MEETING SUMMARY

MEETING ATTENDEES

Attendee	Representing
Jeff Barghout	Robocist, Inc.
Chris Blue	Town of Chapel Hill
Robert Cannaday	NC State Highway Patrol
Thomas Chase	Institute for Transportation Research and Education
Chuck Church	NC Division of Motor Vehicles
Michael Clamann	UNC Highway Safety Research Center
John Congleton	NC Department of Justice
Starla Couso	Kimley-Horn and Associates
Jeff Dale	Kimley-Horn and Associates
Torrey Dixon	NC Department of Justice
Mark Ezzell	NC Governor's Highway Safety Program
Wei Fan	UNC Charlotte
Amanda Good	Kimley-Horn and Associates
Jeff Jaeger	NC Department of Transportation
Dennis Jernigan	NC Turnpike Authority
Jennifer Keel	NC Division of Motor Vehicles
Martin Kinnamon	City of Charlotte
Kevin Lacy	NC Department of Transportation
Michael Langley	Pepsi Bottling Ventures
Monica Laufer	Argo AI
Katie Marshall	Self-Driving Coalition for Safer Streets
Joseph Montano	Waymo
Thomas Moore	Cardinal Government Affairs on behalf of General Motors
Michelle Osborne	NC Department of Insurance
Tim Peterson	NC State Highway Patrol
John Policastro	NC Automobile Dealers Association
Judy Schmidinger	NC Division of Motor Vehicles
David Spencer	Town of Cary
Stephanie Sudano	NC Department of Transportation
Jason Wager	Centralina Council of Governments
Paula Windley	NC Division of Motor Vehicles
Katie Wong	Kimley-Horn and Associates

MEETING NOTES

Attendees were welcomed to the meeting followed by a brief outline of the meeting agenda. A request was made for additional presentations for the next meetings – In the Know. Today's meeting included two presenters. Stephanie Sudano, Special Projects Engineer in NCDOT's

Integrated Mobility Division (IMD), presented on the CASSI project and Michael Clamann, Senior Human Factors Engineer at the UNC Highway Safety Research Center, discussed his research on automated vehicles from the perspective of first responders. Both presentations are provided as attachments to the summary.

In the Know

CASSI Deployment Updates (Stephanie Sudano)

Stephanie Sudano discussed the reasons behind the project, the goals, the previous deployments, and some lessons learned. Some of the highlights of the presentation include:

1. NCSU Centennial Campus was temporarily suspended due to action by NHTSA then indefinitely suspended due to COVID; storage site turned into PPE manufacturing facility
2. Wright Brothers National Memorial – 12 weeks, 3,000+ passengers even with limited capacity due to COVID; 774 trips and 263 survey responses
3. Lessons learned
   a. Fast growing grass/weeds can impact the shuttle speed so it must be cut quickly
   b. Pedestrian behavior – some like to walk on the road instead of the sidewalk but CASSI cannot deviate from the route in autonomous mode so there is some work to be done with education or consideration with pedestrians; Wright Brothers National Memorial implemented an informational sign to alert pedestrians of the needed change to behavior
   c. Service closed due to standing water from heavy rainfall; service closed when precipitation was heavy
   d. Script needed for consistency with the operator messaging
   e. Extensive field testing is recommended for limited mobility loading areas and pedestrian crossings
   f. Finding storage locations is challenging (height of vehicles and climate control is limiting)
   g. Recommend close on-site observation for first week or two
   h. Maintain a shared deployment diary between partners
   i. Meet weekly for communication between partners

CASSI Q&A

1. Kevin Lacy: Can you talk a bit about the registration and legalization of the vehicle?

    a. Stephanie Sudano: IMD wanted a low-speed shuttle rather than a NHTSA compliant vehicle; public/private roads are the same due to Public Vehicular Area laws; NC required shuttle to be NHTSA compliant or a NHTSA waiver for the US manufacturer but NHTSA didn't have a process for US based NHTSA waivers so we pivoted to an imported shuttle; equipment regulations that were a challenge with the DMV (FMVSS) such as the steering wheel, rear view mirrors, etc. which was eventually solved by collaboration and substitute equipment such as a rear facing camera.

2. Jeff Barghout: Also, cannot get a US based shuttle. Is there any movement in getting this changed so they can get the NHTSA wavier for US based shuttles?

    a. Stephanie Sudano: Considered the export to Canada and import back to US but that is what they are doing now with NHTSA's approval. NPS is deploying the Local Motors shuttle (Olli) in Yellowstone.

    b. Kevin Lacy: We have suggested to manufacturers to elevate through the legal process, particularly with an emphasis in the last four years, to fight the disadvantage to the US companies.

