

## Regional Council of Mayors: December 12, 2016

### EXECUTIVE DIRECTOR'S REPORT

#### 2017 RCM Priorities

In advance of 2017, a small change was made to tagline for the Regional Council of Mayors to emphasize the RCM's important role in building civic trust. It now reads:

*"The RCM provides a nonpartisan platform focused on building civic trust through networking, learning, collaboration and action."*

[Link to ULI Minnesota statement, "The Critical Importance of Civic Trust."](#)

#### Cities in the Age of Trump and Brexit

On Dec. 9<sup>th</sup>, the Brookings Institution held a discussion with Chicago mayor Rahm Emanuel and British MP Tristram Hunt about the potential impacts to cities from rising populism and nationalism. In a wide-ranging conversation, both guests spoke about how cities can be even more important under these new regimes through their ability to make decisions and implement change more quickly than at higher levels of government. Additionally, they emphasized the importance of both economic opportunity and social justice together rather than one or the other, arguing that people are more likely to embrace change when they can see it as a reason to be hopeful rather than fearful. These messages are well aligned with the RCM's focus on local leaders learning together and building civic trust.

[Link to video.](#)

### THE FUTURE IS NOW: AUTONOMOUS VEHICLES

[Link to combined presentations.](#)

#### Ray Starr, MnDOT: 3 Dimensions of Connected and Automated Vehicles

##### THE THREE DIMENSIONS ARE:

1. Driving automation and driver assistance
2. Vehicle-to-vehicle connectivity
3. Vehicle-to-infrastructure connectivity

##### DRIVING AUTOMATION AND DRIVER ASSISTANCE

This is the concept people are most familiar with and is defined as technology that takes over some or all the driving tasks from a human driver. Automation and assistance covers features ranging from cruise control and blind spot warnings to fully automated driving. There are five defined levels of automation and assistance against which the technology is being measured.

**Level 0:** No driving automation. No sustained movement control. Human must always monitor and control.

**Level 1:** Driver Assistance – Car can control longitudinal OR lateral movement, but not both. Human must always monitor. Possibly limited to certain environments.

**Level 2:** Partial Automation – Car controls longitudinal and lateral movement. Human must always monitor. Possibly limited to certain environments. (e.g. Tesla's "autopilot" feature)

**Level 3:** Conditional Driving – Vehicle performs all driving tasks under some environments. Graceful transition to human driver when out of automated environment. (e.g. Budweiser's test delivery truck)

**Level 4:** High Driving Automation – Vehicle can perform all driving tasks in limited environments. Does not require transition to human driver. Automated transit vehicles already meet this standard in some settings.

**Level 5:** Full Driving Automation – Can drive on any road and under any conditions that a human could do. Designed to function entirely without human input. To date, no vehicles meet this standard.

Truck platooning may be the first wide scale implementation of automation technology. Delivery vehicles automatically follow a lead truck with smaller headways between them than would be safe with human drivers. This can reduce fuel usage, emissions, and costs.

### Takeaways for transportation agencies:

Consider regulatory issues; impacts on signs, markings and traffic control; and evaluate impact to long-term plans.

## VEHICLE TO VEHICLE CONNECTIVITY

Cars communicate to each other automatically. They can broadcast safety messages like sudden braking that a driver may not be able to see. This is largely the domain of automobile manufacturers.

### Takeaways for transportation agencies:

Stay informed as the technology evolves.

## VEHICLE TO INFRASTRUCTURE CONNECTIVITY

Vehicles communicate with physical infrastructure such as traffic signals. This has the potential to help with safety, congestion, and overall management of roadway networks.

### Takeaways for transportation agencies:

Transportation agencies have a big role to play in shaping how this works. Transportation agencies and infrastructure builders will need to work directly with vehicle manufacturers, which is a new phenomenon. Using vehicles owned and controlled by transportation agencies will be key for testing.

## Philip Schaffner, MnDOT: Planning for Autonomous Vehicles

Autonomous vehicles will have wide-ranging impacts on our transportation system and its users, and MnDOT is studying and planning for changes now. Philip Schaffner shared insights on how MnDOT views several potential impacts.

**Safety:** 90% of crashes are at least partially attributable to human error. AVs don't get distracted, tired, or intoxicated.

