U.S. DEPARTMENT OF TRANSPORTATION AUTOMATED VEHICLES 3.0

Elaine S. Chao, Letter from the Secretary, transportation.gov/av/3 (October 4, 2018)

America has always been a leader in transportation innovation. From the mass production of automobiles to global positioning system navigation, American ingenuity has transformed how we travel and connect with one another. With the development of automated vehicles, American creativity and innovation hold the potential to once again transform mobility.

Automation has the potential to improve our quality of life and enhance the mobility and independence of millions of Americans, especially older Americans and people with disabilities. Moreover, the integration of automation across our transportation system has the potential to increase productivity and facilitate freight movement. But most importantly, automation has the potential to impact safety significantly—by reducing crashes caused by human error, including crashes involving impaired or distracted drivers, and saving lives.

Along with potential benefits, however, automation brings new challenges that need to be addressed. The public has legitimate concerns about the safety, security, and privacy of automated technology. So I have challenged Silicon Valley and other innovators to step up and help address these concerns and help inform the public about the benefits of automation. In addition, incorporating these technologies into our transportation systems may impact industries, creating new kinds of jobs. This technology evolution may also require workers in transportation fields to gain new skills and take on new roles. As a society, we must help prepare workers for this transition.

THREE PATHWAYS TO FULLY AUTOMATED DRIVING

Bryant Walker Smith, *How Governments Can Promote Automated Driving*, 47 N.M. L. Rev. 99 (2017), available at newlypossible.org

Full automation entails the complete replacement of the human driver under all roadway and environmental conditions. Although a fully automated vehicle does not yet exist, there are at least three development pathways that could eventually lead to such a vehicle: advanced driver assistance systems, automated emergency intervention systems, and driverless systems.

An **advanced driver assistance system** (ADAS) supports a human driver by performing some combination of steering, braking, and accelerating over a sustained period. Many such systems are already available in production vehicles: Under optimal conditions, some vehicles can adjust their speed based on traffic conditions, maintain lane position even through gradual curves, and come to a complete stop to avoid or mitigate a crash. The capabilities of these systems are likely to improve in the future. However, at any moment the human driver may need to resume actively steering, accelerating, or decelerating.

An **automated emergency intervention system** (AEIS) acts as a backup to a human driver by intervening to warn of, mitigate, or even prevent a crash or other potentially dangerous situation. The most common of these systems is electronic stability control [while others, such as automatic emergency braking, are available on many new vehicles]. As with advanced driver assistance systems, automated emergency intervention systems are likely to improve significantly. At this point, they cannot substitute for a vigilant and capable human driver. However, an eventual result of these improvements may be vehicles that are nominally driven by a human but are subject to routine automatic interventions to avoid dangerous behaviors and situations.

Both advanced driver assistance systems and automated emergency intervention systems present difficult questions of human-machine interaction. The transition between the automated driving system and the

human driver is challenging: A human driver needs time and context to regain the situational awareness necessary to actively drive. In addition, some of these systems could encourage overreliance by the human driver or lead to the degradation of manual driving skills. Commercial aviation is already struggling with each of these challenges.

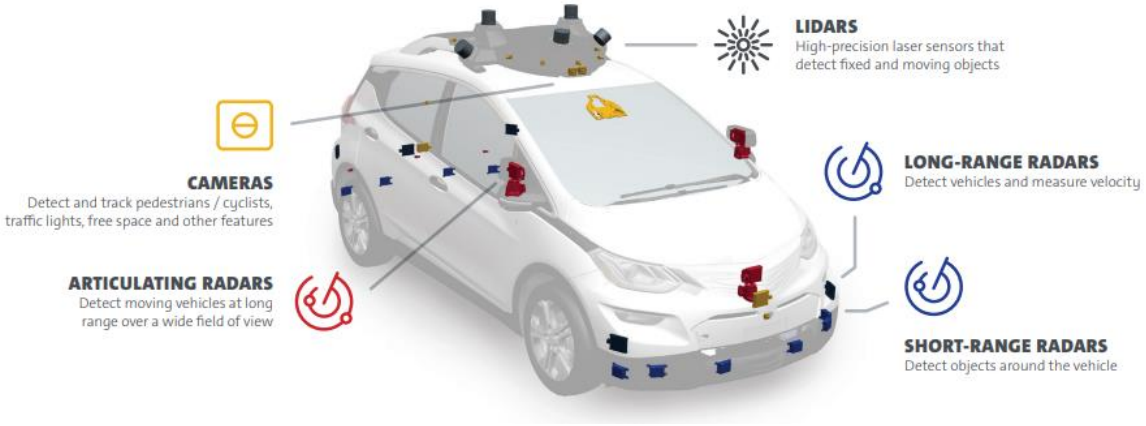
One response to this "mushy middle" of automation is a **truly driverless system**. Such a system avoids these human factors issues by performing all of the driving; the human occupants, if any, are merely passengers for the entirety of the trip. Initial deployments of these systems will likely be characterized by some combination of slow speeds, simple environments, and supervised operations. Slow speeds can reduce the likelihood and magnitude of harm, simple environments can reduce the complexity of the design challenge, and some kind of supervision can reduce the time to identify and address problems. Evolution of these driverless systems will bring higher speeds, more complex environments, and less real-time oversight.

