What Should Local Governments Be Doing to Prepare for Automated Vehicles in Kansas?

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Vehicle automation is rapidly changing the transportation landscape. By 2021, 11 of the largest auto manufacturers plan to have some level of autonomous vehicle on the road. Automation technology has the potential to provide significant societal benefits ranging from reduced traffic fatalities to making to easier to find a parking spot. However, the pace at which this technology is evolving poses planning challenges for local governments. The purpose of this article is to provide basic information about the future use of automated vehicles in Kansas and what your audience needs to be doing (or thinking about) to prepare for them.

Automation 101

University research centers, transportation agencies, and automotive companies have been researching automation technology since the 1980s. By the early 2000s, research teams were able to build vehicles capable of completing a 60-mile urban course. Today, automation technology has gone commercial with 11 major auto manufactures planning to have some form of autonomous vehicle available by 2021.

Automated vehicle technology uses a "sense-plan-act" design that incorporates a variety of cameras and sensors that gather data on the vehicle's environment such as lane markings, vehicle behavior, and pedestrian activity. This data is then interpreted by software algorithms that plan the vehicles actions. The software converts the plans into commands in the vehicle's control system – brakes, steering, etc. This process operates on varying loops and frequencies for different functions. For example, a data loop connected to the emergency braking system would run at a much higher frequency than a loop used for navigation.

The Society of Automotive Engineers classifies automation technology into five categories ranging from no automation to fully autonomous. While advanced automation technology is being piloted by companies like Google and Tesla, most vehicles today
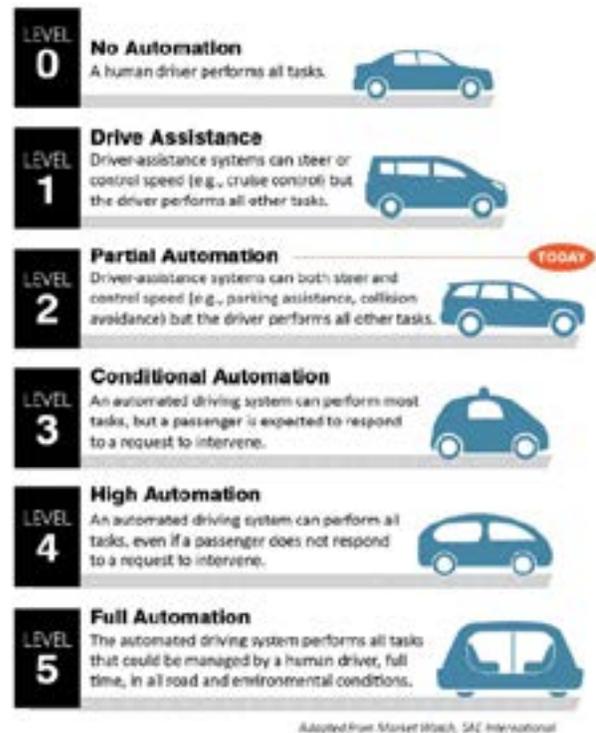

Figure 1. The Evolution of Autonomous Vehicles

utilize partial automation technology such as parking assistance, collision detection, or lane correction. Figure 1 shows the evolution of autonomous vehicles.

Planning for automation in Kansas

Although the widespread use of highly or fully automated vehicles is years away, the right time for local governments to start planning is now. The Mid-America Regional Council (MARC), based in the Kansas City metro area, has identified seven policy areas that local governments should focus on when planning for autonomous vehicles. MARC identified questions to drive movement in each policy area and made recommendations for planning actions for local

governments. The following are the seven policy areas and the driving questions:

- **Travel Demand Management and System Performance** — How can we anticipate changes in travel demand and maximize the safety benefits that AVs promise?
- **Infrastructure, Planning and Investment** — What new infrastructure systems and standards are needed to support AV deployment? What impacts are AVs likely to have on traditional transportation funding sources and what new revenue opportunities might they create?
- **Data Management and Cybersecurity** — What new partnerships, capacities and strategies will the public and private sectors need to securely manage and share AV-related data?
- **Environment and Land Use** — How might changes in travel behavior lead to changes in development patterns? Can AV technology support compact, efficient development and reduce the negative environmental impacts of transportation?
- **Equitable Access and Mobility Services** — How can AVs be deployed to equitably serve the needs of people and communities with transportation disadvantages?
- **Economic and Workforce Opportunity** — What opportunities and risks might AVs create for regional industry clusters, our workforce and the region's economic competitiveness?
- **Certification, Liability and Insurance** — How might AVs impact these issues, particularly for area local governments?

