

**NEW YORK CITY DEPARTMENT OF TRANSPORTATION  
TESTIMONY FOR HEARING BEFORE THE  
CITY COUNCIL COMMITTEE ON TRANSPORTATION  
REGARDING THE FUTURE OF DRIVERLESS VEHICLES IN NEW YORK CITY  
OCTOBER 28, 2016**

Good morning Chair Rodriguez and members of the Transportation Committee. I am Michael Replogle, Deputy Commissioner for Policy for the New York City Department of Transportation (NYC DOT) and I am joined by Will Carry, Senior Director for Special Projects, from my team and Jenna Adams, Director of Legislative Affairs. Thank you for bringing us together to discuss the future of driverless vehicles in New York City.

Automated Vehicles (AVs) present both opportunities and challenges for our city. On the positive side, AVs may help us achieve Vision Zero by reducing human error and risky behaviors such as speeding and distracted driving. AVs may also reduce congestion and overall vehicle miles travelled by encouraging a shift from auto ownership to shared-use mobility services. And AVs may expand mobility by increasing travel choices in neighborhoods underserved by our current transit system.

That said, there are many complex challenges that must be resolved before AVs are ready for New York City. The technology is advancing very quickly and all of us in government—at the City, State, and Federal levels—need to make sure it is safe and secure before we allow AVs on the most complex street system in North America.

We also want to encourage the use of AVs that results in a more efficient transportation network—not one where thousands of empty vehicles clog our streets. If introduced without appropriate transportation system management and policies, AVs may increase traffic volume, pollution, and sprawl.

Finally, we need to consider the impact of AVs on tens of thousands of New Yorkers who make their living by driving. It is important that government at all levels think through how those displaced drivers can continue to provide for their families. My colleagues at the Taxi and Limousine Commission (TLC) will discuss the potential impacts of AVs on taxi and FHV workers, and address accessibility, another key topic.

Let me walk you through the current state of the industry nationally and then focus on New York City.

**What are Automated Vehicles?**

Over the past five years, there has been tremendous momentum in the development of AV technology. Every week, there is a news story about another major tech or auto company investing in AV technology or promising to be the first to have an AV on the market.

In 2016 alone, General Motors acquired Cruise Automation for \$1 billion and invested \$500 million in Lyft, Google's test fleet passed two million miles of automated driving, and Uber introduced test AVs into its Pittsburgh for-hire service.

But what *exactly* is an AV? AV is a broad term that encompasses everything from a car that may be able to drive itself on the highway but still requires a human driver, to a truly driverless car without a steering wheel or pedals.

The National Highway Traffic Safety Administration (NHTSA) has adopted the automation levels used by the Society of Automotive Engineers (SAE). This scale helps us to understand the kind of vehicles we can expect to see in the next five years and those which may be coming to market in the longer term.

Under **SAE Level 0**, the driver is in complete control of the primary vehicle control elements.

With **SAE Level 1**, one or more of the primary control functions are automated, but work separately. Cruise control is a common example of a Level 1 feature.

With **SAE Level 2**, multiple control functions are automated; relieving the driver of responsibility for some driving tasks, such as car parking, but the driver must actively monitor the driving environment and may need to resume control.

**SAE Level 3** marks the beginning of what we consider to be self-driving cars. The vehicle can perform parts of the driving task and monitor the environment in some conditions. The driver can disengage, but needs to be ready to retake control.

At **SAE Level 4**, the vehicle performs all driving and monitoring functions in certain environments, and will not need a human to resume control within those operational domains. The driverless function may be limited to freeways or to streets with low traffic volumes.

At **SAE Level 5**, the vehicle performs all driving tasks under all conditions that a human driver could perform. This is full autonomy; these vehicles will not need a steering wheel nor pedals.

Within the industry, there is still significant debate on two key questions: (1) when are AVs likely to hit the market? And (2) what is the safest way for automation to be introduced? How this plays out will have significant impact on our city.

### **Who Regulates Automated Vehicles?**

This brings us to our next important question: who regulates AVs and what role do cities play as these regulations are being implemented?

Our laws and regulations at the City, State, and Federal levels were drafted with a human driver in mind. The process of adapting these laws to the reality of AVs is just beginning and will likely happen in two phases. In the first, currently underway, states are amending laws to allow for the

testing of AVs on road and the Federal government is beginning to regulate AV safety. For AVs to become widespread, there will need to be a second phase of changes addressing a wide range of issues. These include liability and insurance, the rules of the road, and street design. Today I will focus on this first phase of changes.

## **Federal**

The Federal government's primary role is to regulate vehicle safety and issue national standards for road design. NHTSA sets Federal Motor Vehicle Safety Standards, which dictate components included in vehicles and safety requirements necessary to sell vehicles across the country. Using these standards, NHTSA intends to play an active role in determining how AV hardware and software must operate.

To help guide the transition to AVs, this September, US DOT and NHTSA released, "Federal Automated Vehicles Policy: Accelerating the Next Revolution in Roadway Safety." We commend US DOT for their careful consideration of these complicated issues, specifically the best practices the guidance outlines for the safe design, development and testing of automated vehicles prior to commercial sale, and operations on public roads. This safety guide is crucial as we assess using AV technology in the five boroughs.

The guidance is currently voluntary—meant to inform a developing regulatory framework to govern the testing and development of AVs.

## **State**

While the Federal government will regulate the vehicle itself, New York State will retain control over traffic laws, permitting and insurance requirements, driver licensing, and law enforcement. To assist state lawmakers in planning for AVs, the NHTSA document also includes a Model State Policy. It provides suggestions for how state agencies should distribute responsibilities for AV regulation, respond to applications to test and deploy AVs, and establish insurance and liability requirements.

It is important to understand that New York State, based on how it chooses to permit and allow autonomous vehicles to be tested and operated, will likely determine how and when AVs enter New York City.

NHTSA's recommendations draw heavily from regulation developed by California and Nevada<sup>1</sup>. They aim to foster national consistency as more states implement regulatory frameworks. They recommend first reviewing existing laws to identify obstacles to AV testing and deployment. As

---

<sup>1</sup> Nevada Revised Statutes 482A and California Vehicle Code Section 38750

an example, our State Vehicle and Traffic Law requires a person to have at least one hand on the steering wheel when a motor vehicle is in motion.<sup>2</sup>

Though helpful, we believe the Federal guidance falls short in addressing the impact of AVs on dense, urban environments like New York City.

NHTSA is seeking feedback on all sections of the Federal Automated Vehicles Policy, and we intend to submit comments affirming the importance of AVs promoting safety, security, equity, and sustainability in our transportation system. We will also stress the necessity of regularly engaging cities in federal and state conversations about AV regulation, testing and deployment.

### **AVs in New York City**

So what role might New York City play in the AV discussion? Cities across the country are responding to developing AV technologies in different ways. Some, like Boston, San Francisco and Pittsburgh, are engaging with universities, industry and the Federal government, inviting testing in an attempt to shape the conversation around AVs. Elsewhere, the Chicago City Council has proposed a ban on AVs<sup>3</sup>, in order to ensure that the vehicles do not drive on its city's streets until they have been thoroughly proven.

In thinking about AVs, I would like to discuss a few priorities for our city:

First and foremost is that we should be part of the conversation about new laws and regulations. Our city is a dense, complex urban environment that will require extraordinary attention from the AV industry and regulators to create vehicles that will be safe for passengers of AVs as well as pedestrians, bicyclists, transit riders, and all of our other street users.

Secondly, more thought needs to be given to managing the transition to AVs. In the short term the most likely type of AVs we will see will be Level 3 AVs, which require the driver to retake control in certain conditions. How this transition will be managed is a key safety question. How will a driver who is reading, napping, or surfing the web going to be alerted that they need to take control? We know that driver inattention is a key factor in crashes, how do we make sure that Level 3 AVs do not contribute to this problem?

