CSG convened the **Autonomous and Connected Vehicle Policy Academy** June 12-14, 2017 in Detroit. A group of state policymakers from around the country attended the event. The academy included a concluding panel on how policymakers and others may be able to envision and help bring about what some see as a better vision of the autonomous and connected vehicle future: one that involves a shared-use model of transportation and electric cars. Panelists included Tim Frisbie of the Shared-Use Mobility Center, Prashanthi Raman of Lyft, Carla Bailo of The Ohio State University and Kelley Coyner of George Mason University.

**Benefits of Shared-Use Mobility**

Many believe it will be difficult to achieve the full promise of autonomous and connected vehicles to reshape communities and transportation without a transition away from personally owned vehicles to a concept called shared-use mobility. That’s a term used to describe a collection of transportation services that are shared among users, including public transit, taxis and limos, bikesharing, carsharing, ridesharing, shuttle services and other modes.
“Shared mobility has a lot of benefits to offer communities,” said Tim Frisbie, communications and policy director at the Chicago-based Shared-Use Mobility Center. “It helps to reduce reliance on private autos. The prevailing research shows one car share car can take between 9 to 13 privately owned cars off the road.”

In a study last year [3] for the American Public Transportation Association, the center found that: “The more people use shared modes, the more likely they are to use transit, own fewer cars and spend less on transportation overall.”

Pointing to data that shows demand for Uber and Lyft rides peaks during the hours of 10pm and 4am when transit isn’t running in some places, Frisbie said shared-use mobility is ultimately about providing options and complementary services.

“It speaks to this idea of you can’t just have bikeshare; you can’t just have car sharing,” he said. “You really need all these modes kind of feeding into and feeding off one another and by doing that you’re creating this robust ecosystem of mobility options that help increase access to affordable transportation for people and help provide sustainable ways to get around.”

The trick for policymakers, Frisbie said, will be figuring out how autonomous vehicles factor into this mobility mix and how to maintain that existing ecosystem of options. But he believes the deployment of autonomous vehicles provides a unique opportunity in many ways.

“Right now is kind of an opportunity to take a step back and think about if we are going to reshape or reimagine our communities, what do we want them to look like?” he said. “There are some things that have worked really well over the last 50 years or so and there are things that didn’t work well and maybe had unintended consequences. How can we address some of those with the way we structure autonomous vehicles?”

For example, the prospect of fewer cars on the road can lead to reduced congestion and cleaner air, especially if the vehicles are electric. It can also lead to a revolution in land use policy, Frisbie said.

“There is less (land) that you’ll need with autonomous vehicles, perhaps less street space,” he said. “You can build more densely. You can have more green space in cities with less parking. I think a structured parking space in a lot of cities is like $40,000 per space to build. They’re quite expensive. You get rid of that, you might be able to bring up the affordability of housing a little bit so there are a lot of really positive land use applications.”

But Frisbie said there are two potential scenarios for autonomous vehicles policy planners can envision. Under one “heaven” scenario, the autonomous vehicles are shared and electric and there is more street space dedicated to people, less dependence on private automobiles, greater transportation for all and reduced greenhouse gas emissions and congestion in cities. To achieve that scenario, Frisbie said policymakers can create supportive regulation for shared and electric autonomous vehicles, establish affordable pricing and public subsidies for shared autonomous vehicles, support testing and investing in shared modes such as autonomous shuttles and transit and encourage public-private partnerships between automakers, shared mobility providers and public agencies. They can also work to discourage autonomous zero occupancy vehicles, sometimes known as zombie cars.

“The scenario here ... is you’re out to lunch with a friend,” he said. “There’s no parking so your car is just circling the block. And you can see pretty quickly how that can result in more cars, more traffic, more pollution and of course more sprawl.”
Frisbie pointed to Massachusetts, where lawmakers this year considered a mileage-based user fee on autonomous vehicles. Policymakers could also try more carrot-based approaches such as allowing shared autonomous vehicles to access lanes designated for high-occupancy vehicles.

But a hell scenario of the autonomous vehicle future is also possible, one that would have more zombie cars, increased dependence on automobiles overall, greater social inequality in transportation, and increased congestion and GHG emissions, Frisbie said. What’s required for that to happen is for policymakers to do nothing, sticking with the single occupancy vehicle-oriented model, allowing private interests to drive policy and the market, and not prioritizing public use of street space.

“There are still a lot of questions that need to be answered related to some of these issues,” he said. “But I think having the dialogue right now through groups such as CSG is awesome and this is really something that we need to think about. At the end of the day we say it’s not about technology, it’s not about new brands and new ideas. It’s really about people and as long as we keep that in mind, we’ll be okay.”

**Lyft Facilitating Transition to Shared-Autonomous-Electric Vision**

The rideshare company Lyft is among those hard at work trying to bring about the heaven scenario Frisbie lays out.

