Collaborative Sciences Center for ROAD SAFETY

Coffee and Conversation Speaker Series

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John Hodges-Copple, Regional Planning Director
Triangle J Council of Governments

John Hodges-Copple, Regional Director at the Triangle J Council of Governments, utilizes his experience in planning to explore the environmental implications of automated vehicles (AVs). He examines how technology, cost, regulation, culture, and behavior impact planning for AVs.

Hodges-Copple began by introducing his organization, the Triangle J Council of Governments, also known as CoG. It is a regional planning organization, covering:

- 7 counties
- 30 municipalities

It operates under 3 program areas:

  - Regional planning: Water resources, energy and the environment, development and Infrastructure, Economic Development (just designated as an economic development district by the federal government)
  - Aging services: Paratransit, and
  - Member services: Water resources, economic development, infrastructure, and the environment.

The organization has no taxation or regulation powers. "This means people trust us," said Hodges-Copple. Since planning has many layers of approval across local, state, regional, and federal processes, CoG works to support its member counties and municipalities.

Automated vehicles are categorized across 5 levels of automation. "A lot of the world-changing benefits are in that last level (5). We're not there yet. And it's only when we reach a critical mass of us" driving at level 5.

"More people, more trips, more single occupancy, more polluting cars, driving at sub-optimal speeds, that's how we end up with people in hospitals with respiratory issues," said Hodges-Copple. "The issue is not the technology but how do we actually use it."

He discussed how we often depict the future of technology and its use. He showed images from 50s, 60s, and 70s depicting the future of vehicles and noted that many publications show as illustrations, the plusses but not the concerns about new technology. An example is the recent American Planners

Association (APA) report on AVs that showed less traffic, lots of pedestrian and bike traffic as if "we loved AVs so much we didn't use them. Culture is going to play a significant role in how AVs are used. This is the case with many technology developments.

Currently, AVs are at the peak of a Hype Cycle, said Hodges-Copple. He defined the Hype Cycle as a way to measure the adaptation of new technologies. This measure was developed by research firm Gartner. The levels of social and behavioral adaptation of technology according to this measure is as follows:

- Innovation trigger
- Peak of Inflated Expectations
- Trough of Disillusionment
- Slope of Enlightenment
- Plateau of Productivity

AVs are at the Peak of Inflated, said Hodges-Copple. This means there will be a disillusionment phase coming. With that in mind, he outlines four things we need to think about in forecasting the environmental impacts of AVs:

- **Technology:** what are we able to do?
- **Cost:** What can we afford to do?
- **Regulation:** What should we do as a society?
- **Culture/Behavior:** What are we willing to do as individuals?

Technology: Young entrepreneurs are driving most of the development. However there are issues of cybersecurity. And while human error is seen as a tragedy, technological error is seen as unforgiveable. The technology of how the AV "sees" objects is still in the infant stages. Hodges-Copple showed the research of Dr. Missy Cummings from Duke University on what the AV observes and it looks a bit like a water-color painting.

Cost: AVs raise the unit cost of the vehicle, but there are moderate cost savings come from sharing. There is a modest cost savings from owning a private autonomous vehicle. This comes from expected efficiencies.

Regulation: This includes insurance and liability. The average age of a car is 11 years. Even if every vehicle from today on were AV, it would still be 20-25 years before we were all using them. What is the market penetration needed to transform infrastructure? There is often little reward for legislators and regulators to move quickly and take risks in addressing these issues in insurance products and laws.

Culture/Behavior: Most AV discussions seem to have a cultural assumption that everyone will embrace technologies based on exciting features, evidence-based benefits, and the guidance of experts, but this assumes a stable regulatory environment. This assumption does not account for some of the culture around vintage cars or not wanting to surrender some manual maneuvering of the vehicle.

Community Planning Implications

Uncertainty is the key; and flexibility and adaptability would seem to be important components moving forward. “This is a great topic; no one can prove me wrong yet,” joked Hodges-Copple. He outline a few of the planning implications where there are more questions than answers at this early stage. They include:

Road capacity and design: On the one hand the new AV technology could induce travel. If driving is easier and cheaper, consumers will do more of it. An example of this is in the case of the driver reaching a destination such as work. Will that person be sending the car home and summoning it again? Will there be 2 trips where there used to be one? On the other hand, we have some very efficient actions available with AVs, such as platooning, whereby trucks especially can drive closer together, saving road space. Additionally, what about parking? What will be necessary? What will it look like? These are questions planners will tackle in the decades ahead.

Highway Infrastructure Investment: Currently there are busways in North Carolina, said Hodges-Copple. There is some analysis on possible high-occupancy vehicle (HOV) or high occupancy toll (HOT) lanes. Depending on changes in demand due to autonomous vehicles, would there be a managed autonomous vehicle lane?

Streetscape: How much of the curb lane is devoted to what uses? To what degree of vehicle sharing rather than degree of automation may be the critical factor for streetscape impacts, if curb parking replaced by curb PUDO and delivery---marginal difference?

Transit and Other Shared Vehicles: Transit technology is not the first decision; it’s the last. Travel markets-travel corridor

AV Outlook

When do we think AVs will really be here? When market penetration (another couple decades) occurs. It doesn’t mean there won’t be a few people using these. “I’m going to be more on the longer-term side of things,” said Hodges-Copple.

What about who will have them first? Hodges-Copple forecasts fleets with paid drivers where down-time is money: truck, buses, ride-hailing. These firms will have the incentive to innovate in saving labor costs.

Where will it all happen? Straightforward, well maintained interstates, and multiple lanes, said Hodges-Copple. This is where speeds can increase, vehicle separations can decrease, and lane designations can shift over time.

“That’s why the NC Turnpike Authority (NCTA) is testing them,” said Hodges-Copple, referring to the authority’s program on the Triangle Expressway, an all-electronic toll road. “It’s the perfect place for [AVs].”