This leads us to our third issue—what kind of AV technology will work best in an urban environment. In terms of how AVs see the road, manufacturers are working with sensors and camera systems, radar, and detailed street maps to guide their vehicles.

Ultimately, we believe the safest AVs will be connected vehicles. Connected vehicles use technology to communicate with other vehicles and with infrastructure to prevent crashes, improve vehicle movement, and reduce congestion and pollution.

---

<sup>2</sup> NY Veh & Traf L § 1226 (2012)

<sup>3</sup> Ordinance 6465 of 2016 sponsored by Chicago Council Member Edward Burke.

New York City is already implementing connected vehicle technology. With US DOT, our agency completed the first year of a five-year pilot with technology installed on the FDR Drive and in over 250 intersections in midtown Manhattan and Brooklyn. These intersections are equipped with technology that communicates with over 8,000 vehicles enrolled in the pilot. The pilot also connects with our existing network of nearly 13,000 smart traffic signals that communicate wirelessly with our Traffic Management Center. We expect to move to citywide implementation with the lessons learned from this pilot.

We also need to ensure that the AVs cannot be hacked. The AV industry will need to secure its technology so operations cannot be directed by external parties without the operator's permission. The technology also needs to secure personal information so that it cannot be accessed without authorization.

Fourth, we want AVs to help us achieve our goals of creating a more sustainable transportation system. As the transition to AVs gets underway, we should advocate for an approach that leads to more efficient use of our streets. If AVs are introduced using the shared-use mobility model, they could reduce traffic volumes on our streets by encouraging ride sharing and better serve communities with the greatest need for additional mobility options.

With proper management, widespread AV use could lead to decreased personal car ownership, which we know is a priority for you, Chair Rodriguez. That could reduce demand for parking, free up urban space for other needs, whether for bus and bike lanes, parks and gardens, or more affordable housing.

Finally, AVs hold the potential for increased street safety, as the vast majority of crashes are attributed to human error. Achieving Vision Zero guides all of our work at NYC DOT, and we are intrigued by the idea of vehicles that can be programmed to safely follow the speed limit and traffic laws while interacting with other surface transit. But at this time we do not have assurances that the technology is ready for the unique challenges of New York City, so we must take adequate time to test and evaluate.

In fact, there are two bills pending in Albany that would amend the Vehicle and Traffic Law to allow AVs to operate on public roads in New York.<sup>4</sup> We urge this committee to tell your Albany colleagues that we need a full urban safety review before passing these bills. Instead, New York State should consider the guidance provided in the Federal Automated Vehicles Policy to form a task force, including relevant state and city actors, to evaluate the steps necessary to holistically plan for this technology.

In closing, we are doing everything we can to stay actively engaged as this emerging technology unfolds. We plan on partnering with TLC and other institutions in coming months to discuss the

---

<sup>4</sup> A31 of 2016 sponsored by Assembly Member David Gantt and S7879 of 2016 sponsored by Senator Joseph Robach

opportunities and challenges for AVs operating in the unique environment of New York City. We will invite representatives from all levels of government, academic institutions and think tanks, industry leaders, and other stakeholders to gather information and discuss concepts to inform an emerging AV framework. We will keep this committee informed as the planning for these discussions moves forward.

Thank you again for inviting me to testify today and I look forward to answering questions after testimony from TLC.

**Testimony of the New York City  
Taxi & Limousine Commission  
City Council Committee on Transportation  
Oversight Hearing on Driverless Technology  
October 28, 2016**

Good morning Chairman Rodriguez and members of the Transportation Committee. I am Bill Heinzen, Deputy Commissioner for Policy and External Affairs for the Taxi and Limousine Commission. With me today is Rodney Stiles, Assistant Commissioner for Data and Technology. Thank you for inviting us here today to share our thinking about automated vehicles and the for-hire vehicle market. When I use the term for-hire vehicles today, I will be speaking generally about yellow and green taxis, black cars and liveries. As you know we regulate other for-hire sectors including commuter vans, paratransit and luxury limousines. These sectors may present unique issues, and we will of course evaluate the potential impacts of automation within these sectors as well.

As you've heard from DOT, automated vehicles at various levels are already a fact in the United States, although not at the fully automated level. Additionally, the federal government has expressed its strong support for a regulatory framework that accommodates continued testing of automated vehicles, as well as their deployment as soon as feasible from a safety standpoint.

While it may be several years before automated vehicles function on a for-hire basis in New York City, they are currently being tested and serving as taxis in a limited number in Pittsburgh, albeit with "driver engineers" behind the wheel, ready to regain control of the vehicle. It is therefore not too early to spot the key issues that automated vehicles pose for the TLC as a regulator of 95,000 vehicles and 150,000 drivers. Consistent with our agency mission, these issues include safety, accessibility, driver welfare and accountability.

**Safety.** Vehicle safety standards and inspections are a key part of the TLC's licensing process and crucial to the safety of passengers, drivers and other New Yorkers on the road.

Whether tomorrow's for-hire transportation is a connected vehicle with enhanced safety features that allow a driver to monitor its proper performance and assume control if necessary, or a fully driverless model, our interest in providing transportation that is safe for passengers, pedestrians, and cyclists remains paramount. This is no different from today, when we perform a 200 point inspection, and those vehicles that do not meet our equipment safety standards are not allowed to provide for-hire service. Because many of these vehicles are in constant use and carry passengers, the TLC's inspections are more frequent than the state's standards for non-commercial automobiles. By monitoring evolving technology, the TLC will continue to address safety concerns.

**Accessibility.** Technological progress should not stop or reverse the City's gains in accessible for-hire vehicle service. Any system for regulating automated for-hire vehicles must ensure access for any New Yorker or visitor who uses a wheelchair and needs assistance entering and exiting a vehicle. New York City has made great progress in improving accessibility in key segments of our licensed vehicles, particularly Yellow and Green Boro cabs. In the next few years, fifty percent of Yellow taxis will be wheelchair accessible, and at least twenty percent of Green Boro taxis must be accessible. As the Council is aware, we are working to bring real accessibility to the FHV market, but we know that the black car and livery markets have failed to provide equivalent service to New Yorkers with disabilities. The advent of automated vehicles will factor into the goal of wheelchair accessibility across our regulated sectors.

Although it is obviously too early to know future technology with certainty, we understand that automated vehicles may increase accessibility for some passengers. For people with visual impairments or limited mobility, automated vehicles have the potential to provide safe, efficient mobility within a mainstreamed network. But for New Yorkers who use wheelchairs, we see two broad areas of concern: services and products. On the service level, many people who use wheelchairs require the driver to assist them in entering and exiting the vehicle and in being secured within it. It is unclear how this need would be met by automated vehicles, particularly if for-hire vehicles are, in fact, driverless, with no human monitoring or attendant.

Similarly, when it comes to the products themselves, that is, the vehicles, the challenge will remain exactly what people with disabilities face today: ensuring an adequate supply of fully-accessible vehicles to provide safe, on-demand transportation. We know from experience that this challenge will not be met by the private market, because service providers and car manufacturers will not voluntarily provide accessible vehicles. Whatever the level of automation, government must require a sufficient supply of fully-accessible vehicles to address the basic rights of people with disabilities, and it must implement and administer delivery of an accessible for-hire transportation network. For that reason, it is vital that any federal or state regulatory scheme for automated vehicles does not prevent or impede the City's accessibility framework in the for-hire vehicle markets.

**Driver Welfare.** The TLC licenses over 150,000 drivers, and that number increases every day, fed by growing customer demand for an unprecedented variety of for-hire service providers, and of course by the driver incentives widely advertised throughout the City.

Most of these drivers are independent contractors who rely on driving as their primary source of income to support themselves and their families. And while some autonomous vehicle technology may help TLC-licensed drivers do their jobs more safely and efficiently in the short-term, there is real potential for a vast displacement of workers. At the federal level, President Obama has acknowledged that there may be job loss, and he has spoken of the need for job retraining. On the local level, the TLC will monitor the rate of change as we explore with our sister agencies how best to meet the needs of our driver licensees, possibly including identifying other income opportunities, training opportunities and transition services. Identifying new employment opportunities and providing transitional assistance for drivers should also be a priority in the private sector, whose increase in popularity has fueled the historic influx of drivers.