“We are helping to shift from ownership to ridership,” said Lyft director of public policy Prashanthi Raman, who believes the services offered by the company can be instrumental in reducing vehicle miles traveled, increasing vehicle occupancy, addressing first mile/last mile gaps in transit systems, and introducing more electrification into the fleet.

Now in more than 300 cities across the country, Lyft offers 18 million rides every month. Its carpooling option, known as Lyft Line, accounts for over 40 percent of Lyft rides in markets where it’s available.

As far as the first mile/last mile issue goes, Raman said Lyft has actually increased transit ridership.

“People don’t have to deal with parking constraints anymore (at transit stops),” she said. “We’ve been able to get people to a transit stop to be able to go on their way. ... In Chicago ... 63 percent of our rides begin or end in underserved areas of transportation and that is likely to get that person to that next mass transit stop for them to go outside of their own community and potentially look for other economic opportunities.”

Lyft is working on the electric car issue as well through a program piloted in Chicago called Express Drive.

“With our partnership with (General Motors), we have been able to get cars that are able to be rented so folks who don’t have a car or their vehicles do not pass the vehicle inspections of a certain municipality or state are able to essentially rent a car for a minimal amount of money each month,” Raman said. “Now we have electric vehicles on the platform through Express Drive.”

Raman said Lyft sees ridesharing as just the first phase of a movement to end car ownership and reclaim cities. The next phase would involve autonomous vehicles. She outlined the company’s vision of how things might work in the future.

“Lyft would provide the platform for this fleet of autonomous vehicles and the passengers would see it as a subscription model,” she said. “The average cost of a vehicle (today) when you combine vehicle
maintenance, insurance, maintenance, parking, fuel and registration is upwards of $9,000 in annual costs per vehicle so what we are proposing ... in this autonomous vehicle phase is this subscription model that is custom-tailored to a particular user. For example ... if you are an every-once-in-a-while user, if you’re an everyday user, if you need it for commuting benefits, we’ll start to see subscription models that are utilized based on the usage from these particular users, which will inherently cost less than $9,000 a year.”

Lyft founder Jon Zimmer has predicted private car ownership could all but end in major U.S. cities by 2025.

“Rides in autonomous vehicles will be less expensive than any options today,” Raman said. “As people rely on Lyft for more of their transportation needs, they’re more likely to live car-free and as more people trade their keys for Lyft, the overall market will grow dramatically. When autonomous cars can only solve a portion of these trips, more Lyft drivers will be needed to provide services to the growing number of former car owners. It’s possible that some trips will continue to be performed by human drivers such as providing rides to children or seniors with special needs, wheelchairs, etc.”

Raman also agreed with Frisbie’s view that autonomous vehicles may allow for the reconsideration of land use and the reconfiguration of communities to be more human-oriented.

“We are looking at cities re-designed for people that drive communities and not cars to the center of everyday life,” she said. “If you think about the design of the city, it has tremendous implications on global economics, health, social equality, the environment and overall quality of life and we think autonomous vehicles will actually be beneficial for all of them.”

**Columbus Factoring Autonomous Vehicles into Smart City Concept**

Carla Bailo believes the shift in focus to people represents a fundamental shift for urban planners and policymakers. Bailo, assistant vice president for mobility research and business development at The Ohio State University, helped guide the city of Columbus in their efforts to win the Smart City Challenge, a $40 million competitive grant program awarded by the U.S. Department of Transportation in 2016.

“Instead of designing our cities around roadways like we always do and around parking lots like we always do, we need to design them for what makes the city healthy and a thriving place where people want to live,” she said. “This turns policy completely upside down. How many parking spaces do you really need for a shopping mall? How many do you really need for a restaurant? Should all new buildings be required to have a certain number of (electric vehicle) chargers? All of these questions need to be asked.”

Bailo said Columbus’s Smart Cities effort grew out of a realization the city would have a lot more people in the relatively near future. Now the nation’s 14th largest city with a population of 800,000 people, Columbus is projected to have 500,000 to 1 million more residents as early as 2035 at the current rate of growth, according to Insight 2050, an ongoing effort to generate metrics to inform local decision making in Central Ohio. With those numbers in mind, city leaders made a realization that they could not hope to accommodate those new residents by creating more urban sprawl or more infrastructure. They would instead have to utilize what they had more efficiently and revitalize downtown Columbus.

“Looking at where we wanted to be versus where we are today, we had gaps,” Bailo said. “We prioritized those gaps and then made our proposal for the (Smart Cities) grant. It’s all about access to jobs and access for all.”
Columbus and the state of Ohio are making autonomous and connected vehicle research a major part of their efforts to envision a brighter future. Thirty-five miles North of Columbus, the state is turning a 4,500-acre independent non-profit proving ground built in the 1970s into a contained test bed for such research. On the South side of town, they hope to get funding to turn an old Columbus Clippers minor league baseball stadium into another contained test bed. In between is NW U.S. 33, an “innovation corridor” that includes a cluster of automotive industry companies, which is designated as a corridor for open road testing of autonomous and connected vehicles.