**Capacity:** AVs can react faster than human drivers, reducing safe following distance. Could theoretically double capacity.

**Routing:** People drive 20% less direct than optimal. Connected vehicles and on-the-fly route updates will improve this.

**Mobility for all:** Driving may become more convenient for those who can't or don't want to drive. This could help aging seniors maintain mobility longer.

**Mobility for People with Disabilities:** This is an area with huge potential but it is NOT a given. There are many user-interface and design questions that must be resolved first.

**Ownership:** Vehicle ownership is the current dominant model, and it is an open question how far we will move toward shared vehicles and a shared network.

**Parking:** Impacts to parking demand are closely linked to how ownership models evolve. Owned autonomy may not reduce parking demand much, but shared vehicles could be huge. This will also impact infrastructure design as we may need more structured and formalized loading and unloading zones for vehicles to let passengers in and out.

**Transportation cost:** The cost of owning a vehicle is likely to increase in the short term as the developmental cost of new technologies is passed on to buyers. Long term operational costs will likely be lower. Users of shared autonomous vehicle networks may save money compared to vehicle ownership, especially for users who do not need to use a car frequently.

**Residential Preferences:** Impact on residential preferences remains to be seen with two scenarios considered likely. The "Up" pattern suggests people will move into denser urban areas in pursuit of amenities and the need to own and maintain vehicles may be eliminated. The "Out" pattern envisions people moving away from cities because long distance travel will not pose as much of a convenience problem. MnDOT believes a mix of both patterns is likely.

**Congestion:** Despite crash reductions, increased lane capacity and more direct routing, the impact of AVs on congestion remains uncertain. An increased willingness to travel long distances and empty vehicles traveling to and from user trips could create new congestion. The added convenience could create induced demand that offsets efficiency gains.

### MNDOT CONFIDENCE LEVEL IN POTENTIAL AV IMPACTS

| Change                                | Conf. | Description  |
|---------------------------------------|-------|--|
| Safety                                | High  | One of the most highly touted benefits of AVs  |
| Lane Capacity                         | High  | Shorter following distances likely increase capacity   |
| Parking                               | Med   | "Mobility as a Service" model may significantly reduce parking need  |
| Road Design                           | Med   | "Our philosophy has always been, it has to work with the existing infrastructure" – Chris Urmsom, Google                                   |
| Mobility for people with disabilities | Med   | Likely significant improvement in service, but not a given and may not work well for all types of disability                               |
| Congestion                            | Low   | Despite likely reduction in crashes and increased throughput, we could see dramatic increase in VMT  |
| Timeline                              | Low   | Exact timeline for adoption remains unclear – "inflection point" likely mid-to-late 2020s.   |
| Vehicle Ownership                     | Low   | Uber/Lyft vs. Tesla Models – likely some combination of both   |
| Residential Preference                | Low   | Vehicle ownership model will likely have large impact on where people will choose to live – <b>both</b> "Up" and "Out" scenarios plausible |

**Beyond the Car Examples:** Autonomous trucks and truck platooning. “Ground drones” on city streets and sidewalks for package delivery. Transit agencies may adopt AVs to replace dial-a-ride services and low-ridership routes may be eliminated; however, AVs will not eliminate the need for transit.

## AREAS OF CAUTION FOR AUTONOMOUS VEHICLE ADOPTION

- AVs currently struggle in winter, which may delay adoption in Minnesota.
- Over the next 4 years, MnDOT anticipates rapid growth in vehicles at levels 2 and 3 of automation (see section above for definitions). These levels require human oversight and interaction, and there are challenges determining how AVs transition control with human drivers when those drivers are not engaged throughout the transportation process (e.g. how does a truck notify a human driver to take over and how does the driver react?)
- Beginning in the mid 2020s, greater adoption of AVs is expected. Rapid escalation in usage could be driven by shared networks. At some point, the National Highway Traffic Safety Administration (NHTSA) may require vehicles to be automated. This could be partial at first and eventually rise to complete automation.

## MNDOT'S CURRENT APPROACH

MnDOT is hesitant to make big bets now because most vehicles for the foreseeable future will not be automated and there are many unresolved questions about how AVs will function. For now, MnDOT is focused on targeted pilot projects and will wait until 3-5% of vehicles on the road meet Level 3 or greater before recommending road design changes.

