The Autonomous Vehicle (AV) Revolution

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The race is on for the commercialization of Autonomous (driverless) Vehicles (AVs) – Google and Nissan hope to get there by 2020. Ford and Volvo hope to have a fully autonomous vehicle on the road by 2021. You have probably noticed the almost daily news stories and television segments about AV technology. The reality is that the technology is here (subject only to being fine-tuned), but the regulatory scheme is causing some delays. In other words, our existing automobile laws are becoming more outdated day-by-day as AV technology continues to advance. Many argue that current state laws related to the testing and rollout of AVs are doing nothing but stifling the technology.

While the "non-traditional" auto manufacturers (Google, Apple, Uber, Tesla) raced to a quick lead in the public's eye on AV technology, the major auto manufacturers quickly ramped up their AV development to keep the pace. Now, GM, Ford, Toyota, Nissan, Volvo, BMW, Mercedes, etc., are all in the race to see who can bring AVs to the commercial market first. Traditional auto parts suppliers like Continental, known for its tire division, are also pioneering innovations in the autonomous vehicle race. Continental opened a Silicon Valley business unit called Continental Intelligent Transportation Systems in 2014.

The race has resulted in a series of mergers, acquisitions and partnerships between the auto manufacturers and a variety of start-ups, software companies and product suppliers. For example, GM recently invested $500 million in ride-share company Lyft, and then invested $1 billion to purchase Cruise Automation, a self-driving vehicle startup. Google recently announced the construction of a 53,0000-square-foot facility in Michigan to test its AV technology, and Toyota recently announced a $1 billion investment in its AV program. Uber, which has aggressively hired some of the best and brightest minds in the engineering field to focus on AV technology, is already operating autonomous cars in Pittsburgh, and just acquired self-driving truck startup Otto in a deal reportedly valued at about $680 million. As a group, several of the companies recently banded together to form the Self-Driving Coalition for Safer Streets, a lobbying group, to ensure that AVs hit the market sooner than later. The Coalition is promoting one clear set of federal laws, which they intend to help develop, as the best way to evolve the technology.

With the support of the federal government, the manufacturers and the states have the support to move the AV technology, testing and development along at a brisk pace. President Obama carved out $4 billion in the 2017 budget for AV development, and the National Highway Traffic Safety Administration (NHTSA) is bullishly advocating for AVs. In order to get around the patchwork of various state laws that are already developing, the Department of Transportation (DOT) and NHTSA have been working on proposed operational guidelines for AV testing and regulation, and a "model" policy for the states to help end the mish-mash of local regulations that threaten to stymie the development of AVs.

The new 116-page Policy, entitled "Federal Automated Vehicle Policy – Accelerating the Next Revolution in Roadway Safety" was just released on September 20, 2016, and is intended to serve as a guideline to establish a foundation and a framework upon which future DOT/NHTSA action will occur. The Policy identifies which aspects of AV regulation will be uniform and which will be left to the states' discretion. The guidelines, which use the term HAVs (Highly Automated Vehicles), are focused on safety, acknowledging there were over 35,000 deaths on U.S. highways in 2015, 94% of which were caused by

human error or bad decision making. This initial regulatory framework serves as a "best practices" to guide manufacturers in the safe design, testing and deployment of HAVs. In keeping with the Agency's "ambitious approach to accelerate the HAV revolution," and its desire "to be more nimble and flexible," the Policy is expected to be updated annually, if not sooner.

On the state level, in an effort to make Virginia a leader in researching and developing AV technology and to streamline the use of Virginia's roadways and state-of-the-art test facilities for AV testing and certification, the state announced on June 2, 2015 the creation of the Virginia Automated Corridors partnership. This initiative was created to help build a new economy, and to provide the opportunity for AV manufacturers and suppliers to experience ideal, real-world environments that they need to test complex driving scenarios. The program integrates numerous resources, such as 70 miles of interstate highway, dedicated high-occupancy toll lanes, high definition mapping capabilities, enhanced pavement markings and connected vehicle capability via dedicated short range communications.

Similarly, Arizona Gov. Doug Ducey signed an executive order on Aug. 25, 2015 to encourage AV development and testing. Michigan lawmakers recently passed new legislation to allow for the expanded manufacture and road testing of AVs, in an effort to protect Michigan's dominance in the automotive research and development arena, before other states (and countries) beat them to the task. California and Nevada, among others, have already passed legislation to promote and encourage AV development and to allow AV testing on public roads. In fact, about nine states have passed AV legislation, while 16 other states introduced AV legislation in 2015. Much of the debate among state legislatures involves whether to require a human driver behind the wheel who can take over or whether the definition of "driver" can actually include the AVs computer system, which acts to control the vehicle.

Why all the fuss?

