CONNECTED & AUTONOMOUS VEHICLE READINESS

What are they?

Autonomous Vehicle (AV) technology can handle the whole task of driving so that the driver does not have to. A full AV does not require a driver and these vehicles will eventually integrate onto Capital Region roadways by progressing through the six levels of AV technology. The graphic on the right describes the six levels.

Connected vehicles (CV) are different than AVs in that technology allows vehicles to communicate with each other and the world around them. An example of CV technology is vehicle navigation or GPS-based system that receives information on congestion in the road ahead through cellular signals and suggests an alternative route. Useful information is supplied to a driver or vehicle to help the driver make safer or more informed decisions. This type of technology is already very much part of our transportation system.

Six Levels of Driver Assistance Technology Advancements

Level 0: No Automation
- Zero autonomy
- The driver performs all driving tasks

Level 1: Driver Assistance
- Vehicle is controlled by the driver, but some driving assist features may be included in the vehicle design.

Level 2: Partial Automation
- Vehicle has combined automated functions, like acceleration & steering, but the driver must remain engaged with the driving task & monitor the environment at all times.

Level 3: Conditional Automation
- Driver is a necessity, but is not require to monitor the environment.
- The driver must be ready to take control of the vehicle at all times with notice.

Level 4: High Automation
- The vehicle is capable of performing all driving functions under certain conditions.
- The driver may have the option to control the vehicle.

Level 5: Full Automation
- The vehicle is capable of performing all driving functions under all conditions.
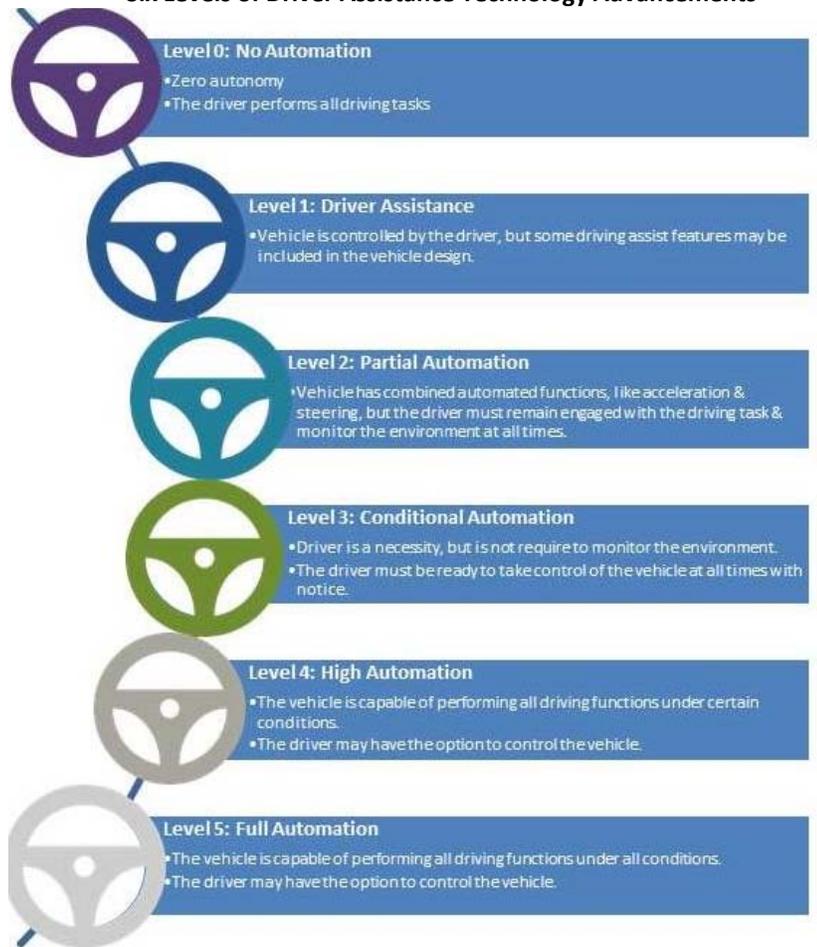- The driver may have the option to control the vehicle.