**Accountability.** Any regulatory system requires information to ensure accountability, and it would be impossible to evaluate or plan for these changes without consistent and reliable data streams. There must be for consistent and precise mapping of New York's unique urban terrain prior to the intensive testing or introduction of automated vehicles. But in addition to that data, which will be so crucial for safety and city planning, the TLC currently collects trip data from our regulated industries, and that data yields information for us and other agencies (as well as other data consumers) about traffic and commuting patterns, as well as informing our regulations, which are designed to protect passengers, ensure accessibility and consumer protections like fare transparency, and also to insure basic services like locating lost property. The fundamental need and utility of this data and consistent collection will remain, regardless of advancements in technology. Indeed, new operating technology will likely lead to new data streams, and new metrics to gauge safety, accessibility and customer satisfaction.

These are some of the major issues the TLC believes automated vehicles will present to New York City, and which must be addressed so that New Yorkers continue to enjoy local protections for safety, consumer protections, accountability and access for all in the City's for-hire vehicle industry.

Thank you very much for giving the TLC an opportunity to speak today, and I would be happy to discuss these issues further.



TRANSPORTATION  
ALTERNATIVES

## Committee on Transportation

### Oversight Hearing – The Future of Driverless Vehicles in New York City

Testimony by Julia Kite, Policy and Research Manager, Transportation Alternatives

Friday, October 28th, 2016

- Autonomous Vehicles must be designed, operated and regulated to prioritize the safety of pedestrians first, occupants second.
- To avoid congestion and sprawl becoming the consequence of efficiencies generated by autonomous vehicles, freed road space should be dedicated to improving pedestrian, cyclist, and public transit facilities.

Good morning, and thank you for convening this hearing. My name is Julia Kite, and I am the Policy and Research Manager for Transportation Alternatives, a 43-year-old membership-based non-profit advocating for better walking, biking, and public transportation in New York City. We have also been at the forefront of New York City's Vision Zero initiative. The development and arrival of autonomous vehicle technology presents an unprecedented combination of opportunity and cause for concern, from our perspective as street safety advocates. There is still a good deal that is unknown about self-driving car technology, and many elements still need to be perfected. At the same time, we are optimistic that by reducing the capacity for human fallibility at the wheel, this technology could greatly reduce the number of injuries and deaths on our streets -- but only if we have policies in place that are designed with the most vulnerable road users in mind.

- We agree with the **Policy Statement on Automated Vehicles issued by NACTO**, the National Association of City Transportation Officials.
- It states that such policies must "promote safety for pedestrians, bicyclists, [and] transit riders," "reduce the environmental impacts of vehicular travel" and "rebalance the use of the right-of-way" to devote less street space to cars, and more to people walking, cycling, and using public transit.
- **Protecting the most vulnerable road users must be the priority** for cities managing automated vehicle traffic.

Autonomous vehicles must not simply become a more convenient, lower-effort version of the status quo for cars. The technological advances that bring them into existence should be harnessed to shake up how we as a society understand cars, and how automobile use impacts our city.

- For example, connectivity with other vehicles and with "smart infrastructure" like traffic signals can allow for autonomous vehicles to drive closer to each other and **move more efficiently** through the city.
- Autonomous vehicles may also free up road space on our congested streets by reducing demand for parking and **facilitating car-sharing over private ownership**: a University of Texas study indicates that one self-driving taxi can facilitate carpooling and replace roughly 10 private cars.<sup>1</sup>
- In order to avoid repeating the mistakes of the past, where increased road capacity devoted to motor vehicles only led to more car usage and congestion, **any road space "freed up" by**

---

<sup>1</sup> <http://www.vox.com/2015/3/17/8231401/self-driving-taxis-amazing>

**these new efficiencies should be automatically dedicated to pedestrian, bicycle, and transit improvements.**

- Failure to plan appropriately for the impact of autonomous vehicles may lead to worsening congestion and sprawl.

It is important to recognize that, at present, autonomous vehicle technology is not focused on the unique road conditions of cities like ours. **Protocols that suit rural driving, where one can travel for miles without encountering any intersections or pedestrians, are unsuitable for New York City.**

A one-size-fits-all policy for driverless cars will not work here; we need autonomous vehicle manufacturers to first prove that their design is centered on the challenges of urban driving, and focused on the safety of vulnerable road users, before they are allowed to sell or operate here.

A major safety concern relevant to New York City that manufacturers have yet to resolve is a form of the “trolley problem,” a scenario where it is impossible to avoid harm to at least one person in a collision. Simply put, what would an autonomous vehicle do if it had a “choice” between only two actions that would lead it to either crash into a pedestrian and injure him or her, or crash into an object and injure the car’s occupant? Recently, Mercedes-Benz announced that it will program its self-driving cars to prioritize saving the people inside the car in such a scenario, reasoning that the safety of the car’s passengers is the only factor an automaker can control. This is despite the fact that car occupants are already better-protected from harm in a crash by virtue of being inside a car equipped with airbags and other safety features. **In crashes, the pedestrian always loses**, and this has been the case for over a century. Autonomous vehicle manufacturers should be using their skills and technology to solve this longstanding problem, not reinforce it. **We find it alarming that an industry leader like Mercedes would make such a public statement at this time**, when other manufacturers are grappling with these difficult safety issues.

- **We reject the idea that autonomous vehicles should shift the burden of safety onto pedestrians and cyclists when technology has the capacity to help protect vulnerable road users.**
- The onus should be on the vehicle manufacturer and the person in the driverless car, not the pedestrian outside the car, to make sure the vehicle is operating safely.
- **Ideally, technology should focus on eliminating the “trolley problem” in the first place by eliminating the opportunity to get into a situation where such a choice would have to be made.** Prevent the crash, and you will prevent the harm to the pedestrian.

For all their innovations, driverless cars are still cars. **We support their development to help reduce overall car usage**, but we need to see this technology shaking up the status quo and redefining how vehicles interact with the urban environment, **prioritizing the protection of the most vulnerable.** Autonomous vehicles have the potential to be an important part of reducing crashes and congestion, but they are not the sole solution, and at present their manufacturers have yet to prove that they are suitable for New York City in the age of Vision Zero. We hope they will rise to the challenge, and that city policies will encourage them to do so. We will continue to monitor developments.



---

## Statement of AAA Northeast, Inc. before the New York City Council Committee on Transportation

New York, NY – October 28, 2016

Good afternoon. AAA Northeast, which serves over 570,000 members in the five boroughs of New York City and over 5.2 million drivers in the metropolitan area, is pleased to submit this testimony, and we would like to thank the Committee on Transportation for holding this hearing.

AAA is committed to educating our members about cutting-edge automotive technology and has conducted numerous studies that examine the effects of certain semi-autonomous safety features. The results demonstrate potential for immense safety benefits while providing reasons for caution about introducing fully autonomous vehicles into the complex driving environments of New York City.

### *Autonomous Parking*

Autonomous parking systems appear to exceed the abilities of all but the most adept parallel parkers. Although nearly three-quarters of drivers wouldn't trust self-parking technology, drivers with park assist experienced 81% fewer curb strikes and landed 37% closer to the curb than drivers without park assist.<sup>1</sup>

### *Rear cross-traffic alert*

Parking lots proved to be a greater challenge. Rear cross-traffic alert systems are designed to assist drivers backing out of spots by detecting traffic approaching the rear of the vehicle. AAA's researchers found that the systems failed to detect a passing vehicle in 30% of tests, a bicyclist in 40% of tests, a motorcycle in 48% of tests, and pedestrians in 60% of tests.<sup>2</sup> As with many advanced features, the sensors can complement an attentive driver but are not yet reliable enough to act on their own.

