DRIVING CHANGE

A Policy and Planning Framework for Autonomous and Connected Vehicles in Greater Kansas City

INTRODUCTION

Greater Kansas City, like other metropolitan areas across the nation and around the world, is facing a technology revolution that will fundamentally change how people and things move from place to place. Without question, autonomous and connected vehicles are on the way; in fact, a high degree of automation is already incorporated into the cars and trucks that roll off today's assembly lines. What seemed like a futuristic fantasy a few short years ago is rapidly becoming reality.

This seismic shift in transportation and mobility will bring new opportunities and new challenges. Autonomous and connected vehicles (AVs) may make travel safer and more efficient, and greatly improve mobility for older adults and other underserved populations. AVs might also have unintended consequences, as they could lead to longer commutes, increased traffic and higher vehicle costs. While the future is uncertain, one thing is sure: regions that don't prepare for and adapt to emerging transportation technologies will be left behind.

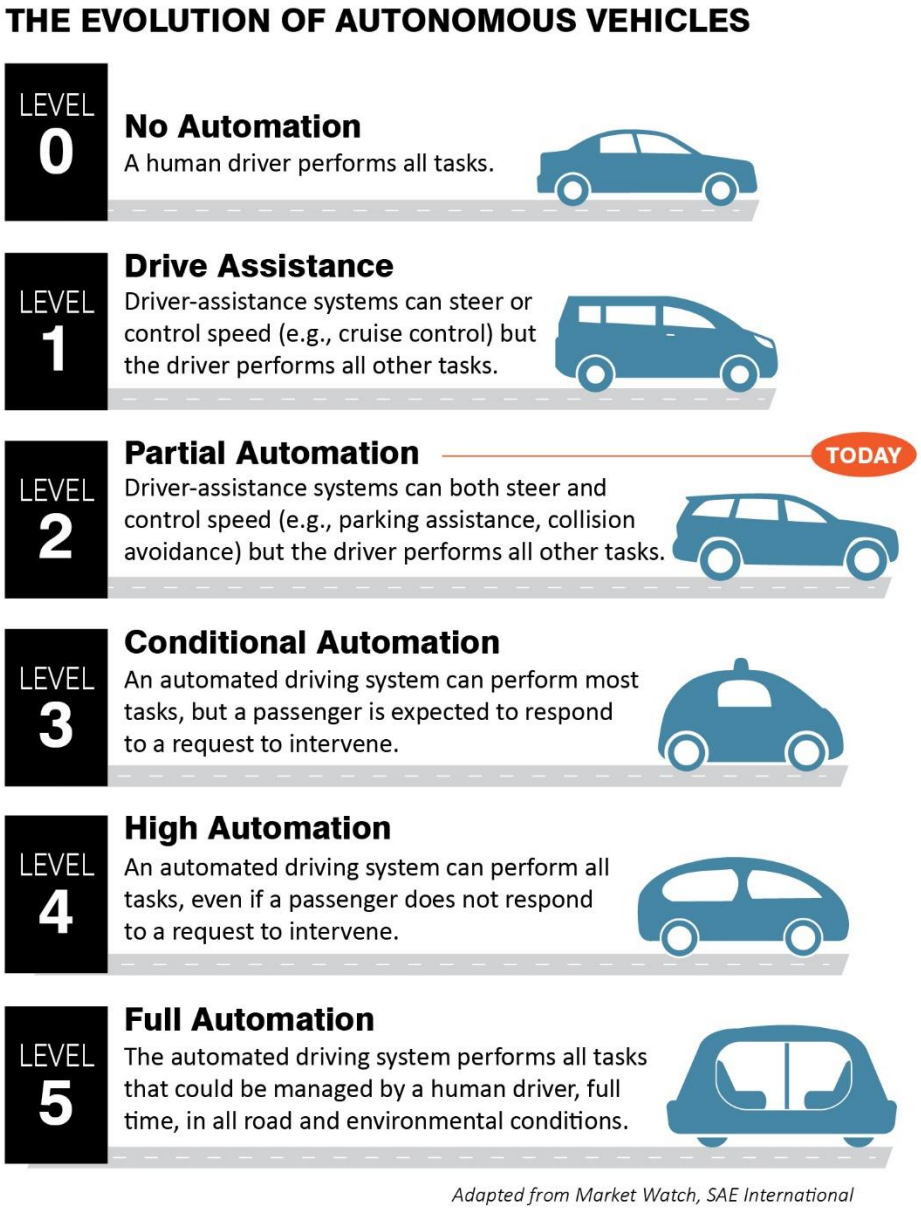
In June 2017, the Mid-America Regional Council launched a regional effort to examine AV issues and create a policy framework that will help the region position itself to maximize opportunities and minimize negative impacts of these new and potentially disruptive transportation technologies. MARC formed an AV Task Force and convened a broad group of stakeholders, including seven work groups that each focused on a key policy area:

- **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?