GM CRUISE SAFETY REPORT (2018)

General Motors (2018), gm.com/content/dam/company/docs/us/en/gmcom/gmsafetyreport.pdf

How the Cruise [Automated Vehicle] Operates

Let's look at three of these elements — **Perception, Planning and Controls** — to showcase how the Cruise AV senses its environment and makes driving decisions.



In our self-driving vehicle, **Perception** "sees" by using sensors to monitor its environment. The sensors feed information to the computer that combines the sensor data with high-definition map data to localize the vehicle. Perception detects and classifies objects, determines their location and provides their speed and direction. It builds a three-dimensional model of the world that keeps track of important objects. Perception also predicts the objects' future motion — pedestrians and trucks have different predicted movements. Using the three-dimensional model and map data, Perception determines free, drivable space around the vehicle….

Within the computers' operations, **Planning** determines the desired vehicle behavior…. Planning identifies multiple paths per second, and constantly chooses the best one to meet changing road conditions and events. If something unexpected happens, Planning has multiple backup plans. For example, while preparing to change lanes to turn right at an intersection, another vehicle may aggressively cut into the destination lane, making the lane change unsafe. Planning would already have an alternative route planned; for example, the vehicle could go around the block instead of blocking its current lane while waiting for an opening to change lanes.

The **Controls** function implements the final path from Planning, converting its commands for the actuators that control the steering, throttle, brake and drive unit. We've designed the Controls function to give the self-driving system full vehicle maneuverability complete with stability, traction and anti-lock brake systems fully active.

REGULATIONS ON THE TESTING OF AUTONOMOUS VEHICLES WITH A DRIVER

California Department of Motor Vehicles

§ 227.02(c) "Autonomous vehicle test driver" means a natural person seated in the driver's seat of an autonomous test vehicle, whether the vehicle is in autonomous mode or conventional mode, who possesses the proper class of license for the type of vehicle being driven or operated, and is capable of taking over active physical control of the vehicle at any time.

§ 227.04. [A manufacturer shall not conduct testing of an autonomous vehicle on public roads unless it] has in place and has provided the department with evidence of the manufacturer's ability to respond to a judgment or judgments for damages for personal injury, death, or property damage arising from the operation of autonomous vehicles on public roads in the amount of five million dollars ($5,000,000), in the form of: an instrument of insurance issued by an insurer admitted to issue insurance in California; a surety bond issued by an admitted surety insurer or an eligible surplus lines insurer, and not a deposit in lieu of bond; or a certificate of self-insurance.

§ 227.32. A manufacturer shall not conduct testing of an autonomous vehicle on public roads unless the vehicle is operated or driven by an autonomous vehicle test driver who [is an employee of the manufacturer and meets other requirements, or unless the manufacturer receives approval for driverless testing].

