



**Testimony of Jeff Klei
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Digital Commerce and Consumer Protection Subcommittee
“Self Driving Cars: Levels of Automation”
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Good morning Chairman Latta, Ranking Member Schakowsky, and members of the Subcommittee on Digital Commerce and Consumer Protection. I thank the Subcommittee for the opportunity to testify today on behalf of Continental. My name is Jeff Klei, and I am the President of Continental Automotive Systems in North America.

Continental is a leading Tier 1 supplier that develops intelligent technologies for transporting people and their goods. We provide our automotive customers with sustainable, safe and affordable solutions that enhance automotive safety. In 2016 we generated more than \$43 billion in sales within our five divisions, Chassis & Safety, Interior, Powertrain, Tires, and ContiTech. Continental employs more than 20,000 employees in the U.S at more than 80 facilities located in 26 states and has more than 220,000 employees in 55 countries worldwide.

In 2015 there were more than 35,000 lives lost in the U.S. due to traffic crashes. Projections for 2016 are expected to increase to more than 40,000 fatalities, a level we haven't seen in a decade. While this is an alarming number, it is even more startling at a global level—more than 1.2 million people die in roadway crashes and another 50 million are injured. This is unacceptable and reversing this trend is what motivates each and every employee at Continental.

In the last 45 years the U.S. has experienced a relative declining trend in traffic fatalities with respect to an increased number of vehicles on the road and number of miles driven. This is due in large part to improved vehicle safety technologies. In the early 1970s the number of injuries and fatalities were at an all-time high. The introduction of the seat belt helped to reduce the total number of traffic fatalities by 10,000 in a few short years. In 1983, the number of fatalities was the lowest in 20 years due to the introduction of anti-lock braking systems. As numbers began to rise again, the airbag became standard in vehicles reducing injuries and fatalities down to its lowest number in 30 years. The introduction of electronic stability control in the mid-1990s helped to reduce traffic accidents to the lowest number in 50 years. Continental projects new crash-avoidance technologies will once again reverse the recent increase in fatalities as the auto industry moves toward a more widespread implementation of Advanced Driver Assist Systems (ADAS).

Innovation has always been at the heart of the automotive industry. From the original concept of the automobile in the late 1800s, the mass production lines pioneered in Detroit, to today, the automotive industry has always invested in research and development to make their products safer, more reliable and more affordable. Today, we are witnessing the automotive industry evolve from a crashworthiness mindset, where manufacturers try to make the passenger cabin more survivable in the event of an accident towards a crash avoidance mindset—after all, the best way to survive a crash is to avoid one in the first place.

Continental, and our dedicated employees, are committed to developing Safe and Dynamic Driving technologies towards Vision Zero. Vision Zero means a future with zero traffic fatalities, injuries and ultimately zero accidents. Such a future can only be achieved with the help of innovative active and passive safety, driver assistance, and automated driving technologies. As Continental brings these technologies to market, we exhaustively test products, and subsystems, as part of a larger system of advanced driving assistance technologies that will be integrated with a variety of components by original equipment manufacturers.

Our Vision Zero philosophy is embedded in each technology we develop as we continue to enable automated driving. At Continental, we describe our systems approach through three primary actions—sense, plan, and act. Whether the technology simply assists the driver like many systems on the road today, or ultimately takes over the driving task completely, it first must *SENSE* the surrounding environment and gather the necessary data that can be interpreted. Sophisticated sensor systems can help eliminate human error and distractions by providing 360-degree awareness of the road at all times. The data gathered from the sensors is then analyzed to identify obstacles or hazards. Our systems then dynamically develop a *PLAN* to determine how to assist the driver. Once that plan is in place, the systems will *ACT* to execute the plan to safely and comfortably pilot the vehicle and in certain cases avoid a hazard or crash situation. Our Sense, Plan, Act approach is the foundation behind Continental's active safety and Advanced Driver Assistance System technology, and is a key component to advancing automated driving systems. We believe that when fully automated driving is possible, traffic fatalities can be reduced by 90 percent because that is the percentage of accidents that are caused by human error.