Between September 2017 and June 2018, members of the AV Task Force and work groups held regular meetings to research best practices, explore possibilities, and hone in on a set of priority recommendations that will strengthen the region's position as a leader in transportation innovations.

BACKGROUND

For the purposes of this policy framework, "autonomous vehicles" refers to vehicles that encompass characteristics of autonomy as defined by the Society of Automotive Engineers (SAE) and are the generally accepted descriptors of different levels of autonomy.



Adapted from Market Watch, SAE International

Connected vehicles are vehicles of all types that have technology to "…enable cars, buses, trucks, trains, roads and other infrastructure, and our smartphones and other devices to 'talk' to one another. Cars on the highway, for example, would use short-range radio signals to communicate with each other so every vehicle on the road would be aware of where other nearby vehicles are. Drivers would receive notifications and alerts of dangerous situations, such as someone about to run a red light as they're

nearing an intersection or an oncoming car, out of sight beyond a curve, swerving into their lane to avoid an object on the road."[1]

Currently there are no formal federal regulations regarding the operation of autonomous vehicles. Many states have passed regulations of their own, and manufacturers and other stakeholders are participating in national dialogues with the US Department of Transportation in several topic areas to help guide federal regulation. However, there are still opportunities for local decision-making with respect to land use, infrastructure investment, data management, traffic enforcement and other areas traditionally left to local and state governments to manage. Similar to the national level, a unified framework of policy decisions at the regional level will allow for more seamless travel across jurisdictional boundaries.

POLICY FOCUS AREAS

I. Travel Demand Management and System Performance

Transportation modeling is an important tool that helps planners anticipate current and future system needs. There is still significant debate on how quickly the region's transportation fleet will transition to a high percentage of autonomous vehicles, and these uncertainties make modeling difficult. However, most agree that the transition will occur sometime during the 25-30 year horizon of current metropolitan transportation plans, so assumptions about AV adoption rates must be made in regional travel demand models.

How well a system performs is measured not only by its ability to move vehicles from one place to another as quickly as possible, but also by its ease of access, equity and affordability. As ownership models change, so may the cost of travel. While there is still no clear answer on whether travel will become more expensive, less expensive, or some combination of the two, these changes have the potential to significantly impact how people choose to move around the region. Planners must also consider how different ownership models may change demand and travel behavior. For example, will overall vehicle miles traveled (VMT) increase or decrease if more people use a fleet-based ownership model rather than individually owned vehicles, and how will those changes impact regional goals related to land use, public health and other performance measures? Accurate scenario modeling will be critical as we transition to higher levels of autonomy in all areas of the regional fleet.

The Travel Demand Management and System Performance working group identified three key priorities for moving forward:

- **Modeling** — Use the scenarios developed through the National Cooperative Highway Research Program (NCHRP Project 20-102, Task 9)[2] as a guide for local and regional travel demand modeling.
- **Data** — Support data sharing and access across jurisdictional boundaries.
- **Education** — Support ongoing stakeholder education efforts.

[1] https://www.its.dot.gov/cv_basics/cv_basics_what.htm

[2] http://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=4008

II. Infrastructure, Planning and Investment

As the transportation system moves to higher levels of technology and autonomy, existing revenue streams may be in jeopardy. Entities that rely on income from sources such as fuel taxes, parking fees, and other traffic-related funding streams may see these revenues decline, compounding existing shortfalls in funding for basic infrastructure maintenance. Local governments seeking innovative strategies to replace lost revenues may see an increased demand for public-private partnerships and other creative funding solutions.