Potential benefits of AVs are:

- Potential for near zero crash fatalities, near zero crash injuries
- Reduction in incidents on the expressways, resulting in greatly reduced congestion
- Significantly higher capacity on existing pavement, reducing the need to widen roads
- Improved mobility for seniors and people with disabilities

Potential Issues with Autonomous Vehicles:

- Access to AV mobility for lower income groups may not be equitable
- Increases in ride hailing, reduction in car ownership?
- Will streets need to be redesigned?
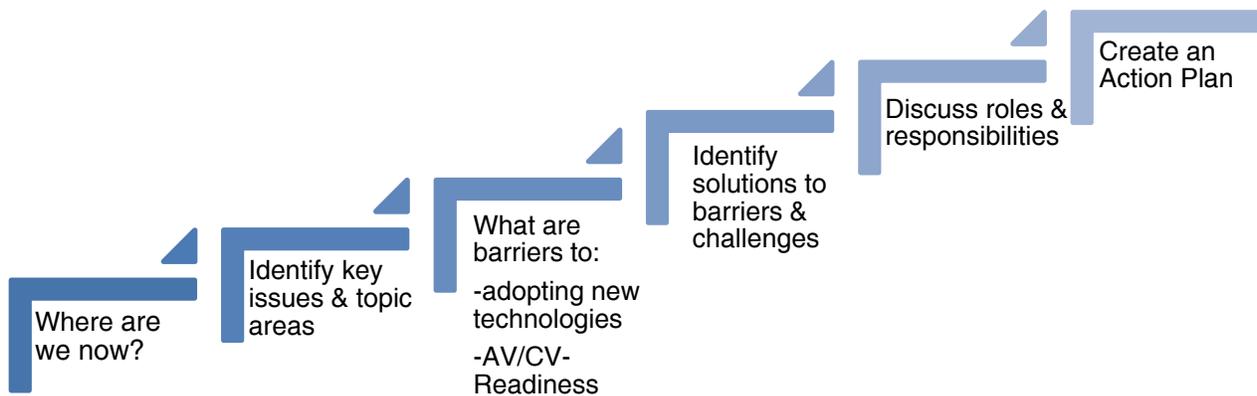- Maintaining complete streets and walkability

- Transition period when only some cars are self-driving

Meeting Overview

The CDTC SMART Communities Task Force met on Wednesday, May 9, 2018. The previous meeting in March attempted to provide steps for developing a SMART Communities and AV-Readiness "Roadmap." The purpose of the Roadmap is to identify CDTC's role and stakeholders, suggest action items, and recommend policies for accommodating emerging technologies and mobility services while maintaining a high quality of life in the Capital Region. After the initial SMART Communities Task Force meeting, CDTC amended the steps and those changes are reflected below.

Where are we now?

Identify key issues & topic areas

What are barriers to:
-adopting new technologies
-AV/CV-Readiness

Identify solutions to barriers & challenges

Discuss roles & responsibilities

Create an Action Plan

The meeting included an overview of what AVs are and what benefits & impacts are anticipated with their integration into the vehicle fleet. CDTC staff presented examples of ongoing AV tests and pilots in cities across the country and scenarios for AV deployment. Task Force members were given opportunities to provide their opinion and feedback on AV technology, how the Capital Region can leverage its benefits, and what concerns or issues should be mitigated. The questions were asked in the context of the investment principles and priorities discussed in the previous SMART Communities Task Force meeting.

Vehicle & Traffic Law

Currently, the use of AV technology is prohibited on public highways within New York State. A provision adopted on April 1, 2017 to the Vehicle and Traffic Law allowed the New York State Department of Motor Vehicles (DMV) Commissioner to approve "demonstrations and tests consisting of the operation of a motor vehicle equipped with autonomous vehicle technology while such motor vehicle is engaged in the use of such technology on public highways within this state for the purposes of demonstrating and assessing the current development of autonomous vehicle technology on public highways within

this state for the purposes of demonstrating and assessing the current development of autonomous vehicle technology and to begin identifying potential impacts of such technology on safety, traffic control, traffic enforcement, emergency services, and such other areas as may be identified by such commissioner." The provision also requires state police to supervise all tests and demonstrations.

The DMV solicited applications for AV tests and demonstrations in 2017. Audi was the first manufacturer to be approved for AV testing and completed a 6.1 mile demonstration in and around Albany in May 2017. A Chevy Bolt EV with AV technology was approved for testing in Manhattan in early 2018 but never moved forward. The AV provision to the Vehicle and Traffic Law expired April 1, 2018 and a report on the testing is expected from the DMV Commissioner on or before June 1, 2018.