Safety. There are about 36,000 deaths in the U.S. each year due to automobile accidents. And, more than 90 percent of those accidents are caused by human error. Estimates show that AV technology could reduce traffic deaths by 80 percent. So the obvious problem is the human driver. Humans get tired, sleepy, and distracted, they text, they look at Facebook … and they drink. In fact, one theory is that our children and grandchildren will look back one day with horror and disbelief as they consider the number of deaths and accidents during the first 100 years of the automobile when we actually drove them ourselves! On the other hand, the recent, highly publicized, Tesla accident in Florida, believed to be the first fatality involving a vehicle in autonomous mode, has been a wake-up call to the industry. But, statistically, Tesla points out that its Autopilot mode, when used in conjunction with driver oversight, reduces driver fatigue and is still safer than purely manual driving. Tesla also notes that its system is still in the beta testing phase and provides warnings that the drivers remain engaged and ready to take the wheel.

Other benefits expected to come about as a result of AVs include reduced traffic congestion, offsite parking, fewer cars on the road and less individual car ownership, as society moves to a ride-sharing mentality. Who wants the cost, maintenance and insurance expenses and other hassles of car ownership, when the vehicle sits in the garage depreciating 90 percent of the time? Studies show that the members of our younger generation do not want to be bothered by driving anyway … they much prefer the freedom to text and use social media! And, AVs will give new freedom to the elderly and people with disabilities.

How will it work?

The AVs are loaded with radar, lidar, cameras, sensors, software, maps and computers with 360-degree awareness that can see around corners, over hills and otherwise anticipate things that humans cannot, and they can react faster. And, they will be connected to each other by Vehicle-to-Vehicle (V2V) technology,

and to the world around them by Vehicle-to-Infrastructure (V2I) technology, via dedicated short-range communication (DSRC) links to a wireless spectrum band similar to Wi-Fi. The merger of these technologies will allow the AV to become part of an integrated transportation ecosystem.

One of the biggest debates among the manufacturers is the issue of how much autonomy the car needs to have and whether to pursue "Semi-Autonomy" (human driver required to take over in emergency, i.e., GM) or "Full Autonomy" (no steering wheel, no brake pedals, i.e., Google). Google argues that Semi-Autonomy is actually more dangerous, because the whole point is to get the humans from behind the wheel, because humans cannot be relied upon to act quickly enough in emergency situations.

Liability?

The proliferation of AVs could indeed bring about a new paradigm in the way we have traditionally viewed auto liability cases and insurance coverage. If the shift to AVs will result in fewer accidents caused by human drivers (i.e., a shift in responsibility from the driver to the car itself), then we are likely to see a shift from traditional auto insurance (purchased by the driver) to product liability coverage (purchased by the manufacturer). Simply put, if the human driver is no longer "driving" the vehicle (since it may not have a steering wheel), then how is the human liable under a typical negligence analysis? While the insurance industry is trying to get a handle on all this, looking for some concrete information as to their potential risk exposures, some believe that the price of personal auto insurance will decline as human driver liability declines, while auto manufacturers and suppliers will need more product liability coverage to deal with an increase in defective technology claims. In fact, in an effort to speed the process, and to settle any questions as to liability, several of the major auto manufacturers have stated publicly that they will be responsible for any accidents occurring while the vehicle is operating in autonomous mode. If the AV technology can truly account for most of the 94% of accidents currently caused by human error, then it sounds like a pretty safe bet.

Other Problems?

In addition to safety, there are a plethora of other thorny practical, legal and regulatory issues to navigate before we see the mass commercialization of AVs, such as licensing, registration, certification, insurance, infrastructure, cyber-security, privacy and ethical dilemmas - such as where the AV must decide between two bad outcomes in an unavoidable accident scenario. But, at the current pace of AV technology, expect to see these issues resolved sooner than later.

What Else is Out There?

Just when you thought the concept of a self-driving car was difficult to digest, you are already way behind! AVs are just a piece of the new transportation ecosystem. As mentioned above, Uber recently got into the trucking business when it purchased the self-driving truck start-up Otto, with its sights set on "Uberizing" the long-haul freight business, with a new division called Uber Freight. Uber Freight plans to connect shippers to trucks, as Uber connects riders to cars, and to increase efficiencies by cutting out the middleman/broker. On October 27, 2016, Uber also released a white paper revealing its ambitious vision for on-demand aviation via small electric-powered aircraft known as VTOL's (vertical take-off and landing), via a new division called Uber Elevate. Yes, flying cars. Uber Elevate does not intend to build the VTOL hardware themselves, but plans to collaborate with vehicle designers, entrepreneurs, regulators, government agencies, and others to bring on-demand urban air transportation to life.

In the larger scheme of things, we are steadily working our way towards Smart Cities. The ever-connected and app friendly Smart Cities will be engineered to alleviate everyday annoyances by utilizing technology systems that react to the data collected. For instance, think smart power grids to immediately address power

outages; smart garbage cans to compact trash and notify the sanitation department when they need to be emptied; on-demand mobility, with new car-sharing availability; smart parking meters, that alert drivers to open spots; and smart policing, with artificial intelligence programs to predict where future crimes will occur 8-10 hours in advance so police can concentrate patrols where needed.

And, looking way on out there, Charles Bombardier has a design on paper for a supersonic plane called the Antipode, which can travel from New York to London in 11 minutes. The supersonic business aircraft can supposedly reach a speed of Mach 24 – up to 16,000 miles per hour – which is 12 times faster the Concorde! Oh yes, the transportation revolution is here! Fasten your seatbelt.

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