Transportation planners should consider impacts on parking and land use as the fleet transitions. Piloting projects such as pick-up/drop-off areas in place of permanent parking spaces or creating flexible curb-share policies that maximize the use of existing curb space can allow for more effective use of the built environment without requiring wholesale changes to existing infrastructure. Additionally, there are likely to be opportunities to maximize existing system capacity, particularly on higher-speed highways and interstates. Automated and connected vehicles may travel closer together more safely, making better use of existing lanes and reducing the need to expand the current system footprint. Local governments should have the opportunity to lead or be involved in decision-making about local projects, pilots and other AV implementation efforts, and state or federal pre-emption of local authority should be discouraged.

Considerable emphasis should be placed on maintaining a state of good repair for existing roadways, including accurate and visible signage, striping and crosswalks, and pavement in good condition. The research and development of autonomous vehicles is not assuming a transportation system that looks vastly different from existing conditions, and improving these conditions will be beneficial to both vehicles and non-motorized users. According to NHTSA, approximately 94 percent of vehicle crashes are due to human error.[3] If implemented thoughtfully, the potential exists for significant improvements to the safety of all users as AVs reduce the possibilities of human error.

The Infrastructure, Planning and Investment working group identified five key priorities for moving forward:

- **Parking and Land Use** — Work with local jurisdictions to better align parking and land use requirements with potential operations related to autonomous and shared vehicles.
- **Pricing and Operations** — Explore pricing and operational strategies such as managed lanes, parking cash-outs or other parking strategies, changes to registration and licensure, and other alternative resources.
- **Capacity and State of Good Repair** —Use AV technologies to leverage greater capacity from existing transportation systems and focus on state of good repair and investments in existing infrastructure.
- **Information Sharing and Coordination** — Coordinate with local, state and federal agencies to ensure information sharing and discourage pre-emption of local government operational strategies related to autonomous and connected vehicles.
- **Education** — Support ongoing stakeholder education efforts.

[3] https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812115

III. Equitable Access and Mobility Services

One of the major potential benefits AVs promise is increased access and mobility for people who currently have transportation disadvantages. For example, there is a high potential to improve service for individuals with disabilities and older adults, providing curb-to-curb service with fully autonomous vehicles or meeting more specialized needs with door-to-door service aided by vehicle attendants. Additionally, greater access to transportation could increase social interaction by offering transport to community centers or activities that do not qualify for medical transport. A recent report concluded that "…autonomous vehicles could provide approximately 2 million people with new opportunities for employment through access to transportation. Additionally, the increased mobility could save $19 billion in annual health care costs from missed appointments."[4]

However, even as application-based or other technology solutions increase mobility options, some populations may experience a decrease in access to the transportation system. People without smart phones, cellular data plans or credit cards may find themselves less able to access services. Planners must be cognizant of these limitations in the implementation of any new or replacement service.

The Equity and Mobility Services working group identified four key priorities for moving forward:

- **Curb-Sharing Policies** — Encourage curb-sharing policies that allow for increased access for pick-up/drop-off operations.
- **Public Transportation Focus** — Ensure a focus on public transit and other public transportation uses in implementation of autonomous and shared vehicle projects and programs.
- **Community Involvement** — Ensure that advocacy and policy organizations are involved in policy discussions related to deployment of changes to the transportation system that may impact their stakeholder group for the express purpose of ensuring equity requirements.
- **Education** — Support ongoing stakeholder education efforts.

IV. Data Management

The proliferation of autonomous and connected vehicles has the potential to change the transportation system in many ways, but one thing that is certain is a significant increase in the amount of data that vehicles will provide. Local governments will need to determine what data to collect, how to store the data and how and when to share it with public and private entities in order to make the most of it. Maximizing use of data in decision-making while maintaining privacy of citizens is crucial to the successful deployment of autonomous vehicles.

In the spirit of open data, a transparent data-sharing process should be established across jurisdictional boundaries to take advantage of the massive increase in available information about travel behavior and demand. To that end, data should be shared to increase insight and understanding of the regional transportation system, not just for the sake of sharing large amounts of data. With better real-time information about how the system operates, users of all types stand to benefit from a more efficient and effective system.

[4] http://secureenergy.org/wp-content/uploads/2017/01/Self-Driving-Cars-The-Impact-on-People-with-Disabilities_FINAL.pdf

Local agencies currently have widely varying levels of ability to participate in data-driven technology advancements. By discussing these issues and implementing new technology solutions at a regional level, we can ensure the process is as inclusive as possible.

