Chairman Green, Vice Chair Greenspan, Ranking Member Sheehy, and members of the committee, on behalf of 3M Company, I would like to thank you for the opportunity to testify today. For almost 80 years, 3M has advanced its mission to improve road safety and mobility in more than 80 countries, with a global team dedicated to bringing families home safely.

3M values its longstanding partnership with the State of Ohio. 3M is a primary provider of roadway infrastructure materials consisting of reflective technology for roadway signs, pavement markings, vehicle markings and license plates. These materials improve safety on Ohio roadways by increasing visibility for the motoring public. As we drive towards a future with zero roadway fatalities, Connected & Automated Vehicles (CAVs) will require an infrastructure that communicates with the cameras and sensors these vehicles use to navigate. Due to our historical involvement and consistent innovation in roadway safety, 3M is uniquely positioned to maximize advancements in CAV infrastructure.

Governments around the globe are beginning to address the policy implications of an automated transportation system. Government stakeholders will need to provide safety solutions for both the human and the machine driver as the highways of the future are built. 3M offers technical and operational solutions that will help national, state and local governments prepare their infrastructure assets for the safe and efficient operation of CAVs on public roads.

CAV safety is a more complex issue than many people understand. Today's conversation is primarily focused on advances in vehicles versus the environment outside the vehicle. However, to have an environment optimized for automated vehicles and the promise of increased safety, it is imperative that road infrastructure be developed in accordance with the increased functionality of the vehicles. As a supplier, both to vehicle manufacturers and infrastructure builders, 3M is working with multiple automotive industry stakeholders to define the safety challenges that CAVs present and deliver lasting, permanent solutions. Redundancy in safety systems and standardization form the backbone of a successful transition from the current state to a state where automated vehicles share the road with each other and with non-automated vehicles. Without redundancy and standardization on roadways and across jurisdictions, we can't realize the full safety potential of automated vehicles, where multiple, necessary components have the capability to interact with each other while automated cars are on the road. Redundant systems help ensure that passengers stay safe should one component fail.

3M™ Connected Roads is working with automakers and regulatory bodies to develop infrastructure solutions that help to provide the tools to communicate effectively with both human drivers and automated driving systems. For example, pavement markings with high contrast provide improved lane detection to humans and to vehicles equipped with machine vision systems.

3M is developing road signs that improve readability for CAVs, helping to improve navigation tools. Next generation lane markings will be designed to be detectable in winter driving conditions or during heavy rains and optimized for reliable performance for Advanced Driver

Assistance Systems. Road signs may be designed to be able to communicate to automated driving systems and to provide more navigational data. We expect static road signs will have the capacity to provide dynamic updates to the vehicle as road conditions change. These increased capabilities are part of the critical redundancy helping to ensure people stay safe in CAVs.

3M's commitment to collaboration is a key element in contributing to a high-functioning, safe environment for drivers and pedestrians. We have established relationships across the automated driving landscape – from municipalities to OEMs, policy makers, research institutes and regulatory bodies. 3M plays an integral role in developing solutions and solving problems throughout the transportation environment.

In 2017, 3M and the Michigan Department of Transportation (MDOT) partnered to deploy connected vehicle technologies along more than 3 miles of Interstate 75 in Oakland County, MI. Using some of the leading roadway solutions, the I-75 modernization project work zone was transformed over the course of four months to test advanced vehicle-to-infrastructure technologies on connected and autonomous vehicles. Advanced all-weather lane markings, retroreflective signs with Smart Code technology and DSRC (dedicated short-range communication) devices for vehicle-to-infrastructure communications were deployed. As vehicles become increasingly automated and connected, existing road infrastructure can be updated to help provide the safety and reliability of this emerging technology.

In addition to the project on I-75, we are collaborating with thought leaders like the University of Michigan Mobility and Transformation Center (MCity), Texas Transportation Institute (TTI), Stanford Center for Automotive Research (CARS), CLEPA European Association of Automotive Suppliers, and ERTICO ITS Europe and more, to pave the way for the connected roadways of the future. Through these collaborations 3M will develop some of the leading solution systems that draw on knowledge from a variety of key stakeholders in this space.

As government stakeholders prepare for the future of automated transportation, a holistic policy strategy that includes changes to both vehicle regulation and the road infrastructure is critically needed. Roadway safety devices, such as pavement markings and materials, highway signage and temporary traffic control devices, should be designed to provide optimal safety benefits to CAV machine vision systems, while maintaining high safety standards for human drivers. In order to achieve regulatory uniformity, appropriate standards for roadway safety devices that are optimized for CAVs and human drivers must be developed. CAVs must operate in harmony with the infrastructure to achieve the high safety standards the public demands and optimized roadway safety devices for CAVs and human drivers can help achieve this goal. National, state and local governments will play a critical role in whether the benefits of a connected and automated transportation system can be realized.

Building on almost 80 years of road safety experience, 3M™ Connected Roads will continue working with partners to help develop the connected roadway of the future and facilitate the long-term transition to CAVs. By applying 3M science to develop tomorrow's connected roads systems, we are helping to make CAVs more effective and much safer. Ultimately, the automated driving future is not just about the technology that OEMs put into their vehicles; it's about creating informative, reliable, resilient infrastructure for CAVs that bring families home safely.