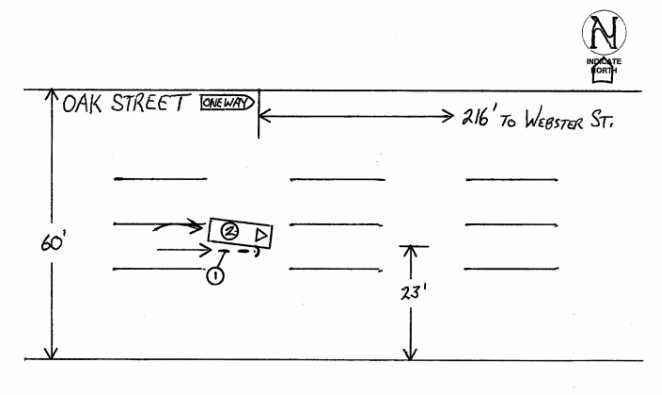
§ 227.48. A manufacturer whose autonomous vehicle … is in any manner involved in a collision originating from the operation of the autonomous vehicle on a public road that resulted in the damage of property or in bodily injury or death shall report the collision to the department, within 10 days after the collision, on Report of Traffic Collision Involving an Autonomous Vehicle….

TRAFFIC COLLISION REPORT #170989746

San Francisco Police Department

Party 1
Driver: Oscar Wilhelm Nilsson
Vehicle: Honda S90 Motorcycle (1966)
Owner: Same as Driver
Insurance Carrier: Geico Insurance

Party 2
Driver: Manuel DeJesus Salazar
Vehicle: Chevrolet Bolt (2016)
Owner: General Motors LLC
Insurance Carrier: National Union Fire Insurance



Narrative

Operator no. 1 told me that he was driving down the middle lane on Oak Street, the vehicle in front of him started to change lanes to the left, but then suddenly changes lanes back to the right and struck him while he was passing.

Operator no. 2 told me that he was sitting in the driver seat of the self-driving vehicle no. 2, the vehicle was engaged in the self-driving mode and attempted to make a left lane change, vehicle no. 1 started to pass on the right while both vehicles were in the same lane, vehicle no 2. sensed that it did not have enough room for the lane change and corrected itself by turning right, operator no. [2] attempted to take control of the self-driving vehicle by grabbing the wheel, but simultaneously collided with vehicle no. 1.

No citation was issued.

REPORT OF TRAFFIC ACCIDENT INVOLVING AN AUTONOMOUS VEHICLE

Submitted by GM Cruise LLC to the California Department of Motor Vehicles

A Cruise autonomous vehicle ("Cruise AV"), operating in autonomous mode in heavy traffic, was involved in a collision [on December 7, 2017] while traveling east on Oak Street [in San Francisco] just past the intersection with Fillmore Street. The Cruise AV was traveling in the center of three one-way lanes. Identifying a space between two vehicles (a minivan in front and a sedan behind) in the left lane, the Cruise AV began to merge into that lane. At the same time, the minivan decelerated. Sensing that its gap was closing, the Cruise AV stopped making its lane change and returned fully to the center lane. As the Cruise AV was re-centering itself in the lane, a motorcycle that that had just lane-split between two vehicles in the center and right lanes moved into the center lane, glanced the side of the Cruise AV, wobbled, and fell over. At the time of the collision, the Cruise AV was traveling with the flow of traffic at 12mph, while the motorcycle was traveling at approximately 17mph. The motorcyclist got up and walked his vehicle to the side of the road, where the parties exchanged information. 911 was called pursuant to Cruise policy. The motorcyclist reported shoulder pain and was taken to receive medical care, and a police report was taken….

COMPLAINT FOR DAMAGES

UNITED STATES DISTRICT COURT, NORTHERN DISTRICT OF CALIFORNIA

Oscar Willhelm Nilsson, Plaintiff, vs. General Motors LLC, Defendant.

This is a personal injury complaint by a motorcyclist injured by a self-driving vehicle. The Plaintiff, Oscar Willhelm Nilsson, by undersigned counsel, states as follows:

JURISDICTION

1. This Court has jurisdiction over this matter under 28 U.S.C. § 1332 in that there is complete diversity of citizenship between the parties and the amount in controversy exceeds $75,000.00.

2. Personal jurisdiction and venue are proper in this District pursuant to 28 U.S.C. § 1391(b) in that Defendant transacts business here and a substantial portion of the acts giving rise to this action occurred here.

PARTIES

3. The Plaintiff, Oscar Willhelm Nilsson (hereafter "Mr. Nilsson"), is an adult individual residing at San Francisco, California.

