data is tied to the owner; most of the data is fairly anonymized;
    - Bottom of p 17: talks about how much data there is; might be overblown in terms of the amount; doesn't seem that all of the data that will be collected by the vehicle will be off-loaded to the cloud; seems that the OEMs will determine what will need to be off-loaded and some of it will only be needed for immediate use by the vehicle; some of it might be overwritten
    - On p. 16 table/chart - was synthesized; under "safety" it doesn't mention law enforcement, courts, and other entities that would likely want access to the data; under diagnostic, doesn't mention auto repair
    - On p. 17: accurate in terms of how not many folks are use the data today; there probably are some using real-time data from cell phones from 3rd party aggregators; Las Vegas is deploying a project that is using CV data directly as well as Salt Lake City
    - On p. 19: there might be an opportunity for more discussion on data sharing itself; seems that the biggest issue right now with regard to public sector is that have to buy it; there might be some data that is being generated that they are giving away for free; might be that agencies will need to rely on 3rd party entities to sift through all of the data to make it usable for TMCs and other public agencies
    - On pg 16, the CV transmissions should reference new models and models of using/storing the data model. Edge data centers as well as edge compute is being utilized to break down the larger data requirements and decreasing

latency and other issues that are brought up by real time interaction required for CV
- o Who owns the BSM? Is that relevant to the owner? Any discussions on this? detail?
- o There are some callouts to specific named companies, and it is not always favorable; avoid specific corporate references (Volvo, GM, Cruise, etc.); takes away from what we are trying to do; keep the focus
- o Need to rely on the discussions for the public-private partnerships
- o even beginning with the text box (in Europe); the different is that the EU has implemented a broad consumer privacy laws; there is no Federal law and we are relying on an assortment of state laws; the OEM needs to determine the boundaries between what belongs to what data is owned by the consumer and what is owned by the OEM;
- o (CAV) there is no law that governs the collection of CAV data (with reference to CA);
- o CA consumer privacy act governs everything in CA and covers potential CAV data and its use;
- o text box appears to infer that there is a need for those laws; be more accurate of what is going on in that space; need for more discussion in this space
- o Call out the trade alliance etc. is that comprehensive? does it cover any developer that might be engaged in this space? lots of conversations going on; General Data Protection Requirements Opportunities, Challenges, and Models for Data Sharing
- o Cybersecurity data-related sharing for threat awareness without sacrificing privacy information; ISAC
- Opportunities, Challenges, and Models for Data Sharing
  - o Refer to the issue related to everything being transmitted to RSUs; really might mostly be cellular or wireless (4G LTE) (p 17)
  - o Disagree on latency and cloud - cloud based RSU V2X systems can easily operate in the 500ms - 2s latency range. Captures a huge amount of use cases/applications
  - o The reference to the Tesla crash should be corrected to 2016 vice 2015 (though there was also a near-identical crash in FL in 2019).
  - o We could refer to current public/private efforts related to transit data (ie. GTFS efforts): https://gtfs.org/
  - o Under Data Sharing Model subsection, the reference to the Auto-ISAC needs correction to read along the lines of: "Industry consortia were also identified, such as the Automotive Information Sharing and Analysis Center (Auto-ISAC), comprised of 56 member companies from across the auto industry, that shares information on cyber security risks, exchanges best practices, and facilitates collaboration amongst its member companies."
  - o On p. 17 - talks about going to the cloud for automated functions; latency associated with that might not drive immediate decisions about a particular action; cloud more for downloaded updated maps and info that can be used to make decisions

- What data sources and agencies documented here as well (table #3 on p. 22); need to round this out with more explanation on the roles of agencies; who has which data, etc.
- The two tables referring to the types of data; data required to provide to CA is basic data; suggest striking this section; the two types of data are different when it comes to what is required from regulators vs. more infrastructure-related data
- In the list of what data companies might collect, the companies might not be collecting all of that data; include a broad statement indicating that this is the type of data that might be possible to collect and share; not all AV and CV companies conducting testing might not be collecting all of that data (tables 2-3)
- No mention of data sharing activities in Texas; there are some beginnings of those activities; we want to mention them so that the legislature is aware of them (e.g., access to DriveTexas for information on closures, etc.); data sharing related to freight corridor projects; highlight these;
- Paragraph just above S&C: distinction to make in the Tesla example that the vehicle is not a high-level AV (rather a conditional example); as a whole the paragraph vilifies OEMs in general; need to clarify why there is a data sharing problem and what might be solutions; soften this text
  - Also note the level of automation of the vehicle
  - Remove specific reference to Tesla
- The licensing and registration subcommittee discussed data sharing; might be able to cross-reference some of the content that is included in that white paper; what would be helpful information / data to share from TxDOT; tension with respect to data privacy and/or trade secrets and IP; will continue to exist; can frame it as a way to have those conversations and share what they can while protecting what needs to be protected from public disclosure

- Summary and Conclusions
  - 2nd paragraph: expand to understand that not all data is for the consumers; it is part of the conversation but not all of the discussion; doesn't necessarily tell the entire story
  - The paper tends to focus on vehicle-generated data and needs to be noted in this section as well; not just consumer-privacy data
  - We should give ourselves a shout-out for all of the work that the task force is doing and will continue to have and work through; looking to work on addressing these issues together
  - Data-sharing types: 4 types mentioned - TxDOT has a network of 200 towers that send GPS corrections generally used for surveying and mostly internal now; is that something that industry would see as a high-value data; strong possibility that OEMs would find that data beneficial
- References

VI. Next Steps – Brian Steiner / Zeke Reyna
- We will start modifying the document with these comments. We expect it to take another 3 weeks of writing.

- If you have additional comments, please email them so we can look them over as well.
- Once we prepare the next revision, there are two possible paths, based on what the subcommittee would like to do:
  - Send out revised version via email, subcommittee can review it, submit final thoughts, and accept it in the way in which it was written. We can then finalize it and get it into editorial review, 508 compliance production and give it to the Task Force
  - Or, if you feel that there are enough changes that warrant another meeting, even if it is brief, we can schedule that.
- Once it is agreed upon, it goes to the Chair who presents it to the Full Task Force.
- This committee prefers to hold a brief meeting again for feedback on the next draft

VII. Closing Remarks – Brian Steiner
- Such a pleasure to be a part of this process and this team
- We appreciate the constructive contributions of this team and we are grateful for each and every one of you.
- Thanks to the writing team for a great effort