## Frank Douma, Humphrey School of Public Affairs: Legal and Insurance Issues

### AUTONOMOUS VEHICLES ARE *PROBABLY* LEGAL

Right now, states may not need to do much in terms of regulation and legislation as pertains to autonomous vehicles. An analysis by legal scholar Bryant Walker Smith suggests that, because they are not explicitly prohibited, autonomous vehicles are *probably* permitted.

On 2/4/2016, NHTSA equated “self-driving System” to the driver. Previously vehicles and drivers were regulated separately. This means NHTSA sees itself as having regulatory responsibility over AVs where before states had most control over driver-specific regulations.

### FEDERAL AUTOMATED VEHICLE POLICY

On 9/20/2016, NHTSA released this policy as a framework for regulating autonomous vehicles, spelling out distinctions between state and federal roles as well as existing regulatory tools and ones that need to be developed. A key focus of policy will be the major turning point will be between automation levels 3 and 4 where we transition from expecting humans to intervene and not requiring it.

[Link to policy.](#)

### DON'T BE EXPLICIT YET

Because so much remains unknown, it is both unnecessary and likely unwise for states to be highly explicit yet in terms of legislating and regulating autonomous vehicles. States with no explicit laws are already allowing testing while other states that have regulated AVs have caused unintentional consequences, such as California which ended up with a law that prohibits Level 5 vehicles while passing a law designed to allow AV testing.

### LIABILITY: WHAT IF SOMETHING GOES WRONG?

Liability responsibility for crashes today is mostly for drivers. As AVs progress, it is likely the vehicle manufacturers will move from 2% responsibility now to perhaps 80 or 100% liability. Some insurance is likely to still be necessary (e.g. “falling trees won’t care if your car is automated”). Mercedes, Google and Volvo are already on record as accepting 100% liability because they have such high confidence in the trajectory of the technology.

## Brendan Jordan, Great Plains Institute: Electric Vehicle (EV) Opportunities for Minnesota

Electrification and automation are parallel technological revolutions, and mass market EVs have arrived (e.g. Chevy Bolt EV and Tesla Model 3). These combine long range (200 miles plus) and affordable prices (\$27,500 to \$40,000).

- By 2040, EVs are expected to be 35% of global new car sales.
- Beginning in the 2020s, EVs will be a more economic choice without tax credit, largely due to precipitous drops in lithium-ion battery costs.
- EVs are already the cheapest choice when counting upfront tax credits. They also generate the least emissions for a full life-cycle and are the cheapest to operate on a per-mile basis.

## OPPORTUNITIES FOR MINNESOTA

The settlement of the Volkswagen emissions scandal will see \$2B nationwide that can be used for the electrification of vehicles and infrastructure. An additional \$43M will come to Minnesota specifically and will be managed by the Minnesota Pollution Control Agency (MPCA). Some opportunities for the MPCA money include:

- Work with cities on identifying EV charging infrastructure
- Replace school buses.
- Helping cities develop “EV ready” building codes.
- Outreach and education at city events and festivals.

## IF AUTONOMOUS VEHICLES ARE ALSO ELECTRIC VEHICLES

Electric autonomous vehicles can magnify some of the benefits of automation.

- Lower lifecycle emissions and zero tailpipe emissions.
- Help justify investments in EV infrastructure through greater utilization.
- Increase deployment and manufacturing of EV batteries, driving down costs.
- EVs have higher upfront costs but lower lifecycle costs. Shared autonomous vehicle fleets will use vehicles more, which increases the cost effectiveness of electric vehicles.

## Tom Fisher, Metropolitan Design Center: Shared Autonomous Vehicles and Land Use

The advent of the automobile dramatically changed how cities use land, and autonomous vehicles have the potential change it dramatically once more. Tom Fisher identified three specific impacts for cities to consider as AVs develop.

### PARKING

Vehicles today spend over 90% of their time in storage. Car companies are not only developing AVs; they are also partnering closely with ridesharing companies like Uber and Lyft to develop shared ownership and subscription based business models. This could dramatically reduce the demand for dedicated parking. As such, parking structures are being designed with flat floors so they can be adapted to other uses as demand falls. Markets will incentivize this shift away from ownership. For example, Google is looking at making transportation free if you're willing to look at advertising.