The Data Management working group identified four key priorities for moving forward:

- **Added Value** — Work with local governments to help determine and understand the value of data sharing, gather insights into regional system operations, and identify potential revenue sharing or other opportunities for return on investment.
- **Data Sharing** — Coordinate efforts to develop transparent, multi-jurisdictional data-sharing agreements and collection schema for local AV data.
- **Privacy and Security** — Conduct a regional study on data privacy and security.
- **Education** — Support ongoing stakeholder education efforts.

V. Environment and Land Use

Changes in land use and corresponding changes to the impacts of the transportation system on the environment are significant drivers of regional planning efforts for autonomous vehicles. Existing regional goals such as creating quality places, an emphasis on centers and corridors for new and infill development, and transit-oriented development are all likely to see benefits from the shift to a driverless future. Promoting shared-use vehicles through priority placement of transit and fleet-owned vehicle operations will support regional goals to increase public transportation and expand mobility options for all users.

In many places, AV adoption may lead to a reduced need for parking spaces. As land currently allocated for parking is reclaimed from the transportation system, an emphasis should be placed on increasing green space and other green infrastructure improvements. At the local and regional level, comprehensive plans, zoning requirements and other tools can be used to ensure that AV adoption complements current centers-and-corridors strategies for higher-density, mixed-use development and redevelopment. These approaches can maximize the efficiencies of AVs through shared-use infrastructure, such as mobility hubs, and along identified fast-and-frequent transit corridors.

The Environment and Land Use working group identified six key priorities for moving forward:

- **Parking Policies** — Consider changes to specific parking requirements/minimums.
- **Curb-Sharing Policies** — Explore curb-sharing policies and pilot projects to increase operational efficiency of existing land uses.
- **Level of Service** — Consider new level-of-service standards that include all modes and prioritization of bicycle, pedestrian and other non-motorized travelers.
- **Environmental Benefits** — Prioritize green infrastructure and environmental benefit when converting existing development to new uses in response to changes from autonomous and shared vehicles.
- **Pricing Strategies** — Consider pricing strategies that encourage shared-use autonomous vehicles over private ownership.
- **Education** — Support ongoing stakeholder education efforts.

VI. Economic and Workforce Opportunity

In addition to changing how commuters get to and from work, automated and connected vehicles are expected to bring about significant changes in the jobs they do. For example, demand for some occupations, such as truck drivers and bus/taxi drivers, may be dramatically reduced, while others, such as warehousing, logistics and information technology, may see rapid growth.

In many ways, the Kansas City region is well-positioned to take advantage of economic opportunities that AV adoption will bring. Our high degree of specialization in the engineering and architecture industry may provide a significant advantage in attracting new businesses and technology jobs related to AV and infrastructure design. Our strengths in advanced manufacturing could support production of electric or other high-tech vehicles. The region's intermodal freight facilities, logistics expertise and central location are also important strengths; while AV use may automate the movement of goods, employers will still need workers at origin and destination points for loading, unloading, warehousing, invoicing and other functions.

As more industries transition from low-tech jobs to high-tech jobs, employers will seek different skill sets, requiring a shift in education and training certifications. Through the KC Rising initiative, we have established systems to better align industry and education, which will be critical to retraining workers who need new skills. AVs also have the potential to greatly improve job access, helping trained workers get to employment centers that are not currently accessible by public transit.

The Economic and Workforce Opportunity working group identified four key priorities for moving forward:

- **Training for new job skills** — Develop regional systems to help drivers and other workers who are likely to experience early impacts prepare for the transition to AVs and learn new skills for higher-tech jobs.
- **Training for new operations** — Explore regional training opportunities for first responders, auto mechanics, fleet managers and others on how autonomous vehicle operations may impact their work.
- **Attracting and retaining businesses** — Coordinate public and private efforts to attract and retain new technology firms with jobs related to autonomous and connected vehicles.
- **Sharing information** — Support ongoing stakeholder education efforts.

VII. Certification, Liability and Insurance

While many of the issues related to AV implementation are easy to connect with local and regional policies and processes, the registration and certification of vehicles is primarily a state or federal function. However, there are still some issues that are best addressed at the local and regional level, including traffic operations and enforcement. Public works departments, police departments and other officials should work together to create a safer environment for all users.