The state of Ohio also joined forces in November with the states of Michigan and Pennsylvania to create the Smart Belt Coalition, combining the transportation expertise of three universities, three state departments of transportation, and the Ohio and Pennsylvania turnpikes to create corridors for freight movement to do truck platooning and autonomous trucking.

Noting that many believe autonomous cars and trucks could have the potential to eliminate significant numbers of driving jobs in the future, Bailo said new technologies may also create new jobs, but workforce training and retraining will need to be part of the policy landscape.

“I maintain there are a lot of other new businesses that are just waiting there to be sprouted and this is one of the things we need to train our students for and we need to think about a way to be continually educating our workforces,” she said. “We have technology emerging so rapidly that if we’re not continually updating our workforces, people will quickly become outdated.”

In addition to the focus on autonomous vehicles, the Smart Columbus project also has a component focusing on electrification. Along with the $40 million from USDOT, the city received $10 million from Vulcan, the foundation owned by Microsoft co-founder Paul Allen, for that purpose.

“We only have 0.23 percent electric vehicles in Columbus right now,” she said. “We’re going to increase that by four times, put in about 300 charging stations. Right now, 70 percent of our electricity comes from coal so we have a very dirty carbon footprint for our (electric vehicles). That will be improved year-over-year with a significant investment from AEP, which is our power provider.”

Data will play a big role in achieving Columbus’ vision of the future, Bailo said. The city is studying how to build an integrated data exchange that will gather data from every source of transit and transportation in order to enable a one-stop-shop mobility app for travelers.

“You can simply look at this one app and say I want to go from A to B and you get this menu of choices,” Bailo said. “Maybe this is the healthiest (route), this is the lowest carbon footprint, this is the cheapest, this is the fastest. So you will have choices. It will be simple and easy to use. We’re trying to rip away that security blanket of having your own car. And then one payment system. You won’t have to have an account (for each mode of transportation), have a credit card linked to each of those accounts. ... There are already cities that have done this globally.”

Since winning the Smart Cities grant last year, Columbus has been able to leverage $500 million more in matching funds from private sector sources and state and regional efforts. Columbus Mayor Andrew Ginther has a goal to increase that funding to $1 billion.

“Quite frankly that’s just kind of a drop in the bucket when you look at cities and the commitment they’re going to have to put in financially to do all of these improvements,” Bailo said.

Columbus has four years to follow through in implementing aspects of the Smart Columbus proposal and to produce data demonstrating results which USDOT can use to replicate successful programs elsewhere. City officials conceded recently that much of the first year has been spent establishing
new partnerships and rounding up additional funding but residents will start to see things like the additional electric vehicle charging stations popping up soon.

Public Skepticism, Transit Impacts, Infrastructure Funding, Trucking Workforce All Issues of Concern

Kelley Coyner, a senior fellow at George Mason University, concluded the panel discussions portion of the policy academy, by identifying a variety of concerns policymakers should keep in mind with autonomous vehicles. Coyner, who has held positions in the public, private and nonprofit sectors and at all levels of government, said one of the biggest could be public skepticism.

“In Northern Virginia … they’re doing tracking opinion surveys on a 60-day cycle and consistently we’re getting 75 percent saying that they don’t want autonomous vehicles,” she said.

Policymakers should also keep in mind the potential for autonomous vehicles to impact other modes of transportation, Coyner noted.

“We want to create an environment … that expands choice and builds a more robust and resilient system and that means making sure in the short term we don’t undermine our transit systems, that the kinds of things that we do are additive to those systems, that the financial health of those systems is strong,” she said. “Because one of the things that we know is that the greater frequency and the greater connectivity we have, the greater ridership we get and those are positives.”

Transportation planners and policymakers are also concerned about how autonomous vehicles might interact not only with non-autonomous vehicles but also pedestrians and bikes. There will likely be a need to redesign intersections and perhaps employ more dedicated lanes in the future for different
modes of travel. Transportation investment will need to balance both bringing existing infrastructure into a state of good repair and preparing it to accommodate the future technology upgrades, Coyner said. Such investment could become more challenging as autonomous vehicles and particularly shared mobility take their toll on some key revenue sources.

“Localities gain a lot of revenue from parking so what is the replacement for that?” she said. “Is it congestion pricing at the curb in order to direct people to a particular area? It seems hard to think about these questions when we’re talking about full deployment (of autonomous vehicles) a long way off but if we’re looking at a large amount of fleet deployment or shared-ride deployment in congested urban areas, it’s a question that we need to deal with now.”

As for concerns about job losses in the trucking industry, Coyner said it’s important for policymakers to keep in mind those jobs are already changing.

“The notion that (long-haul trucking) is a low-skill job is way off the mark,” she said. “It is a job where now we’re already using technology to manage inventory, to manage hours of service and the like. What we need to think about is what is the opportunity in trucking in particular? Is it the long-distance trucking that we want to look at more automation in and is it really viable to have that same (level of automation) in the first and last mile pieces of it?”

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