### *Autonomous emergency braking*

Similarly, autonomous emergency braking systems are designed to brake when a driver fails to take evasive action before a potential rear-end or pedestrian collision. These systems, which will be standard in new cars by 2022, are frequently featured in advertisements for new vehicles. However, drivers should not interpret the ads to mean the systems are foolproof. The most advanced systems avoided 60% of crashes when approaching a vehicle with a speed differential under 30 mph, and 40% of crashes when traveling at 45 mph and approaching a stationary vehicle.<sup>3</sup> These are extraordinary benefits for the occasions when drivers fail to react, but clearly insufficient to trust with full control of the vehicle.

### *Adaptive cruise-control systems*

Adaptive cruise-control systems essentially allow drivers to set their vehicles to cruise control while maintaining a particular following distance behind the car in front of it. They appear to work fairly well, but AAA's researchers discovered that tracking a vehicle at highway speeds while navigating a mild curve was unexpectedly difficult. Owner's manuals specifically state that these systems may not react to motorcycles, stopped vehicles, traffic cones or other obstructions.<sup>4</sup>

### *Blind Spot Monitoring / Lane Departure Warning Systems*

Blind spot monitoring systems are helpful, but had difficulty detecting fast moving vehicles, such as when merging onto a busy highway – a particular obstacle on New York City’s short entrance ramps. Likewise, lane departure warning systems alert a driver when he or she is drifting, but road conditions such as worn pavement markers can cause the system to lose track of lane location.<sup>5</sup>

Accordingly, we should be wary about making an immediate transition to fully autonomous vehicles – a change which is unlikely, due to consumer skepticism. According to an AAA survey, 75% of US drivers would be “afraid” to allow an autonomous vehicle to drive itself with them in it.<sup>6</sup>

Moreover, the vehicle fleet in New York City will not turn over so quickly. Currently, over 1.8 million passenger vehicles are registered in the five boroughs. Their average age is 8 years old.

| <b>Borough</b> | <b>Passenger Vehicles</b> | <b>% increase in registrations, ‘10-‘15</b> | <b>Median Model Year</b> | <b>% Model Year 2007 or earlier</b> | <b>% Model Year 2000 or earlier</b> |
|----------------|---------------------------|---|--------------------------|-------------------------------------|-------------------------------------|
| Bronx          | 237,486                   | 6%  | 2007                     | 50%                                 | 13%                                 |
| Brooklyn       | 431,103                   | 10%   | 2009                     | 45%                                 | 12%                                 |
| Manhattan      | 215,606                   | 3%  | 2010                     | 40%                                 | 11%                                 |
| Queens         | 688,120                   | 7%  | 2008                     | 45%                                 | 12%                                 |
| Staten Island  | 242,186                   | 4%  | 2011                     | 36%                                 | 9%                                  |
| <b>Total</b>   | <b>1,814,501</b>          | <b>6%</b>                                   | <b>2009</b>              | <b>44%</b>                          | <b>12%</b>                          |

Clearly, for the foreseeable future, New York City roads will be occupied with a wide variety of vehicles. Vehicles with almost no modern safety features will drive along cars with semi-autonomous technology.

Fortunately, the investments the City must make to satisfy the requirements of driverless cars are exactly the kinds of investments drivers need today: infrastructure in a state of good repair. The Mayor and the Council deserve credit for appropriating the funds that allowed the City to repave an historic 1200 lane miles in Fiscal Year 2016. The DOT’s strategic plan commits to repaving 1300 lane miles in FYs 2017 and 2018, and increasing pavement marking installation to 75 million linear feet per year. We urge the Council to make these levels the new normal rather than a temporary surge.

Lastly, as semi-autonomous and connected vehicles obey the law more often than human drivers, as we hope they will, the City should not expect fine levels to continue at their current level: \$642 million from parking fines in FY 16, and \$400 million from automated enforcement from FYs 17-20. The City should begin to funnel these fines to dedicated funds to improve safety and mobility. This change will help keep the roads safe today and safeguard the City against a drop in this revenue.

Thank you for the opportunity to comment and for your interest in these matters.

---

<sup>1</sup> <http://newsroom.aaa.com/2015/09/americans-steer-away-from-autonomous-parking/>.

<sup>2</sup> <http://newsroom.aaa.com/2015/12/majority-of-american-drivers-on-naughty-list/>.

<sup>3</sup> <http://newsroom.aaa.com/2016/08/hit-brakes-not-self-braking-cars-designed-stop/>.

<sup>4</sup> <http://newsroom.aaa.com/2014/05/automated-vehicle-systems-not-a-substitute-for-driver-engagement/>.

<sup>5</sup> <http://newsroom.aaa.com/2014/12/new-car-technologies-still-working-kinks-says-aaa-assessment/>.

<sup>6</sup> <http://newsroom.aaa.com/2016/03/three-quarters-of-americans-afraid-to-ride-in-a-self-driving-vehicle/>.

**Testimony of Claire Delaunay  
before the New York City Council Committee on Transportation**

Good morning, Chair Rodriguez and distinguished members of the Council.

My name is Claire Delaunay, and I am an engineering director at Uber's Advanced Technologies Center, and the co-founder of the self-driving truck startup Otto.

I would like to thank the City Council and Chair Rodriguez for inviting me here today to share Uber's vision of the future of transportation.

The promise of self-driving cars is core to Uber's mission of reliable transportation, everywhere for everyone.

We cannot predict what the future will hold, but self-driving cars have the potential to make cities safer, cleaner, more efficient and more affordable.

And the greatest potential of self-driving vehicles is safety.

Today, 1.3 million people across the globe die every year in car crashes.

(pause)

**Ninety-four percent** of those accidents involve human error.

Despite the work the City has done to implement Vision Zero, here in New York, more than 250 New Yorkers are killed each year in traffic crashes.<sup>1</sup>

Another four thousand are seriously injured.

This is where self-driving technology can help save lives.

Computers can perceive better, calculate faster, and react earlier—which means that they can drive safer.

Safety is built into our entire product process - it begins in design, extends through testing, and is continuously evaluated through real world performance.

---

<sup>1</sup> <http://www.nyc.gov/html/visionzero/pages/home/home.shtml>

Once self-driving technology becomes part of everyday urban use, accidents resulting in injuries or deaths can be drastically reduced.

While it won't happen overnight, self-driving will be an important part of the future of urban mobility.

This is consistent with the goals of the Car Free NYC initiative, and I would like to thank Chair Rodriguez for his leadership on this issue.

An estimated **20 percent** of the space in cities is currently used to park the world's billion plus cars...

A future with self-driving cars could mean less parking, which could mean more space for parks, playgrounds and other community uses.

It could also mean cutting congestion, which wastes trillions of hours every year.

We know riders and drivers will have questions about what this technology means for them. But it's still early days.

Uber is running a pilot in Pittsburgh with a small number of self-driving Ubers, which have a safety driver in the front seat because they require human intervention in many conditions, including bad weather.

Even when the technology is more advanced, we believe there will still be a mix of self-driving and human drivers.

I believe that the opportunities are boundless.

And I look forward to sharing the progress of this technology as we continue to refine it. Thank you again for your time, and I welcome any questions.

- Ends -

**Committee for Taxi Safety**  
**David Beier, President and General Counsel**  
**October 28, 2016**

FOR THE RECORD

Good morning Chair Rodriguez and Councilmembers:

My name is David Beier and I am the President of the Committee for Taxi Safety, which is a trade association of licensed medallion lease agents and operators, who works with ten thousand drivers, owners, mechanics, and clerical workers to provide what has been the premier taxi service in the world.

We are here today to point out one simple fact that must be dealt with by government officials, such as yourselves, before we all give ourselves over to multinational companies trying to supplant iconic local businesses in exchange for mass quantity of cars flooding the streets with the congestion of limitless autonomous vehicles. These cars cannot provide the same service that humans can provide - they cannot assist a wheelchair user, they cannot load luggage and they cannot make split second judgement calls. Yet, let's not fool anyone and let's recognize that these vehicles are designed to replace everyone who currently drives for a living.