3. Omar Shaikh: After implementing CASSI shuttle what would you have done differently or what would you look for if you did it again?

    a. Stephanie Sudano: Low-speed automated shuttle was good to test from a transit/mobility perspective (first mile, last mile and limited mobility solutions); it is not ready for prime time, speeds are slow, weather conditions are a challenge; technology is improving and, as they improve, technology can be downloaded to the vehicle but it isn't ready for full-time deployment; survey results were overwhelmingly positive and interested about the future of transportation.

4. Tim Peterson: Will there be a demonstration coming up?

    a. Stephanie Sudano: We are talking to some potential partners both in the Triangle area and hopefully at the N.C. Transportation Summit next year.

First Responders' AV Perspective (Michael Clamann)

Michael Clamann discussed his research of "*advancing crash investigation with connected and automated vehicle data.*" This research was a collaboration with multiple universities. Some of the highlights of the presentation include:

1. First Responders (law enforcement, fire and rescue, EMS, roadway response, towing and recovery)
   a. Asking for license and registration, unlocking a door, rolling down a window, all will be replaced with different interactions; the challenge is finding common/agreed upon interactions between agencies and manufacturers

2. Law Enforcement and Crash Investigation
   a. The role of the "driver," vehicle, roadway, environment in a crash
   b. Requires specialized tools and training which have already evolved over the decades of traditional vehicles

3. Event Data Recorder
   a. 2012 – NHTSA began mandating specific elements of the event data recorders if present (device itself is not mandatory but there are mandated minimum data elements if they are present)
   b. For example, speed, engine throttle, seatbelt status, airbag deployment
   c. Technician can download the report from the vehicle
   d. EDR data is not necessarily a replacement for a good crash investigation but as a supplement and corroborating data
   e. NTSB after Tesla crash in 2017 said that EDR data is inadequate to comprehend even the simplest questions of who/what controlled an AV at the time of the crash; the useful data came from Tesla engineers; today, many think that knowing who is in control of the vehicle is a minimum safety requirement/standard

4. Detailed Crash Data
   a. Can also use sensors/cameras in the vehicle to observe other crashes
   b. Sonar, radar, lidar, cameras, short-range radar, wireless communication

5. Data Recording
   a. No current standard data elements for law enforcement, researchers, and others who need to determine why an ADS-enabled vehicle crashed

6. Voluntary Guidance for Automated Driving Systems
   a. 28 companies have submitted this to NHTSA; 12 have mentioned emergency responders; only 3 have mentioned data following a collision

7. Law Enforcement & AVs
   a. This interaction is already occurring and will continue to increase over time

8. Research Objectives

    a. How can newly available AV data improve crash investigation?

    b. Include law enforcement in this conversation to get their opinions on effectiveness of AV data for crash investigations

9. Survey Design

    a. Small groups of semi-structured interviews with NCSHP

    b. In-person workshop with law enforcement

    c. Nationwide law enforcement surveys based on where there was AV deployment

10. Survey Questions

    a. Top three pieces of data you'd like the vehicle to collect and give to law enforcement

        i. Video data

        ii. Automation performance

        iii. Speed or in-vehicle video

    b. What do you like most about EDR data and what do you like least?

        i. Abundant and helpful data

    c. What could be improved?

        i. Universal cables/single system for gathering data

11. Additional Findings

    a. Video can be used in criminal investigations and are useful in non-occupant collisions

    b. Current five-second data record is insufficient to show aggravating factors

    c. Reports are inconsistent among manufacturing

    d. Training materials are not keeping up with the technology

    e. Crash reports – law enforcement will need guidance on this

12. Tracking AV Crashes

    a. NC updating the crash report form for the first time in 12 years

    b. If we put AV dynamic data elements on this list and law enforcement doesn't know what to do with it, we need to train them

13. Next Steps

    a. Research continuing for another year including speaking with professional crash investigators to get an additional assessment

    b. Explore AV topics to add to future law enforcement training

First Responder AV Q&A

1. Kevin Lacy: Who owns data?
   a. Michael Clamann: We avoided that question on purpose because we wanted to get the best-case scenario and worry about constraints later.

2. Kevin Lacy: Did you look at California rules like required law enforcement training?
   a. Michael Clamann: I have not seen in those interaction plans any information for data/crash investigation, more about opening doors, moving the vehicles, etc.

3. Michael Clamann: Stephanie, did you have law enforcement input or get feedback from them during CASSI?
   a. Stephanie Sudano: Our steering committee did have law enforcement, and they were included in the steering committee meetings.
   b. Stephanie Sudano: Also had training for local fire/EMS/police during the deployments.

4. Kevin Lacy: What increase in data time coverage were they requesting?
   a. Michael Clamann: Between 30 seconds (crashes) vs. 24 hours (criminal investigations).