### STREET DESIGN

Because AVs will operate more safely, predictably, and efficiently, we will be able to reshape how we design streets and reclaim lane space for other uses. AVs can work well with a single dedicated lane and a second lane that can be shared with other users like cyclists. Additional lanes can be turned into greenspace and wider sidewalks. Government should think about how streets designed today can be flexible for when AVs become widespread.

### LAND USE AND POLICY

A decline in the need for parking and road capacity means, “every municipality is about to pick up a tremendous amount of land.” Cities should begin thinking about how land currently devoted primarily or entirely to automobile uses now could be repurposed and what kinds of policy changes may be necessary to successfully transition away from current models. Revenue from traffic tickets and parking revenues is likely to mostly disappear, which could impact budgets. Dense housing will need less dedicated parking, necessitating a change of parking minimum policies.

## Questions and Answers

### What should cities think or do about the federal guidelines for AVs?

There is reluctance to make big changes before there is more data. At the MnDOT level, new state aid guidelines will be more permissive of narrower and smaller footprint roads independent of AVs which could help with long term adaptation. It is important for the Comprehensive Planning process to at least acknowledge this change is coming.

### The mayor of Pittsburgh jumpstarted their participation in AVs. How do we do that here?

Pittsburgh emerging as a testing ground was due largely to proximity to universities, namely Carnegie Mellon. There are areas for AV research that our region could try to lead on such as how AVs can help the disabled. Because AVs struggle with snowy conditions, our climate could present an opportunity for testing.

### What about larger personal vehicles becoming available in electric models?

This will be driven by pressure on battery costs. As they decline, building pickup trucks and SUVs becomes more doable. Products are in development.

### How does weather, especially cold, affect EVs?

EVs perform fine in bad weather. Panelists who own EVs reported a small but negligible impact on battery efficiency.

### **How will EVs impact our electrical grid? Can we keep pace?**

Not only should we be able to keep pace, but EVs present an opportunity for better efficiency. Utilities currently have a problem where demand is too low at night and too high at peak. Overnight vehicle charging may make utilities work better. The Great Plains Institute is working with utilities to set rates for this scenario.

### **Are there any numbers or trend data about ridesharing impacting ownership? How much?**

In a study of Car2Go users in major cities (e.g. New York, San Francisco), each Car2Go was attributed to a drop of 8 personally owned vehicles, mostly 2<sup>nd</sup> and 3<sup>rd</sup> vehicles. It is easy to imagine a reduction of 30–50% in vehicle ownership.

### **We already struggle to pay for maintenance on our transportation system. Funding is declining further as EVs and fuel efficiency continue to erode the gas tax. What do we do about financing the system?**

We need to transition to mileage based fees. One model involves partnering with a car sharing service like Hourcar to build mileage fees into subscription costs. Charging by the mile is much easier for services where you pay on a per-trip basis, such as Uber, Lyft, Hourcar and others. Registration fees and taxes are a big portion of how we pay for roads, and EVs currently pay more on average because they are more expensive.

Another risk to the transportation system is sprawl, and the panel expressed skepticism that AVs and EVs will lead to more sprawl. EVs and AVs do not do much to address infrastructure cost, so building a lot of new road capacity will remain prohibitively expensive.

### **How does MnDOT feel about the Federal Policy for AVs and where Minnesota stands?**

MnDOT felt it was unclear, but they are working with the Minnesota Department of Vehicle Services to determine what MN should do. It may be better to do nothing than to do the wrong thing right now.

### **What are the privacy implications of AVs? Who gets access to the data?**

Frank Douma said, “privacy rights evolve with technology and our expectations.” With Google’s design, all data stays in the car. Connectivity will be very different question. The Supreme Court used very specific language to refer to smartphones as “super computers,” and protected ownership of that data to the user. This could be applied to autonomous vehicles as well.

It is possible AVs will have some sort of “black box” like airplanes, and the privacy of this data is being debated. Great pains are going into making data anonymous. For example, a single car will have different IDs as it moves so you cannot reconstruct trips. NHTSA guidelines include a requirement to think about cybersecurity, which is a good start.