Over the next five years, these self-driving cars will end four million jobs in the United States. While seeking the least regulation possible, app-based dispatched services are aiming to attract drivers who are frustrated with the over-regulated taxi industry. These same companies are planning the elimination of the driver's income as quickly as they can get driverless cars to market. The City has not seen fit to adequately regulate apps with the requirement to provide any service to wheelchair users and the City has not seen fit to restrict the types of cars that can be used, the technology they use or the contracts they make drivers sign. They are on an honor system to share their trip data without any means of verification. These app-based businesses have been allowed to pursue their profits without any responsibilities. And, it was all done on the promise of the new jobs that they were creating.

Now these companies wish to break that promise through this next evolution of technology. The promise of a better future of technology depends on who's future one is talking about. The four million Americans about to lose their livelihoods, includes everyone licensed by the TLC: from the driver in all service models; from the mechanics who service cars throughout the five boroughs who see their businesses close as the multinational companies use their streamlined automated repair, maintenance and assembly line production; to the dispatchers, insurance intake clerks, and license update clerks in every taxi and base operations throughout the City, who will all be displaced. Even the neighborhood diner will see their customer base diminished as these others lose their own livelihoods.

It is not enough to take the assurance of the multinational companies that these people will find jobs in their created self-driving industry. Their whole business plan is based on not having to pay human beings a living wage to perform any task related to the moving of passengers. Earnings will be slashed from what drivers have made a few years ago by the app-based companies if not totally eliminated and no one in government has done anything about

it. There is no truth to the assertion that the new economy promised by high tech will lead to anything other than a substandard of living without the government actually structurally mandating these companies to provide more services and more employment opportunities for every person that they displace. These companies have the money to make it work.

Taxis are prohibited from testingt electric car options on their own to determine if they are a viable cab option. Taxis, by the laws and rules of New York City, cannot find their own customized Taxi Passenger Enhancement options to satisfy the passengers' ever changing technology appetites. We are prohibited from rewarding drivers for providing excellent service or for embracing the use of apps. We are not allowed to design our own customer dispute resolution. This is all because it was assumed that because a medallion once sold for a million dollars, we could afford it.

The straw that is breaking the camel's back in this industry is not the financial obligations of medallion ownership, a burden that is not imposed upon any other for hire segment. Rather, it is the City's lack of instituting any similar responsibilities on other players who seek to enter the market place with tens of billions of dollars in valuations, with limitless investor capital, and make continuous short term cash promises to lure drivers from the taxi segment to their segment. And now, as we have seen today, these same multinational companies cannot wait to come into this City to eliminate driver's jobs completely.

The only thing that stands between this level of corporate greed and the mass unemployment that will be the result is you, as our elected representatives, and how you determine this future will unfold. There is a future where both the taxi with the human touch and automatically driven cars can exist - where employment can continue for thousands in this City - but you will have to act before people start losing their jobs for following the City's current rules.



PREPARED REMARKS FOR NEW YORK CITY COUNCIL COMMITTEE ON  
TRANSPORTATION HEARING – THE FUTURE OF DRIVERLESS VEHICLES IN NEW  
YORK CITY - 10.28.16

Good morning Chairman Rodriguez and other distinguished Members of the City Council.

My name is Andrei Greenawalt. I am the Vice President for Public Policy at Via, and I appreciate the opportunity to address you today on the subject of driverless vehicles. Via is an on-demand transit service that utilizes cutting-edge technology to group multiple passengers into vehicles along dynamically updating routes. Our company is headquartered in New York City, and each day we provide highly efficient rides for tens of thousands of New Yorkers who pay affordable, flat rates.

As we look toward the future, it's clear that driverless vehicles will eventually transform the transportation landscape and provide significant public benefits, including saved lives, increased mobility for communities that need it, and reduced congestion and pollution. As driverless vehicle technology continues to develop, we believe that public and stakeholder engagement is critical, and that laws and regulations at every level of government should encourage ongoing innovation in a smart and responsible way.

Today, I'd like to briefly make three points informed by our company's experience in New York. First, we believe New York City has the opportunity to be – and should be – a leader and innovator in this area. As you know, other cities are already working with private sector partners and organizations to test driverless vehicles. In the five boroughs, New York has a wide range of neighborhoods, street and traffic patterns, and transportation needs, which present a variety of opportunities for pilot programs and experimentation. A successful program would fuel economic activity and further establish New York City as a leading global city for technology and innovation. Also, by taking a proactive approach to the development of driverless vehicles and their use on city streets, New York could learn important lessons on how to make these vehicles work most effectively for the City, whether that be how to best oversee and regulate their widespread

deployment or how their emergence should inform decisions about investments in infrastructure. This is far preferable to New York merely reacting to this technology and its implications once its development is more advanced and tailored to other cities.

Second, we believe the City should promote the use of driverless vehicles on a shared basis. Rather than private, individual ownership, we support a model in which driverless vehicles are a public resource with multiple passengers sharing each vehicle at any given moment. This is the best way to harness all of the benefits that driverless vehicles promise, and could drastically reduce congestion on City streets as well as the emission of harmful pollutants. Dynamic routing and technology that groups multiple passengers into vehicles in an efficient way that commuters and travelers enjoy is not some dream on the horizon. It's here. Through our service, Via has demonstrated that we can transport New Yorkers to their offices, schools, homes, and other destinations with a high level of efficiency and aggregation, and we can do so at scale. By promoting a shared-use vision of driverless vehicles now, New York could be at the forefront of a new era of mobility that will move residents around a city more cheaply and efficiently.

Third, we will leave timing predictions to others, but it's clear that the widespread deployment of driverless vehicles is inevitable. While this has the potential for significant public benefits, we should all recognize the upheaval that it could cause for the large number of New Yorkers who are paid to drive vehicles. At Via, we care deeply about the drivers who use our platform and their experience, feedback, and input is a critical part of how we operate our business. As you consider the exciting, complex, and challenging implications of driverless vehicles, we encourage you and other policymakers to begin discussing how best to support drivers who will be impacted by potential changes. For example, you could consider the creation of a fund to help drivers save their earnings for the future, and programs to help drivers learn the skills to transition to other work opportunities whenever it is that driverless vehicles ultimately begin displacing current vehicles. Thank you for your time today and for your consideration of our remarks.

**Testimony Before the New York City Council Committee on Transportation**

Good morning. It's an honor to appear before you today and thank you for the committee's interest in exploring the tremendous potential benefits provided by Automated Driving Systems (ADS), more commonly referred to as self-driving cars. I am a partner in the regulatory practice at Venable LLP, and am testifying here today as Counsel to the Self-Driving Coalition for Safer Streets, which was founded in April of this year by Ford Motor Company, Google, Lyft, Uber, and the Volvo Car Group. The purpose of the Coalition is to create a mechanism for civic leaders, community organizers, businesses, lawmakers, and regulators to work together to advance the deployment of fully autonomous self-driving vehicles in a safe and timely manner. The Coalition is working with a broad spectrum of stakeholders to make fully self-driving capabilities available to as broad a segment of the American population as soon as possible.

As governments grapple with the most effective way to address self-driving cars without compromising safety or inhibiting innovation, we welcome the opportunity to partner with state and local governing bodies to facilitate deployment and bring these potentially life-saving technologies to market. The Coalition applauds New York City for taking advantage of the opportunity to understand how self-driving cars have the potential to improve public safety. The primary approach to reducing traffic fatalities in the last several decades has been to improve occupant protection by making the passenger cabin more robust and capable of protecting drivers and passengers. This concept of crashworthiness has allowed us to enjoy a dramatic decline in fatalities, but persistent challenges, such as human error, driver impairment, not wearing seatbelts, and newer challenges, such as device-related distraction, continue to be contributing factors that lead to a loss of life that remains one of this country's top public health challenges. Despite decades of success in reducing that number, we lost 35,092 people on our roadways in 2015. This translates to approximately 90 fatalities per day due to traffic crashes. More frustrating is that we are seeing an upward trend again in fatalities in 2016, after enjoying years of significant reductions. While we must continue to make strides in crashworthiness and improving driver behavior, the future of occupant protection includes active safety and crash avoidance systems as new and important tools in this fight. The Coalition strongly believes that self-driving cars have the potential to significantly transform and advance the personal safety of passengers and other roadway users from what we are currently experiencing.