AV Tests & Pilots

Despite the sunset on the AV testing provision, the University at Buffalo's Amherst campus received funding from the New York State Energy Research and Development Authority (NYSERDA), and will begin a demonstration of an autonomous electric bus called Olli. The demonstration is limited to private roads on the university campus and will assess the safety, efficiency and user acceptance of self-driving vehicles as well as the operability of the vehicle in Western New York's inclement weather. The University will also study what kind of laws and policies must be implemented to support self-driving shuttles on public roads.

A number of AV demonstrations are currently being tested on public roads across the U.S. Some examples include:

AAA's Hop On Project in Las Vegas offers free rides to its members on a self-driving shuttle bus in downtown. The shuttle only makes three tops on a 0.6-mile loop, but has been called "the largest self-driving pilot project in the U.S."

The **MCity Driverless Shuttle** research project on the **University of Michigan's North Campus** is expected to begin testing this spring. The shuttle is an all-electric, 11-passenger vehicle and will cover a one-mile circular route at no cost to riders. The University of Michigan will be the first college campus to deploy driverless shuttles on public roads to transport students, faculty, and staff. The test will study how passengers react to the vehicle as a way to gauge consumer acceptance of driverless technology.

Uber began testing self-driving cars on America roads in 2015. They have tested AV technology on various models of cars in multiple cities with mixed results. There have been collisions and traffic violations reported and Uber recently suspended AV testing after one of their vehicles and "safety drivers" was involved in a fatal crash in Arizona.

AV-Readiness: Task Force Feedback

What job do we need AVs to do?

- Deliver resources and goods to homebound populations (ex. medicine, food, etc.)
- Data and information must be collected and delivered to vehicles in real-time
- AVs must reduce crashes and improve safety
- Connect to larger transit system through scaled services (first/last mile/ shuttles)
- Increase ride-sharing

How can AV technology expand access to healthcare, employment, education & recreation for all users of the transportation system and all ages, abilities, and incomes?

- Ambulatory services & connected passengers – mobile information hubs could deliver medical information and a diagnosis to hospital or medical facility before a patient arrives by AV
- Improve transportation reliability for low-wage workers to get to work and reduce turnover for employers.
- AV technology could be used to provide one-way car sharing

How will AVs impact the transportation ecosystem?

- Public roads could become privatized
- Insurance market impacts
- Access and sharing of data could become problematic – as services become privatized, data becomes a commodity that governments are required to purchase in order to provide high quality infrastructure and appropriate programming
- Privacy concerns and increased exposure to advertising and marketing
- Mobility and transportation could shift to a subscription service
- There will be new economic opportunities as companies develop products and services that can be offered while using an AV.

Other Benefits/Costs of widespread deployment of AVs for cities & metropolitan regions

- AVs could provide an opportunity for the acceleration of smart grid and EV charging technology (i.e. inductive charging) that can reduce the need for new power plants.
- Better information can improve government programs and services.
- Data sharing or an open data system can improve government transparency and cultivate an environment for innovation that could deliver improved or new products and services.

Next Steps

The CDTC SMART Communities Task Force is scheduled to meet next on June 13, 2018 at 3:00pm. The Task Force will discuss the role of the MPO in AV-Readiness, public policy considerations, how communities can plan for the coexistence of existing infrastructure and AVs, and how can communities take advantage of any new infrastructure investment.

A Few AV Resources

National League of Cities, *Autonomous Vehicles: A Policy Preparation Guide*

National Conference of State Legislatures, Autonomous Vehicles: Self-Driving Vehicles Enacted Legislation

USDOT, *Federal Automated Vehicles Policy: Accelerating the Next Revolution in Roadway Safety*

Rand Corporation, *Autonomous Vehicle Technology: How to Best Realize Its Social Benefits*

Seattle Department of Transportation, New Mobility Playbook

Pedestrian and Bicycle Information Center, Discussion Guide for Automated and Connected Vehicles, Pedestrians, and Bicyclists

Boston Transportation Department, Go Boston 2030 Imagining Our Transportation Future: Vision and Action Plan

Video: The Future of Autonomous Vehicles by Robin Chase