5. David Spencer: A lot of what is going on is after the event occurs, could use data for preventative measures like changes to streets, etc.
   a. Michael Clamann: A lot of people are interested in tracking when things go right/vehicle makes the right decision/near-miss data but that was not part of this particular research effort. But, yes, companies are interested in learning more about this.
   b. Kevin Lacy: I have talked to companies about testing in NC and asking them to give NCDOT feedback on what makes it easy or hard in NC.

6. David Spencer: Microsoft was doing some video analytics on near misses and not sure where it went but that was what sparked my interest.
   a. Amanda Good: Google is also doing a lot of near-miss analysis.
   b. Kevin Lacy: We just reviewed an initial proposal for video analytics and if successful we will see that here.

7. Chuck Church: License and Theft Bureau purchased hardware and software to get events out of the EDR (not sure how many times they have done that, but it was several years ago).

8. Chuck Church: In February 2020 when we met, we talked about making emergency procedures/interaction plans accessible to law enforcement, but how are we going to follow up on that?

   a. No real conclusion here about how to move it forward.

Update on Draft Legislation

Kevin Lacy provided an update on HB814: Neighborhood Occupantless Vehicles. Nuro is taking the lead on this HB (might be familiar with Domino's commercial). One of the concerns was about state law adding to federal requirements and if federal exemption overrules the state law. Crafted language to exempt fully autonomous vehicles from having equipment that is for motor vehicle operation by a human driver but is not needed for operation by an automated driving system alone. This Bill has passed the House and is in the Senate.

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(c)   Equipment Exemptions. – A fully autonomous vehicle that is designed to be operated exclusively and at all times by an automated driving system shall not be subject to any State law or regulation requiring the installation, maintenance, or inspection of vehicle equipment that relates to or supports motor vehicle operation by a human driver, but is not necessary for operation by an automated driving system alone. "Automated driving system" is defined in G.S. 20-400."

SECTION 3. This act becomes effective October 1, 2021.

Draft Legislation Q&A

1. John Congleton: Are these vehicles registerable?
   a. Kevin Lacy: These are fully autonomous vehicles, but they needed to address their classification as a low-speed vehicle and the limits on where they could operate which were more restrictive than what they thought their vehicle was capable of.
2. John Congleton: So, these will fit FMVSS with the exception of steering wheel and windshield wiper?
   a. Kevin Lacy: Yes, they will be registered in NC as fully autonomous vehicles and will be tagged and treated like a low-speed vehicle; in the long run you will see these at higher speeds and a regular delivery vehicle outside of low-speed environments; for now, they will be operating as grocery store delivery vehicles in a specific zone near the store and will follow all rules of regularly operated vehicles.

Roadmap and FAV Collaboration

Jeff Dale discussed the effort for updating the NC CAV Roadmap. Kevin Lacy mentioned the current document is over five years old and, with this technology, it was time for an update. We need to determine what we have learned over the last few years to then figure out how we move forward – where do we want to be? The effort will evolve into a strategic plan for CAV. The update process will include:

- NC and Industry Assessment: this would be a three-part assessment.
    1) Assessing the roadmap to determine what has been accomplished, in progress, or pending.
    2) Assessing other states and leveraging appropriate strategies.
    3) Expand on identifying the state of the industry – how is the future defined/forecasted?
- Define the Vision and Goal Development: by working with the working groups to develop action plans.

The update would include input from the FAV Committee. Some of the expectations include:

- Will want input for the vision.
- Will want feedback from recommendations from working groups.
- Feedback on action plans.
- Review and provide feedback on strategic plan and other documents.

But what do we need today?

1. Any thoughts regarding where NC should go? Chat? Email?
2. Provide your designated contact for this strategic plan process in case they are not on the committee or on this call.
3. What groups might you want to be included in?
    a. Business
    b. Infrastructure
    c. Legislation
    d. Operations
    e. Research

We are currently working on a detailed schedule but will plan to meet every few months. Kevin reminded everyone, if they have seen anything in other states/areas that would be good for NC, send them to Amanda Good.

CAV Strategic Plan Q&A

1. Kevin Lacy: If we need to condense the working groups, let's consider that.
   a. Jeff Dale: After we craft the vision and get volunteers, we can definitely pivot the working groups.

Open Discussion

Thanks to everyone for their participation and excitement for the CAV Strategic Plan. Few emails to keep in mind:

- Jeff Dale's email: jeff.dale@kimley-horn.com
- Amanda Good's email: Amanda.good@kimley-horn.com

Finally, Amanda Good and Kevin Lacy thanked the Committee members and guests for their attendance and participation, and the meeting was adjourned.