As various active safety technologies continue to be deployed, it is imperative that we do not lose sight of the wide potential societal benefits self-driving cars may provide. Self-driving cars directly address driver awareness and error, can reduce congestion, and could provide the opportunity for millions of people to attain individual mobility that are currently foreclosed from driving. The potential benefits of self-driving cars have exceptional relevance in a market such as New York City, where they could help reduce traffic delays and address parking challenges.

The Coalition is engaging with civic leaders so that any regulatory or legislative actions designed to improve safety do not foreclose self-driving cars for the public, and to ensure that this is achieved in a timely manner. The Coalition is excited to engage all stakeholders in order to facilitate the creation of a uniform, national framework for the testing and deployment of self-driving cars. This approach has the virtue of fostering safety and certainty at the same time.

As you are aware, the National Highway Traffic Safety Administration (NHTSA) recently released voluntary guidance regarding the testing and deployment of "highly automated

PRIVILEGED & CONFIDENTIAL  
ATTORNEY-CLIENT COMMUNICATION

Draft 10/27/2016

vehicles.” The Coalition supports NHTSA’s effort to construct a novel regulatory approach that would promote the “expeditious and safe introduction” of fully self-driving vehicles as a means of improving safety and promoting mobility. To that end, the Coalition encourages opportunities to collaborate with local, state, and federal governments to ensure thoughtful and uniform testing and deployment, including through public-private partnerships, which will be integral to successful deployment of self-driving cars. Early engagement, as exemplified by the Council’s efforts, will ensure that the public sector’s efforts are in sync with technological developments. For instance, New York law currently requires that drivers keep one hand on the wheel, effectively banning deployment of vehicles that do not require a human operator in the vehicle. This provision was originally added to New York’s Vehicle and Traffic Law in 1967, long before the prospect of self-driving cars became a reality. Hearings such as this one provide the opportunity to identify and resolve these unforeseen obstacles and pave the way for more advanced technologies.

The Coalition appreciates the Council’s proactive approach to understanding the future of self-driving cars and their potential to help your constituents and this City. As the Council continues to explore this area, the Coalition looks forward to serving as a resource concerning both technical and policy questions.

The Self-Driving Coalition for Safer Streets looks forward to working with the New York City Council towards making fully self-driving cars an immediate reality. We appreciate your interest in this area and would welcome further collaboration moving forward.

Thank you.



# tech:nyc

**Testimony Before the New York City Council  
Committee on Transportation  
Oversight: The Future of Driverless Vehicles in New York City  
October 28, 2016**

## **Introduction**

Good morning Chair Rodriguez and members of the Committee on Transportation. My name is Julie Samuels and I am the Executive Director of Tech:NYC. Tech:NYC is a non-profit trade group that launched in May of this year with the mission of supporting the technology industry in New York by, among other things, increasing engagement between our industry and New York City government. It is also our goal to demonstrate to the growing technology industry that New York is the best place for technology and the companies that build it to grow and develop. We believe that New York's unique business ecosystem as a global center for so many industries, such as finance, media, fashion, art and real estate, will serve to strengthen the technology businesses that call New York home.

## **Overview**

Self-driving cars represent one of the most exciting and promising developments emerging from the technology industry today. Self-driving car technology promises extraordinary benefits—ranging from significantly improving human safety to dramatically reducing the massive carbon footprint of automobiles. Like any new technology with far-reaching implications, there are undoubtedly concerns and considerations about how this technology will work and be used.

To best harness the promise of self-driving technology while ensuring it meets public considerations such as safety will require a consistent dialogue between industry and government. As a trade group that represents several companies interested in developing self-driving technology, we are pleased today to begin that conversation with this committee, and the City Council in general; a discussion that will undoubtedly continue in the months and years to come.

As we start this conversation, we also want to emphasize the importance of sending the right message to technology leaders nationwide that New York is a welcoming environment for the technology industry. The industry is, and will continue to be, a source of significant job growth in New York. Employment in the technology industry in



New York City increased 71 percent between 2004 and 2014.<sup>1</sup> Notably, at a time when wage stagnation is so prevalent in the U.S., technology sector jobs in New York City pay more than one-third of the City's average private sector salary.<sup>2</sup> The growth and high wages of technology firms is particularly noteworthy for New York City at a time when city tax revenue is declining for the first time in several years.<sup>3</sup> We believe it is important for lawmakers to think about how we attract the types of businesses that create jobs and generate economic development. A highly-visible issue like self-driving cars is important for the perception of New York as a tech-friendly city.

### **How Would A New York Future Look with Self-Driving Cars?**

New York is a city unlike any other in the U.S. As a result of its individuality, self-driving cars present unique opportunities for New York that could improve many of New York's most significant day-to-day challenges.

First, pedestrian safety is an issue of paramount importance in New York. It is well known that Mayor de Blasio has made the pursuit of zero traffic deaths a primary focus of his administration through his Vision Zero initiative. Last year in New York City, more than 3,500 people were killed or severely injured in traffic crashes.<sup>4</sup> While this number represents a significant improvement from years past -- much to the credit of the Mayor and Commissioner Trottenberg -- we can all agree that we would like to see that number dramatically lower.

The National Highway Transportation Safety Administration (NHTSA), the federal agency charged with protecting the traveling public, tells us that 94 percent of automobile-related crashes can be tied to human choice or error.<sup>5</sup> By reducing the element of human choice or error, self-driving cars can dramatically lower the deaths and injuries attributable to cars.<sup>6</sup> In fact, in guidance documents that I will discuss more later, the NHTSA stated that "the automobile industry is on the cusp of a technological

---

<sup>1</sup> Center for an Urban Future, "New York's Tech Profile" (August 2015)  
<https://nycfuture.org/data/nycs-tech-profile>.

<sup>2</sup> NYS Comptroller Thomas DiNapoli, "New York City's Growing High-Tech Industry" (April 2014)  
<https://www.osc.state.ny.us/osdc/rpt2-2015.pdf>.

<sup>3</sup> Dawsey, Josh, "New York City's Tax Revenue Slumps" The Wall Street Journal, Oct. 26, 2016  
<http://www.wsj.com/articles/new-york-citys-tax-revenue-slumps-1477530508>.

<sup>4</sup> City of New York, "Vision Zero 2015 Year End Review" (2015)  
<http://www.nyc.gov/html/visionzero/assets/vz-year-end-report.pdf>.

<sup>5</sup> U.S. Dept. of Transportation, National Highway Transportation Safety Administration, "Federal Automated Vehicles Policy: Accelerating the Next Revolution in Roadway Safety" (September 2016).

<sup>6</sup> *Id.*



transformation that holds promise to catalyze an unprecedented advance in safety on U.S. roads and highways.”<sup>7</sup>

Next, self-driving cars promise significant improvements in New Yorkers’ quality of life. New York is a place where space—both on our streets and in general—is at a premium. A future with self-driving cars means a significant reduction in car ownership and fewer cars sitting parked on our streets or in garages serving no purpose. Most cars sit unused for 22 hours a day,<sup>8</sup> and there is no reason why we can’t take land back from cars for beneficial uses. Less on-street parking could mean extra dedicated and protected lanes for cyclists. And reducing our need for parking lots and parking garages means more land for parks and developing housing.

Reduced car ownership would also decrease the financial burden that cars have on their owners. The average car-owning family in New York spends over \$2,000/year on gas, insurance and repairs.<sup>9</sup> This does not take into consideration costs that are particularly high in New York City such as monthly parking fees or parking tickets.

