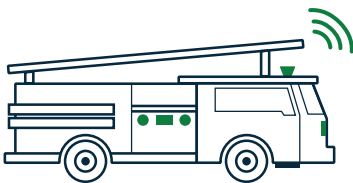


We are entering a time when advanced computing, sensors, and telecommunications technology are transforming automobile and road-based surface transportation. Connected and Automated Vehicles, commonly referred to as CAV, use advanced communication technologies to connect vehicles and roadside infrastructure (V2I/I2V) or vehicles to other vehicles (V2V). These communication messages increase safety, mobility, and efficiency of the transportation network for all modes of travel.

Connected vehicles are becoming increasingly more prevalent throughout the transportation network as manufacturers continue to focus on integrating these technologies and preparing for the future. Connected vehicles are equipped with advanced technology for communication with other vehicles and roadside infrastructure. Connected vehicle technology enables vehicles, trains, buses, roads, smartphones, and other equipped infrastructure to ‘talk’ to one another. Examples of existing technology being used include:



Vehicle to Infrastructure: The traffic signal ‘talks’ to the vehicle and offers information about the traffic signal timing, potential pedestrians present, and other location specific information. For example, the traffic signal may tell you that the light is about to turn green or that a pedestrian has requested to cross.



Emergency Vehicle Preemption (EVP): The emergency vehicles “talk” to the traffic signals which adjusts signal timings to clear traffic in the direction of travel before the emergency vehicle reaches the intersection. Providing faster response times and safer travel for all motorists.



Transit Signal Priority (TSP): The transit vehicle “talks” to the traffic signal to ask if the traffic signal can provide additional green time for the transit vehicle to progress through the signal. Providing more efficient and reliable transit services.



Advanced Pedestrian Detection: Advanced pedestrian detection can initiate a message to a device to “talk” to on-coming vehicles, warning that there is a pedestrian in the crosswalk. In addition, the flashing ‘don’t walk’ time can be extended to clear pedestrians from the intersection which may need additional time. Providing additional safety for pedestrians.



Bicycle Detection: Advanced bicycle detection can initiate a message to a device to “talk” to on-coming vehicles, warning that there is a cyclist in the bike lane. Providing additional safety and efficiency for bicyclists.

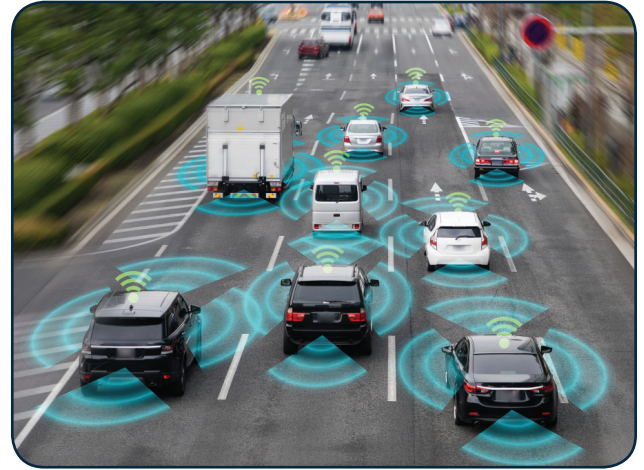


Automated and Autonomous Vehicles

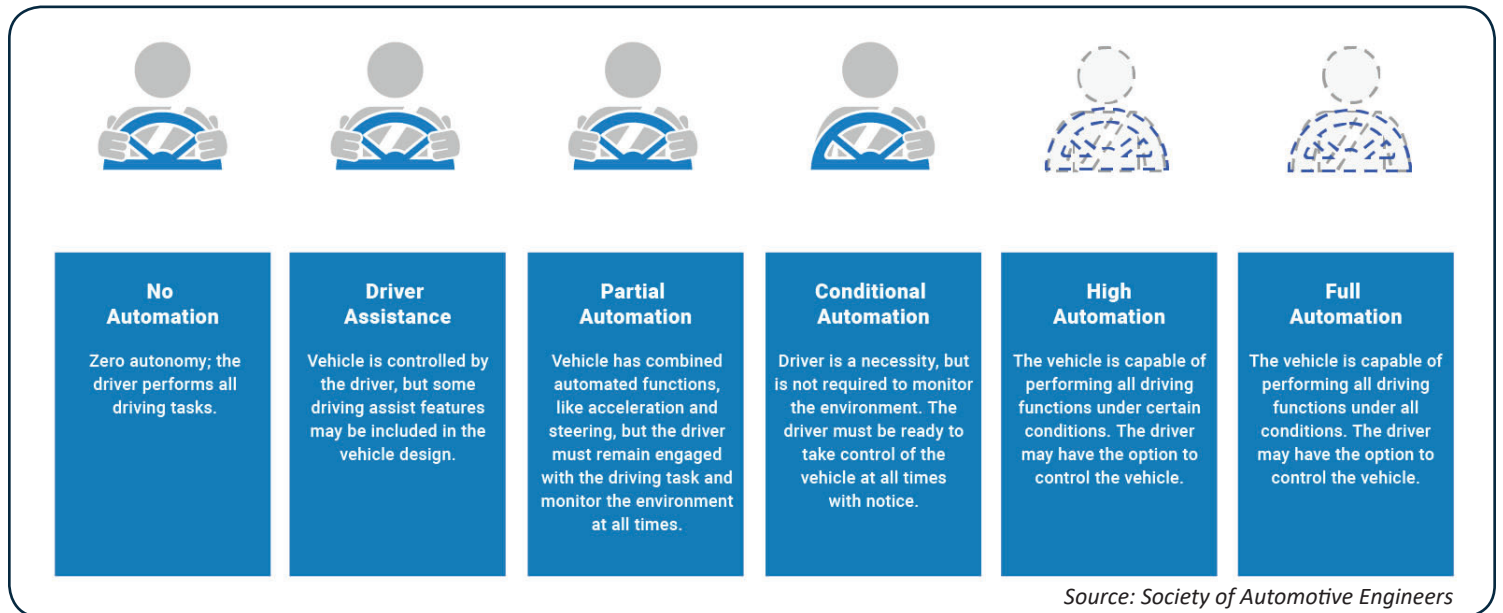
Automated and Autonomous Vehicles use advanced sensors, communication, and computers to replace various functions typically handled by the human driver. Vehicle automation is well under development and is expected to improve safety, mobility, and sustainability. Drivers will receive notifications and 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. Automated and autonomous vehicle technology has the potential to significantly prevent or reduce the impact of millions of accidents every year.

By limiting the number of crashes, thousands of lives will be saved and millions of injuries prevented.

Although there is much debate over autonomous vehicles, whether they should be pursued, and what a state DOT's level of involvement should be, automated features are already here and fully autonomous vehicles are predicted to be here in the next 30 years. State DOTs can either help shape this revolution or let it shape them.



Society of Automotive Engineers (SAE) has defined 6 levels of driving automation as can be seen below, ranging from 0 to 5. Currently, most new vehicles can be characterized as level 0 (no automation), level 1 (driver assistance), or level 2 (partial automation). Automated technology examples include: adaptive cruise control, lane departure assist, and parking assist. Autonomous vehicles operate independently and require no human intervention.



Source: Society of Automotive Engineers