4. Defendant, General Motors LLC (hereafter the "Manufacturer," and/or "Defendant"), is a business entity with a principal place of business at 300 Renaissance Center, Detroit, Michigan 48232. The Manufacturer is in the business of marketing, supplying, and selling motor vehicles in this District.

ALLEGATIONS OF FACT

5. On the morning of December 7, 2017, Mr. Nilsson was proceeding east on the middle lane of Oak Street on his motorcycle in the city of San Francisco, California.

6. At the same time and place, Mr. Manuel DeJesus Salazar (hereinafter "Mr. Salazar") was in the driver's seat of a 2016 Chevrolet Bolt vehicle, manufactured by Defendant General Motors LLC (hereinafter "Self-Driving Vehicle").

7. At the same time and place, Mr. Salazar had the Self-Driving Vehicle engaged in a self-driving mode, and he kept his hands off of the Self-Driving Vehicle's steering wheel.

8. At the same time and place, there came a point when Mr. Nilsson was riding his motorcycle behind the Self-Driving Vehicle.

9. As Mr. Nilsson was riding his motorcycle, Mr. Salazar, travelling directly in front of Mr. Nilsson, commanded the Self-Driving Vehicle to change lanes to the left.

10. Once the Self-Driving Vehicle cleared the roadway, Mr. Nilsson proceeded to travel straight.

11. However, at the same time, the Self-Driving Vehicle suddenly veered back into Mr. Nilsson's lane, striking Mr. Nilsson and knocking him to the ground.

12. As a result of the crash, Mr. Nilsson suffered injuries to his neck and shoulder and will require lengthy treatment.

13. As a result of the crash, Mr. Nilsson was forced to take disability leave from his work.

COUNT I NEGLIGENCE

14. The Plaintiff incorporates by reference all of the above paragraphs of this Complaint as though fully stated herein.

15. Defendant owed Plaintiff a duty of care in having its Self-Driving Vehicle operate in a manner in which it obeys the traffic laws and regulations.

16. Defendant breached that duty in that its Self-Driving Vehicle drove in such a negligent manner that it veered into an adjacent lane of traffic without regard for a passing motorist, striking Mr. Nilsson and knocking him to the ground.

17. As a result of such negligent driving, Mr. Nilsson sustained serious injuries of body and mind and incurred expenses for medical care and attendance, all to the great detriment of Mr. Nilsson for past, present, and future damages.

PRAYER FOR RELIEF

WHEREFORE, the Plaintiff prays that judgment be entered against the Defendant as follows:

A. Enter judgment for the Plaintiff and against the Defendant on Count One of the Complaint;

B. Award damages to the Plaintiff;

C. Award costs and attorneys' fees to the Plaintiff;

D. Award punitive damages; and

E. Award other relief that the Court deems just and proper.

DATED: January 22, 2018

By: /s/ Trinette G. Kent Trinette G. Kent, Esq. Lemberg Law, LLC Attorney for Plaintiff

JOINT STIPULATION FOR DISMISSAL WITH PREJUDICE

UNITED STATES DISTRICT COURT, NORTHERN DISTRICT OF CALIFORNIA

Oscar Willhelm Nilsson, Plaintiff, vs. General Motors LLC, Defendant.

Pursuant to Rules 41(a)(1)(A)(ii) of the Federal Rules of Civil Procedure, and the Confidential Settlement Agreement between the Parties, Plaintiff, OSCAR WILLHELM NILSSON ("Plaintiff") and Defendant GENERAL MOTORS LLC ("Defendant") ("Collectively referred to as the "Parties") by and through their respective undersigned attorneys, hereby submit the following Stipulation for Dismissal with Prejudice.

1. The Defendant does not admit any liability as to the claims and causes of action asserted against Defendant.

2. Each side shall bear its own attorneys' fees and costs.

3. The court shall retain jurisdiction to enforce the terms of the Parties' Confidential Settlement Agreement.

WHEREFORE, the parties hereby request this Honorable Court to enter an order dismissing the above matter with prejudice, including all claims and causes of action and for such other and further relief as the Court may deem appropriate.

IT IS SO STIPULATED. DATED: June 25, 2018