A crucial element of regional planning for autonomous vehicles in Greater Kansas City is ensuring bi-state coordination in decisions related to vehicle registrations, operations, testing and implementation of AV projects. With the state line dividing the region down the middle, any conflicting decisions made by Missouri and Kansas would present significant challenges to the operation of personal and commercial vehicles in the region. Federal rules may also impact local operations and they should be monitored as planning work progresses in local and regional settings.

The Certification, Liability and Insurance working group identified three key priorities for moving forward:

- **Crash Reporting** — Explore the possibility of adding information fields to local crash reports pertaining to the autonomous features of involved vehicles and how they were operated during a crash.
- **Bi-state Coordination** — Encourage and facilitate bi-state coordination of state policies related to vehicle registration, certification and other AV-related issues.
- **Education** — Support ongoing stakeholder education efforts.

RECOMMENDATIONS

As the working groups completed their discussions, common themes emerged. These overarching themes — each identified by two or more working groups — are recommended for initial action.

- **Recommendation 1: Identify ongoing opportunities to provide AV information, education and training to a wide range of stakeholders in the region.**

  The need for education and training was identified as a priority for all seven work groups. This includes general awareness for the traveling public, as well as more detailed, technical information for decision-makers and job training for workers who need new skills. Initial steps will focus on determining who needs information and what types of information, education and training they will need, both in the short term and as AV adoption rates increase.

- **Recommendation 2: Research, develop and build regional consensus on land-use policies related to AV implementation.**

  In the current funding climate, it is unrealistic to expect major new investments in infrastructure to support AVs. Instead, work group members suggest focusing on using existing infrastructure in different ways. For example, shared use of AVs might lead to more curb space devoted to drop-off/pick-up zones in lieu of parking spots. Efforts to maintain current transportation infrastructure in a state of good repair could be broadened to incorporate new uses.

- **Recommendation 3: Develop pricing strategies to address shifts in revenue sources.**

  Traditional revenue streams such as parking meters, fuel taxes and licensing and registration fees will be disrupted by widespread use of AVs. Ownership models are likely to shift from individual to shared, multi-party owners or subscription services. Initial work in this area could explore new fee structures, perhaps based on vehicle miles traveled, as well as new revenue opportunities, including charges for private companies to tap into public fiber networks or other existing infrastructure. As fleet operators are likely to be early adopters, pricing strategies involving the trucking industry, public transportation and other fleet services should be prioritized.

- **Recommendation 4: Develop agreements for sharing and storing data.**

  Regional strategies for sharing data — what data to share, how to share it, and with whom — will likely require the adoption of Memorandum of Understanding agreements by local governments, as well as investments in hardware and software systems to store and share data.

Initial work in this area should also address privacy and security issues. Public/private partnerships may offer opportunities for revenue generation.

- **Recommendation 5: Ensure equitable access to the opportunities provided by AV technology.**

  AV technology could greatly expand access to opportunity for underserved populations, but it also has great potential to leave people behind. As policies and strategies are developed, public officials should be mindful of the digital divide. App-based AV services should offer alternatives for users who are not able to pay with a credit card or use a smart phone.

CONCLUSION AND NEXT STEPS

As the metropolitan planning organization and association of local governments for the bistate Kansas City region, the Mid-America Regional Council has a unique capacity to lead regional efforts to prepare for AV implementation. Changing transportation technologies will not only cross state and local government boundaries, but will also impact much more than the transportation system. MARC's strong network of partners across a broad range of regional initiatives will provide an organizational structure to advance policies and foster a cohesive, collaborative approach.

It is important for AV planning and policy initiatives to have broad participation from various interests and decision-makers, including state and local governments, chambers of commerce, economic development agencies, educational and research institutions, trade associations, major employers, transportation authorities and leaders in innovation and entrepreneurship. It is also important to engage a broad cross-section of stakeholders already working together on related initiatives and plans, including KC Rising, Regional Transportation Plan 2050, Operation Green Light, Destination Safe, Planning Sustainable Places, KINETIC and others.

MARC has designated a senior staff member to coordinate internal efforts to advance key recommendations in this report, including engage external stakeholders and leaders of related initiatives to implement priority strategies. These efforts will begin immediately will include adoption of a more detailed work plan and expected outcomes over the next two years.

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