



MEETING SUMMARY

MEETING ATTENDEES

| Attendee | Representing |
|-------------------|--|
| Racquel Asa | Beep, Inc. |
| Sarah Bales | Brubaker and Associates, Inc. on behalf of FedEx |
| Jeff Barghout | Robocist, Inc. |
| Daniel Baum | Navigator LLC |
| Charles Blackwood | Orange County Sheriff's Office |
| Robert Cannaday | NC State Highway Patrol |
| Chuck Church | NC Division of Motor Vehicles |
| Michael Clamann | UNC Highway Safety Research Center |
| John Congleton | NC Department of Justice |
| Justin DeLancey | NC Department of Transportation |
| David Estrada | Nuro |
| Mark Ezzell | NC Governor's Highway Safety Program |
| Wei Fan | UNC Charlotte |
| Jennifer Foote | Beep, Inc. |
| Anna Gallup | City of Charlotte |
| David Goldwater | Nuro |
| Amanda Good | Kimley-Horn and Associates |
| John Hardin | NC Department of Commerce |
| Stephanie Harmon | Kerr-Tar Regional Council of Governments |
| David Howard | NC Department of Transportation |
| Kendell Jackson | NC State Highway Patrol |
| Jeff Jaeger | NC Department of Transportation |
| Dennis Jernigan | NC Turnpike Authority |
| Wendy Kelly | Focus Public Affairs, LLC on behalf of Toyota |
| Martin Kinnamon | City of Charlotte |
| Kevin Lacy | NC Department of Transportation |
| Michael Langley | Pepsi Bottling Ventures |
| Tom McInnis | NC Senate |
| Joseph Montano | Waymo |
| Andy Munn | Nuro |
| Tim Peterson | NC State Highway Patrol |
| John Policastro | NC Automobile Dealers Association |
| Frank Sculetta | NC Community College System |
| Debbie Smith | City of Charlotte |
| Nick Smith | Waymo |
| Paul Steinman | HNTB |
| Stephanie Sudano | NC Department of Transportation |
| Marco Sylvester | Venable LLC |
| Jason Wager | Centralina Council of Governments |
| Chris Wall | Nuro |



MEETING NOTES

Attendees were welcomed to the meeting followed by a brief outline of the meeting agenda. Raquel Asa and Jennifer Foote, both from BEEP, provided a presentation about BEEP and the process and partnership they have with local transit agencies and communities that deploy their AV shuttles.

David Estrada from Nuro presented a brief overview of their vehicle and how the vehicle works in local communities. They included a brief overview of their law enforcement interactions plan and their plan for working with the NC legislature. Joseph Montano from Waymo provided a brief overview of the Waymo vehicle and how it works. They are a semifinalist for the Inclusive Design Challenge for their AV Wayfinding.

Each presentation had a short Q&A session:

Questions and Answers

1. [BEEP] How many shuttles do you have?

Currently we have eight in one location but manage 16 in other locations.

2. [BEEP] Do you have any remote operations that utilize a command center?

We are working on plans for teleoperations. 5G and cybersecurity are the main components that we are working through.

3. [BEEP] Have you looked across jurisdictional lines regarding operating equipment/vehicle in one state while the vehicle is in another?

Anyone who comes into the company goes through a background check. Also, for the teleoperations, we engage with local jurisdictions and review all local/state traffic laws. We ensure everyone understands how teleoperations works and what happens in certain situations.

4. [BEEP] Are the teleoperators driving the vehicle through a computer?

For the most part, an onboard attendee is needed, per NHTSA, for AV shuttles in the US, especially in mixed traffic. The vehicle operates on a preprogrammed route that is geolocated, and only a few locations are trying out the remote operations. In the event the operator needs to take over the shuttle, they can be using the cameras and sensors on board. The teleoperator would then maneuver the vehicle around the incident.



5. [BEEP] When there is a mechanical failure, are teleoperations working?

There would be two scenarios; if there is a mechanical failure and the vehicle is not working as it should, this would be a mechanical at fault. If the operator was operating and an incident occurs, this would be an operator at fault. Data can be pulled from the sensors and cameras to determine who may be at fault.

This continues to be a point of contention and policy needs to be defined and worked through. Teleoperations is on the horizon (~ 12-18 months). Also, teleoperation is considered a failure mode, not primary mode.

6. [WAYMO] Do you allow the occupant to turn off the driver experience?

No, this is not permitted of the occupants to do.

First Quarter Activities/Updates

Manual on Uniform Traffic Control Devices (MUTCD) Part 5 Revisions [Comment]

The FAV Committee members were asked to review and provide comments regarding the revisions to the MUTCD Part 5 – Automated Vehicles. Comments were originally due February 16, but the due date for comments has been extended. ***Anyone who would like to provide comments can do so – submit comments by April 20th.*** Comments will be consolidated, reviewed, and submitted for consideration.

NC Brochure for Industry

As part of the first quarter activities, the committee would like to develop a brochure to provide to the industry informing them NC is open for business. This will be led by NCDOT and will include pertinent information for partnering in NC, legislation, and other key points companies may need to know.

Draft Amendment Language

Based on recent reference to the Bill, it was clear during the registration process of the AV shuttle that the required equipment on the vehicle was a stumbling block that needs to be addressed. Some suggestions for an amendment to the Bill include:



- Provide a process for granting equipment waivers; NHTSA still controls some of the language, but these vehicles are to operate without some of the standard vehicle equipment (i.e., steering wheel, rear view mirror, etc.)
- Include testing language or at the minimum include a statement that anyone testing in the state needs to coordinate or communicate with DMV
- Require AV manufacturers who sell or operate elsewhere (outside NC), they will need to include an emergency document that informs NC law enforcement what to do/how to interact if involved in an incident

It was suggested for more federal guidance on what should or should not be part of an autonomous vehicle. Draft language was provided to the FAV Committee members for review/comments. ***Please provide feedback by March 24th.***

Gap Assessment

Another first quarter activity is to perform a gap assessment, identifying activities NC could engage in based on the information gathered from other states. The assessment will analyze data collected to identify current/completed activities that could impact NC. This assessment will identify potential partners, educational opportunities, and potential funding sources.

Second Quarter Activities

NC C/AV Roadmap Update

The previous version of the NC C/AV Roadmap was completed in 2016 and is due to be updated. The update will be slightly different, but the overall document will incorporate industry changes and needs for the future of NC.

Open Discussion

Question: Are there additional opportunities or activities the committee and friends would like to see more of/be engaged in?

- Joe Hummer (NCDOT) is working with the Transportation Planning Division to complete a sensitivity analysis on future planning.
- Education for AV and Bus Rapid Transit (BRT)
- Present at the Board of Transportation's Future Technologies subcommittee
- First responder AV educational session/interaction day (AAMVA)



- Michael Clamann (UNC Highway Safety Research Center) is the primary investigator on a project to obtain the law enforcement perspective of CAV specific data elements that would provide the greatest benefit to future crash investigations.
- Promotion of additional platooning opportunities – crash attenuator (maintenance/construction)
- Explore particular corridors in the state that would lend themselves to FAV implementation like they have in CA for initial use case studies (per Roadmap)
- Engage Center of Excellence more

Comment: Thanks to all those who volunteered to support some of the ideas above.

- Dennis Jernigan – driverless TMIA crash cushion coordination
- David Howard – Board of Transportation coordination

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