See "Driving Change: A Policy and Planning Framework for Autonomous and Connected Vehicles in Greater Kansas City" for more information on actions local governments can take to prepare for autonomous vehicles. https://www.marc.org/Transportation/Plans-Studies/pdfs/Driving-Change-AV-White-Paper.aspx

Rural considerations

Autonomous vehicles are not new to rural areas – they have been used for years in farming operations. But those vehicles do not interact routinely with traffic on roads.

We talked with Mike Floberg, Director of KDOT's Innovative Technologies Division, about how counties and rural communities should be preparing for autonomous vehicles on their road systems.

Floberg said the strategy for using autonomous vehicles in Kansas will be stepped -- depending on the size of the jurisdiction. Connected vehicles will likely come first, he said, and these would start on the interstate system and then eventually the state and local systems. These would function like

trains, reducing the space needed between a system of vehicles. These are anticipated for use on major highways and also in local areas to get goods from factories to interstates. Another application for autonomous vehicles might be automated transit buses within a community that would visit common destinations. To use automation technology, vehicles will need reliable infrastructure to delineate the roadway, and this would likely be on main roads and major freight routes.

In local areas, Floberg anticipates that an autonomous vehicle would still be "manned," and the attendant would help with loading and unloading and any trouble-shooting needed en route. It would be like flying a plane on auto-pilot. You still need the pilot.

Some places in other states are testing driverless vehicles, but they are geofenced and in very controlled environments.

Cities and counties will have the most time to prepare, Floberg said. "They should be thinking about getting main roads up to standard with pavement markings and signing," he said. Floberg would like to see KDOT and local governments cooperate more on pavement marking projects. Local agencies could contract with the same pavement marking vendor, for example, to stripe the state and local roads in the same general area and create some cost efficiencies. Floberg said Clay County approximately 5 years ago went in with KDOT on a pavement marking project.

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- Mike Floberg

Floberg also said it will be important to keep roads and roadsides clean, and to plan for that in maintenance schedules. And to get a public information campaign together for residents about autonomous vehicles.

There have been bills in the Kansas Legislature in the past to test semi-truck automation on interstate highways, but there were challenges and didn't move forward. Policy, sensitivity and thorough understanding can cause delays. "We've got time. No need to panic," Floberg said.

A recent Federal Highway Administration (FHWA) tour for knowledge exchange in automated and connected systems specifically in local agencies. The report has not yet been released. We will let you know when they publish it. This may contain more ideas and

examples to learn from as automated technology is rolled out across the country.

Another opportunity to learn more about autonomous vehicles and local governments will be to attend a seminar titled Autonomous Vehicle Transportation in Rural and Urban Settings (Seminar 4 of 4). This will be a free 2.5 hour presentation on the topic, hosted by Wichita State University. A date has not yet been set for this seminar, but you can check this website for more information (and also for presentations from previous seminars on the topic). https://www.wichita.edu/research/WSUInitiatives/technology-takes-the-wheel/PPT-Recording-Download-Page.php

Conclusion

Autonomous vehicles will eventually come to the transportation system in Kansas. Local governments have time to get ready for them. To prepare, it would be helpful to learn how the technology works and initiate conversations with your business owners and elected officials to plan ahead for investments you might need to make (and maintain) in your jurisdiction's infrastructure to facilitate their use on routes that would serve your community's needs.

Source:
Interview with Mike Floberg on April 27, 2020.

Endnotes
1. Henaghan, J., Rouse, D., Kelley, C., Nisenson, L., & Jordan, J. (2018). Preparing Communities for Autonomous Vehicles . American Planning Association.
2. Anderson, J., Kalra, N., Stanley, K., Sorensen, P., Samaras, C., & Oluwatola, O. (2016). Autonomous Vehicle Technology: A Guide for Policymakers . RAND Corporation .
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4. Mid-America Regional Council. (2018). Driving Change: A Policy and Planning Framework for Autonomous and Connected Vehicles in Greater Kansas City. Kansas City, Missouri.
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ADDITIONAL RESOURCES

- The FHWA has a variety of resources on automated vehicles: https://www.transportation.gov/AV

- A detailed primer on connected and autonomous vehicles is here: https://ops.fhwa.dot.gov/publications/fhwahop17001/ch1.htm

- If you have questions about your local Kansas government's steps in preparing for autonomous vehicles, reach out to Mike Floberg at Mike.Floberg@ks.gov.

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