Drexel Hamilton
A Service-Disabled Veteran Owned & Operated Business

Drexel GPS – "Outside the Wire"

Exploring the Liability Around Potential Cyber Threats to Autonomous Vehicles
"Where the Rubber Meets the Road" (Part 1)

Photo Credit: Interesting Engineering

The global pandemic exposed this, but the lack of resiliency has been there over the past two decades or more. Where are the goods? Evidence that something is wrong with the supply chain has been experienced in some form by most Americans over the past year. Empty store shelves and months-long delays on everything from household goods to new vehicle deliveries have been felt by everyone at some point, leaving many asking the question- "What is the problem?" The answer is the global and domestic supply chains that provide goods and services have been disrupted in a major way.

There is no single reason that the supply chain has slowed down. It is the culmination of a variety of factors- many of them a direct result of the COVID-19 pandemic. Changes in consumer consumption patterns during a global lockdown caused significant disruptions in the systems and have highlighted vulnerabilities in a supply chain that has been placing a lopsided priority on efficiency over resiliency.

What does that mean? The system as currently designed was not built to withstand and compensate for the types of delays we are seeing at places such as ports and trucking hubs. The New York Times's David Lynch described it this way:" like a relay race where no matter how fast you run your leg if there is no one there to take the baton from you – you everything stops." As businesses look to correct the system a significant increase in the use of autonomous vehicles is increasingly being looked at as a solution.

In the U.S., one of the main issues with the supply chain is the shortage of truck drivers to move goods from the ports and beyond. In the short term, the need for more truckers is dire and must be resolved to clear the current bottlenecks. It has also accelerated and emphasized the idea that autonomous vehicles (AV) and autonomous trucking may be the solution to shoring up these inefficiencies in the future. There was already substantial interest in the market for AVs. Still, the pandemic has accelerated the timeline and appetite for investment in AV technologies. No longer is the question from investors and businesses for AV deliveries a matter of "If," it has now quickly become a crescendo of "When- and how fast can we get them going and on the road?"

While autonomous transportation is in its relative infancy, with its own set of challenges, several fundamental shortcomings are associated with traditional forms of transportation that can be addressed with autonomous modes of transit. There are four key factors that illustrate the benefits of the integration of the autonomous vehicle into the global supply chain.

Safer driving conditions

The two primary sources of collisions in traditional forms of transportation are a) vehicle malfunction and b) human (driver) error. There is a disproportionately higher percentage of fatal crashes based on the latter – human error.
According to the National Highway Traffic Safety Administration (NHTSA), over 3,000 deaths in 2017 were caused by distracted driving stemming from driver fatigue, driver distraction, and unlawful speed.

Automated transportation seeks to mitigate these issues by reducing the human element and maintaining driving conditions that are consistent with the driving environment and what is prescribed by the law. Additionally, studies have shown that automated vehicles equipped with modern collision avoidance technology have improved reaction times relative to vehicles operated by humans. Industry experts remain bullish on the ability to improve further in this area, given the use of machine learning and other modern techniques to augment traditional means, coupled with the level of venture capital attention to this space.

Greater efficiency & Improved productivity

Delivery efficiency can be defined as the number of deliveries made with the least amount of time and cost attributed to each delivery. Autonomous transportation requires multiple pieces of infrastructure to be implemented. Before we can ultimately assess its efficiency, we can draw conclusions based on historical data and theory.

First, route optimization is related to the efficiency of the delivery. It is not limited to the discovery of the shortest or least congested route. Beaconing mechanisms that allow one vehicle to communicate with another also allow for real-time assessments of AVs approaching total capacity; diverting deliveries to other trucks in the vicinity or grouping deliveries to specific regions can help reduce the length of routes.

Secondly, while in transit, the AVs have unique algorithms that allow them to "platoon," using adaptive cruise controls to optimize the space between vehicles and communicate with "smart" road signs to maximize speed safely.

Lastly, since driver fatigue is eliminated, businesses will utilize AVs around the clock to optimize the number of deliveries per day, per truck, without the costs of driver shift pay.

Less energy consumption

Many laws of physics play into the efficiency of autonomous transportation. Since the vehicles themselves will be electric, there is a massive reduction in the carbon footprint per delivery. A significant drain on energy use can be attributed to wind resistance on these huge vehicles. When "platooning" in convoys, there are benefits of vehicles downstream from the lead vehicle, resulting in the entire platoon benefiting from the energy savings related to reduced wind resistance. Lastly, the ability of the trucks to be programmed to follow best practices that lead to low energy consumption minus the human element (e.g., no air conditioning needed in the cabin) is a significant departure from the traditional ways that trucks consume diesel on the freeway.

In this 4-part series, Drexel GPS “Outside the Wire” will look at target markets and applications, technical implementations and risks, and legal ramifications (privacy, liability, and contractual) surrounding the inevitable scaled-up usage of autonomous vehicles.