Finally, the reduced need for vehicles could significantly improve the city’s air quality and our carbon footprint. A recent Community Air Survey issued by the City’s Department of Health and Mental Hygiene indicates a strong correlation between high-traffic roads and highways and negative air quality in certain New York neighborhoods.<sup>10</sup> And it’s not just high-density roads that we should be concerned about—in congested urban areas, about 40 percent of total gasoline use is by cars looking for parking.<sup>11</sup> In addition to our own air quality, vehicle reduction will have a meaningful impact on our carbon footprint and global warming—roughly 13 percent of greenhouse gases nationally are attributable to passenger vehicles and light-duty trucks like SUVs, pickup trucks, and minivans.<sup>12</sup>

---

<sup>7</sup> *Id.*

<sup>8</sup> KPMG & Center for Automotive Research, “Self-Driving Cars: The Next Revolution” <http://www.kpmg.com/us/en/issuesandinsights/articlespublications/documents/self-driving-cars-next-revolution.pdf>.

<sup>9</sup> Khan, Chris, “Car Ownership Costs by State” Bankrate.com <http://www.bankrate.com/finance/auto/car-ownership-costs-by-state.aspx>.

<sup>10</sup> City of New York Department of Health and Mental Hygiene and Queens College, City University of New York, “The New York City Community Air Survey” (April 2016). <http://www1.nyc.gov/assets/doh/downloads/pdf/environmental/comm-air-survey-08-14.pdf>

<sup>11</sup> KPMG, “Self-Driving Cars: The Next Revolution.”

<sup>12</sup> U.S. Environmental Protection Agency, “Sources of Greenhouse Gas Emissions” <https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions#transportation>.



## **Regulating Self-Driving Cars**

Tech:NYC supports a balanced approach for regulating self-driving cars. In September, President Obama published an op-ed that argues that we must strike a balance in regulating self-driving cars. He stated that “[r]egulation can go too far” at times, and “government sometimes gets it wrong when it comes to rapidly changing technologies.” But at the same time “Americans deserve to know that they’ll be safe today even as we develop and deploy the technologies of tomorrow.”

To strike that balance, in September the NHTSA issued a Federal Automated Vehicle Policy. That policy outlines a 15-point Safety Assessment that sets a range of goals for manufacturers based on factors like object detection and response, crashworthiness, cybersecurity, human/machine interface, data-sharing and other factors.<sup>13</sup> The agency states that the policy is by no means the final word on automated vehicles but an effort to establish a foundation and a framework upon which future agency action will occur. We think this is a sensible approach.

NHTSA’s guidance document also provides model state rules in an effort to avoid a patchwork of inconsistent laws and regulations among states and jurisdictions, which could delay the widespread deployment of self-driving cars. In order to avoid interference and confusion, the agency encourages states and jurisdictions to allow it alone to regulate the performance of self-driving cars for now.

## **Conclusion**

As a role for states and localities develops to regulate self-driving cars, Tech:NYC wants to be a partner with the City of New York to craft its laws and regulations that work for both the industry and the unique characteristics of New York. We look forward to working with this Committee and the entire Council going forward.

---

<sup>13</sup> Davies, Alex, “The Feds Just Got Real About Self-Driving Cars (It’s About Time)” Wired.com (Sept. 19, 2016) <https://www.wired.com/2016/09/feds-just-got-real-self-driving-cars-time/>



**Statement for the Record for Tesla Motors, Inc.**

---

**Testimony of  
Will Nicholas  
Government Relations Manager**

**Before the  
New York City Committee on Transportation**

---

October 28, 2016

Good morning—my name is Will Nicholas and I am a Government Relations Manager for Tesla. I want to thank Council Members Rodriguez, Constantinides, Richards, Cornegy, Cabrera, Greenfield and Rose for allowing me the opportunity to describe Tesla's initiatives to create automated vehicle technologies that provide drivers more confidence behind the wheel, increase safety on the road and make highway driving more enjoyable and less fatiguing.

## **I. Background**

Tesla is an American technology and design company that solely manufactures and distributes electric vehicles. Founded in 2003 by five Silicon Valley engineers seeking to end the country's dependence on oil, particularly foreign oil, this U.S. based company's core mission is to accelerate the transition to sustainable energy.

From the outset, Tesla's plan has been to capitalize on its innovative new powertrain technology in high end products with a goal to aggressively drive down price while iterating and improving the technology in subsequent product offerings. The company first designed and built the market-inspiring Tesla Roadster in 2008; a two-seat sport car, capable of 245 miles of range on a single charge, with a zero to 60mph time of 3.7 seconds. 2,450 units were sold around the world with a starting price of \$109,000. The car had an intentional limited production run in order to quickly move to the next offering – the award-winning Model S.

Released in 2012, less than a year after the conclusion of the Roadster program, Model S is capable of achieving over 315 miles of range on the updated EPA test that takes into account air conditioning usage, cold weather operation and high speed driving. With a starting price of \$66,000, Tesla has taken out nearly half of the cost of this next iteration vehicle while providing vastly improved utility (i.e., seating for five adults and two children in optional rear facing child seats, class-leading storage, Supercharging capability, etc.) and performance (0-60mph times of as little as 2.8 seconds, improved range, and a dual motor all-wheel drive powertrain). The Model S has won numerous awards, including being named MotorTrend Magazine's 2013 Car of the Year; Automobile magazine's and Yahoo Automotive's automobile of the year; and lastly, being referred to by Consumer Reports as "the best car they ever tested" scoring 103 out of possible 100. In the third quarter of last year, Tesla released Model X, a crossover vehicle with seating for up to seven adults, towing capacity and other compelling features.

Earlier this year, Tesla unveiled its mass-market vehicle, Model 3 – with an expected range of 215 miles and a starting price of \$35,000. Tesla Model 3 will achieve a 5-star safety rating in each category, seat five adults comfortably, and have compatibility with the Supercharger network. Scheduled for start of production in mid 2017, this third generation Tesla will represent the market entry of a long range EV at a third of the price of the Roadster. Once achieved, this aggressive technology innovation will represent a feat in engineering and price reduction that no other automobile manufacturer has ever matched.

## **II. Automated Vehicle Technology**

Tesla is committed to building exceptionally safe vehicles. Considering that an estimated 94% of all crashes are caused by human error,<sup>1</sup> a solution for reducing crash frequency is to reduce human error. While humans are not recognizably improving their driving skills, fully automated driving has advanced dramatically over the last decade. Therefore, Tesla believes automated vehicles can dramatically reduce both crashes and associated fatalities.

In October of 2014, Tesla began to build its cars with Autopilot hardware – a package including a front-facing camera, radar and 12 ultrasonic sensors. Months later, software was developed and deployed over-the-air to Tesla's fleet, enabling the first active safety technologies. Today, Model S and Model X owners enjoy available features like Autosteer, Auto Lane Change, Autopark and Summon. Tesla is continuously innovating to keep customers at the forefront of technology through the aforementioned over-the-air software updates. With the current feature set, Tesla Autopilot is still classified as an SAE and NHTSA Level 2 automated system where the driver is responsible for and must remain in control of their car at all times.

In accordance with the commitment to remain at the forefront of the industry, Tesla announced last week that all vehicles in production, as well as the forthcoming Model 3, will be built with an updated hardware suite, equipping each Tesla with the hardware needed for full self-driving capability, dependent on regulatory approval, at a safety level substantially greater than that of a human driver.

Eight surround cameras provide 360-degree visibility around the car at up to 250 meters of range. Twelve updated ultrasonic sensors complement this vision, allowing for detection of both hard and soft objects at nearly twice the distance of the prior system. Forward-facing radar with enhanced processing provides additional data about the world on a redundant wavelength that is able to see through heavy rain, fog, dust and even the car ahead. To make sense of all of this data, a new onboard computer with over 40 times the computing power of the previous generation runs the new Tesla-developed neural net for vision, sonar and radar processing software. Together, this system provides a view of the world that a driver alone cannot access, seeing in every direction simultaneously and on wavelengths that go far beyond the human senses.