### **What about, say, motorcycling enthusiasts and others who want to drive recreationally?**

This is sort of analogous to the movement from horse-drawn carriages to motor vehicles. We still have horses, just in limited ways. We may designate space outside of core areas that still permit manual driving, such as in rural areas. However, most vehicle fatalities are currently in rural areas so that may necessitate stricter regulation.

### **Vehicle insurance is something like a \$200B/year industry. How will companies in that sector change?**

Improvements in vehicle safety have already lowered the number of crashes, which in turn lowers the amount companies pay out in claims. Insurers may change to sell more to fleet operators instead of individuals, which could diminish the need for adjustors and salespeople. Some private vehicle insurance will still be necessary to protect against non-driving incidents like fallen trees. The safety improvements may be so profound that insurers incentivize adoption of AVs by offering such a great deal that people will not be able to pass them up.

### **What about personal safety with no operators? For example, children going to school or women traveling alone?**

This is an open question, but it is somewhat analogous to saying would you let your kid ride the bus? For private trips, it will be possible to prevent entry to a vehicle from an unauthorized user. You can send your kids in a private car and a stranger will not be able to open the door.

### **What are the panel’s thoughts about how AVs will compete or complement transit?**

It is likely that core, backbone transit lines like fixed-route rail or bus rapid transit will either benefit from AVs or at minimum still serve an important role. AVs can help solve the “last mile” problem, particularly in dense areas. Less efficient systems in less dense areas may get outcompeted by a shared vehicle network system. Transfers are a big deterrent to users in transit systems currently. AVs might make transfer penalties less of an issue.

Private services may also help complement public transit. In the Bay Area, private services route workers to major employers, which could eventually be available in our market and performed by AVs. We may need to offer ROW to both public and private providers.

## COMING UP

The next meeting of the Regional Council of Mayors will be Monday, January 9th from 11:30 a.m. to 1:30 p.m. in the Seattle Room at Dorsey & Whitney, 50 South 6th Street, Minneapolis, MN.

## ATTENDEES

### Mayors

|                        |   |
|------------------------|---|
| Mary Giuliani Stephens | City of Woodbury (Co-Chair)               |
| James Hovland          | City of Edina (Co-Chair)                  |
| Debbie Goettel         | City of Richfield (Chair, HRC Initiative) |
| Mike Maguire           | City of Eagan (Chair, Housing Initiative) |
| Kurt Briggs            | City of Prior Lake                        |
| Chris Coleman          | City of Saint Paul                        |
| Molly Cummings         | City of Hopkins                           |
| Jerry Faust            | City of St. Anthony                       |
| Shep Harris            | City of Golden Valley                     |
| Kathi Hemken           | City of New Hope                          |
| Marvin Johnson         | City of Independence                      |
| Sandra Kresbach        | City of Mendota Heights                   |
| Denny Laufenburger     | City of Chanhassen                        |
| Lili McMillan          | City of Orono                             |
| Tim McNeil             | City of Dayton                            |
| Terry Schneider        | City of Minnetonka                        |
| Jake Spano             | City of St. Louis Park                    |
| Mike Webb              | City of Carver                            |
| Ken Willcox            | City of Wayzata                           |
| Janet Williams         | City of Savage                            |
| Gene Winstead          | City of Bloomington                       |

### Guests

Brendan Jordan, Great Plains Institute; John S. Adams, University of Minnesota; Ellen Sahli, Family Housing Fund; Michael Huber, Blue Cross & Blue Shield of MN; Bart Fischer, City of Oakdale; Jamie Verbrugge, City of Bloomington; Mike Ericson, City of Centerville; Emily Goellner, City of Golden Valley; Diane Norman, RSP; Patricia Nauman, Metro Cities; Jennifer O'Rourke, Metropolitan Council; Tom Harmening, City of St. Louis Park; Mark Casey, City of St. Anthony; Jon Wertjes, City of Minneapolis; Peter Wagenius, City of Minneapolis; Burke Murphy, Corporation for a Skilled Workforce; Bob Engstrom, Robert Engstrom Companies; Tom Fisher, University of Minnesota; Ray Starr, MnDOT; Philip Schaffner, MnDOT; Frank Douma, Humphrey School of Public Affairs

### ULI Minnesota

Aubrey Austin, Cathy Bennett, Caren Dewar, David Baur, Gordon Hughes