Continental has been an active participant globally in policy discussions and initiatives with governments, automotive industry partners, trade associations and other standard setting organizations. The collaborative efforts to help establish consistency within the emerging self-driving market has been crucial to the advancement of automated driving technologies. Continental is currently engaged with the Department of Transportation's Smart Cities Program. Several of our divisions are working together to develop a highly sophisticated intersection in Columbus, Ohio, with vehicle and integrated infrastructure technologies that will help save the lives of vehicle occupants as well as pedestrians while improving transportation efficiency in urban environments. We support the National Highway Traffic Safety Administration's recent adoption of the SAE International definitions of automation, as we believe it is beneficial to helping educate the public in order to distinguish between different automated technologies and garner public acceptance.

Continental is one of the leading suppliers in this market, with a complete portfolio of technologies for all defined levels of automation. Each innovative safety feature undergoes an extensive testing process before becoming available to the market. As a supplier, we currently develop a multitude of innovative technologies that can save lives and enhance the driving experience under the Level 0 to Level 2 definitions of automation. These products are designed based on the needs of our customers to assist the driver in interpreting the surrounding environment and control the vehicle in order to prevent an accident from occurring.

Continental has been integral in the deployment of current crash avoidance technologies such as lane keep assist, rear back up assist, automatic emergency braking, and adaptive cruise control, to name a few. These crash avoidance technologies are the building blocks to higher levels of automated driving and need to be embraced as crash avoidance technologies that save lives. All of these technologies can be found throughout the fleets of most vehicle manufacturers.

As the industry moves forward towards Level 3 automation technology and beyond, Continental is positioned to supply public and personal transportation needs with the safest and most advanced technology available on the market. The world and the behavior of drivers within it are ever changing, and the vehicle must adapt to these changing trends. Our children seem to rely on smartphones more so than vehicles. Living in a world of distractions has become commonplace. Automotive technology must be developed accordingly. That is why Continental has put a great deal of effort into Human Machine Interface technology. We want the driver to be aware of their surroundings, be aware of what the systems in the vehicle are doing, and be aware of when it is safe to relinquish control of the vehicle and when to reengage with the vehicle. In addition to informing the occupants, keeping them safe, and pedestrians safe, we must also secure the systems within the vehicle. As part of system development for Highly Automated Driving, we focus on redundancy of vehicle safety systems. That is why we are developing complimentary systems and technologies that support existing safety systems in the vehicle's architecture.

Since 2011, we have continued a pursuit of testing and developing highly automated driving with next generation technologies like automated parking, cruising chauffeur and a complete self-driving vehicle in combination with V2V/V2X technology. We were the first supplier in the U.S. to be awarded a testing license for automated vehicles in Nevada and are currently testing our third generation automated vehicle on highways and roads throughout the country and around the world. We are currently integrating sophisticated technologies such as high resolution flash lidar, which will expand the vehicle's detection capabilities. This is the same technology that has been deployed on space shuttles at the most advanced technical level, and we are working to utilize its potential for road applications. But, our continued efforts in this direction would benefit greatly from an investment in infrastructure that promotes vehicle to X communication, a dedicated spectrum communication band that can be utilized by current and future safety systems, and harmonization of safety laws that allows for the full real world testing of these technologies.

The challenges in broadly testing this new and innovative safety technology across the country are great. The industry currently faces considerable uncertainty on state and federal requirements that would require clarification from the federal government's exclusive authority to regulate all motor vehicles. The safe commercial deployment of potential life saving technology depends on the ability to extensively test on public roads under all conditions. In order to envision a future of full automation, the government must review federal motor vehicle safety standards that would allow for vehicles that may not be under the full control of a driver at all times. Similar to the need of improved road conditions as automobiles transitioned from rural landscapes to metropolitan areas in the early 1900s, we need a road infrastructure that complements automotive advancements, and a legal framework that supports a new system of mobility.

The automotive world is one of excitement. Software developers are becoming automotive suppliers, automotive companies are becoming software developers, and our vehicles are becoming our smart-device. The world of mobility has the capability of expanding to unimaginable independence and personal freedom without sacrificing the safety of future generations. Continental stands at the ready, alongside our industry colleagues, to work with the Committee and Congress in helping construct laws that foster innovation, enable mobility, and create a safer environment for the public.

Thank you again, Chairman Latta, Ranking Member Schakowsky, members of the Subcommittee on Digital Commerce and Consumer protection and staff, for the opportunity to testify at today's hearing.