Before activating features enabled by the new hardware, Tesla will further calibrate the system using millions of miles of real-world driving to ensure significant improvements to safety and convenience. Availability of these features will be dependent upon extensive software validation and regulatory approval.

---

<sup>1</sup> See SANTOKH SINGH, NAT'L HIGHWAY TRAFFIC SAFETY ADMIN., CRITICAL REASONS FOR CRASHES INVESTIGATED IN THE NATIONAL MOTOR VEHICLE CRASH CAUSATION SURVEY 1 (February 2015).

### **III. Guidance**

Tesla vehicles are compliant with today's laws in every region where registered. The Federal Automated Vehicles Policy are guidelines for developing and deploying automated vehicle technologies. We look forward to further collaboration with the National Highway and Traffic Safety Administration (NHTSA) on the guidance as we build together toward an automated driving future.

Historically, NHTSA has successfully promoted innovation by allowing safety technologies to be deployed in the field, and then using data gathered from their deployment to inform regulations. This approach encourages manufacturers to think and invest boldly, to collect data on new technologies, and to rapidly improve upon developing technologies. The approach has successfully ushered in the deployment and adoption of many major advancements in vehicle safety including airbags, antilock brakes, and electronic stability control. While we now know that each of these technologies provides a safety benefit, none of these technologies are inherently innocuous. Rather, there were risks associated with their initial deployment. Fortunately, rather than being stifled by premature regulations, these technologies each benefited from an early period of unfettered innovation.

Intelligent regulations can promote safety by mandating technology-neutral safety standards that raise the bar for all manufacturers. However, such intelligent regulations can only be drafted after being inspired and informed by safety innovations. This also holds true for any eventual regulations regarding automated vehicles. The complex and rapidly evolving nature of this technology currently makes it difficult to accurately predict exactly what path forward will result in the greatest safety benefits.

For cities like New York, infrastructure improvements that are beneficial for human drivers will also be beneficial for automated vehicles. Tesla believes the best action cities can undertake today to support the development and deployment of automated vehicles is to invest in road infrastructure. Although Tesla plans to eventually deploy automated vehicles that are capable of operating on any roadway, in the short term, its technology operates best on roads that are well maintained. Cities are best served by filling potholes, painting lines and fixing signage and guardrails, than anything else. These efforts will not only benefit today's human drivers but will prepare cities for the adoption of automated vehicles.

Thank you for the opportunity to provide this testimony. I welcome any questions that the Committee may have.

**THE COUNCIL  
THE CITY OF NEW YORK**

Appearance Card

I intend to appear and speak on Int. No. \_\_\_\_\_ Res. No. \_\_\_\_\_

☐ in favor ☐ in opposition

Date: \_\_\_\_\_

Name: Bill Heinzen (PLEASE PRINT)

Address: \_\_\_\_\_

I represent: TLC

Address: \_\_\_\_\_

**THE COUNCIL  
THE CITY OF NEW YORK**

Appearance Card

I intend to appear and speak on Int. No. \_\_\_\_\_ Res. No. \_\_\_\_\_

☐ in favor ☐ in opposition

Date: Oct. 28 2016

Name: Alec Slatky (PLEASE PRINT)

Address: \_\_\_\_\_

I represent: AAA Northeast

Address: 1415 Kellum Place, Garden City, NY 11530

**THE COUNCIL  
THE CITY OF NEW YORK**

Appearance Card

I intend to appear and speak on Int. No. \_\_\_\_\_ Res. No. \_\_\_\_\_

☐ in favor ☐ in opposition

Date: \_\_\_\_\_

Name: Will Carry (PLEASE PRINT)

Address: \_\_\_\_\_

I represent: DOT

Address: \_\_\_\_\_

Please complete this card and return to the Sergeant-at-Arms

**THE COUNCIL  
THE CITY OF NEW YORK**

*Appearance Card*

I intend to appear and speak on Int. No. \_\_\_\_\_ Res. No. \_\_\_\_\_

☐ in favor ☐ in opposition

Date: \_\_\_\_\_

Name: Jenna Adams (PLEASE PRINT)

Address: \_\_\_\_\_

I represent: DOT

Address: \_\_\_\_\_

**THE COUNCIL  
THE CITY OF NEW YORK**

*Appearance Card*

I intend to appear and speak on Int. No. \_\_\_\_\_ Res. No. \_\_\_\_\_

☐ in favor ☐ in opposition

Date: \_\_\_\_\_

Name: Michael Replegle (PLEASE PRINT)

Address: \_\_\_\_\_

I represent: DOT

Address: \_\_\_\_\_

**THE COUNCIL  
THE CITY OF NEW YORK**

*Appearance Card*

I intend to appear and speak on Int. No. \_\_\_\_\_ Res. No. \_\_\_\_\_

☐ in favor ☐ in opposition

Date: 10-28-16

Name: Will Nicholas (PLEASE PRINT)

Address: \_\_\_\_\_

I represent: Ferla

Address: \_\_\_\_\_

◆ Please complete this card and return to the Sergeant-at-Arms ◆

**THE COUNCIL  
THE CITY OF NEW YORK**

*Appearance Card*

I intend to appear and speak on Int. No. \_\_\_\_\_ Res. No. \_\_\_\_\_

☐ in favor ☐ in opposition

Date: \_\_\_\_\_

(PLEASE PRINT)

Name: DELAUNAY CLAIRE

Address: \_\_\_\_\_

I represent: UBER

Address: \_\_\_\_\_

**THE COUNCIL  
THE CITY OF NEW YORK**

*Appearance Card*

I intend to appear and speak on Int. No. \_\_\_\_\_ Res. No. \_\_\_\_\_

☐ in favor ☐ in opposition

Date: 10/28/2016

(PLEASE PRINT)

Name: David Strickland

Address: \_\_\_\_\_

I represent: Self Driving Coalition for Silver Streets

Address: 575 7th Street Washington, DC

**THE COUNCIL  
THE CITY OF NEW YORK**

*Appearance Card*

I intend to appear and speak on Int. No. \_\_\_\_\_ Res. No. \_\_\_\_\_

☐ in favor ☐ in opposition

Date: 10/28/2016

(PLEASE PRINT)

Name: ANDREI GREENAWALT

Address: \_\_\_\_\_

I represent: VIA

Address: \_\_\_\_\_

Please complete this card and return to the Sergeant-at-Arms

**THE COUNCIL  
THE CITY OF NEW YORK**

Appearance Card

I intend to appear and speak on Int. No. Oversight Res. No. \_\_\_\_\_

☐ in favor ☐ in opposition

Date: 10/28/16

(PLEASE PRINT)

Name: Julia Kite

Address: \_\_\_\_\_

I represent: Transportation Alternatives

Address: 111 John Street, NY, NY 10038

**THE COUNCIL  
THE CITY OF NEW YORK**

Appearance Card

I intend to appear and speak on Int. No. \_\_\_\_\_ Res. No. \_\_\_\_\_

☐ in favor ☐ in opposition

Date: 10/27/2016

(PLEASE PRINT)

Name: OSMAN CHOWDHURY

Address: 43-42-45 ST APT 4G SUNNYSIDE

I represent: UNITED TAXI DRIVERS ASSOCIATION

Address: \_\_\_\_\_

**THE COUNCIL  
THE CITY OF NEW YORK**

Appearance Card

I intend to appear and speak on Int. No. \_\_\_\_\_ Res. No. \_\_\_\_\_

☒ in favor ☐ in opposition

Date: 10/28/16

(PLEASE PRINT)

Name: Julie Samuels

Address: \_\_\_\_\_

I represent: Tech: NYC

Address: \_\_\_\_\_

Please complete this card and return to the Sergeant-at-Arms