

# Future predictions for autonomous guided vehicles

[Transportation](#)



Over the past century, rapid increases in manufacturing speed and growth in the complexity of warehouses have created a need for vehicles that transport materials from place to place. Typically, forklifts have handled this load. Late in the 20th century, Automated Guided Vehicles (AGV) began taking the role of forklifts. Autonomous Guided Vehicles are robots, typically battery powered, that travel around a facility without the need for a human operator. These AGVs are able move materials around a factory or warehouse by working in a similar fashion to a forklift or by towing carts of materials. However, uses for AGVs are not limited to manufacturing and warehouse settings. Recently, AGVs have been used in hospitals to transport trash bins as well as medical waste and patient meals.

In the past, wires or electronic tape have been used as a guide for the AGVs. The first AGV followed an overhead wire to move grocery product around a warehouse in 1953. Current technology involves using laser target navigation or inertial guidance to guide AGVs around the warehouse. A single AGV is typically not useful in a factory. Rather, a firm would employ tens of AGVs across the entire location in order to achieve a more desirable effect. Currently, AGV systems only communicate to avoid collisions using zone control or collision avoidance, though, collision avoidance technology between AGVs has much room to grow. Extremely high upfront costs due to the cost of an AGV fleet and high expense of updating facility infrastructure is the main roadblock from widespread adoption in the United States at this point in time.

## Predictions

1. Autonomous Guided Vehicles (AGV's) replace all human-operated forklifts responsible for repetitive tasks.

Time frame: Short-term (by 2020)

Level of Certainty: Probable

Autonomous Guided Vehicles are taking over a growing number of jobs, especially the repetitive tasks human forklift operators are responsible for in modern warehouses. Warehouse automation is nothing new, however. For years now, businesses have been optimizing their warehouse with wires, lasers, and tape so that Automated Guided Vehicles could be implemented into the supply chain. Although these vehicles have been noted to successfully carry out lifting, towing, and product construction operations, the required changes to a facility's infrastructure to accommodate for these vehicles has been a large factor in the decision to adopt new warehouse technology. Recently, robotic technology has grown to be much more advanced; no longer are wires, lasers, and tape required to automate warehouse operations. Using cameras and image-recognition algorithms, warehouses can now seamlessly adopt AGVs to carry out most repetitive tasks with little to no human interaction. With human-operated forklifts being the most lucrative application for automation, it is expected that these jobs will be the first to be effected on a large scale in the short-term (by 2020).

The largest manufacturing and distribution companies including General Motors, Amazon, and Whirlpool have already reported 725, 000 production miles within the pre-order phase of a single AGV manufacturer — all without

<https://assignbuster.com/future-predictions-for-autonomous-guided-vehicles/>

a single accident. With AGVs leading the warehouse automation frontier with positive numbers, it is unlikely that any roadblocks related to the technology itself are going to effect this near-term prediction. However, there is always the possibility of companies receiving negative backlash from Union workers in response to increasing job replacement by AGVs.

2. Amazon or a similar tech giant starts manufacturing and selling their own AGVs, and undercut the AGV market

Time Frame: Mid-term (by 2025)

Level of Uncertainty: Possible

Within the next 10 years, it is plausible that a tech giant like Amazon could start marketing their own models of AGVs and attempt to capture the market. Amazon Robotics, formerly known as Kiva Systems, already works to optimize the mobile fulfillment systems that are in use at Amazon's numerous distribution centers. With years of data in their hands and large capital reserves, Amazon has a distinct advantage when it comes to creating next generation AGVs. As of 2017, the AGV market was valued at 1.86 billion dollars, and is expected to grow at a compound annual growth rate of 8.02% in the next 5 years.

This prediction is mid-term due to the large potential for growth that Amazon could take advantage of by seizing this rapidly growing sector while it is still in its infancy. Amazon has repeatedly shown off its large capital reserves and desire to expand laterally with their acquisition of Whole Foods for 13.7 billion dollars, and ventures into privatized space flight with Blue Origin. By

<https://assignbuster.com/future-predictions-for-autonomous-guided-vehicles/>

acquiring a few of the current AGV manufacturing leaders and pooling all of the resources, Amazon could afford to make huge leaps in AGV technology that smaller companies simply couldn't compete with while maintaining lower prices. While the chance to seize the AGV market might be tempting, there are many reasons this prediction is possible, rather than probable. Accusations of monopolizing the AGV sector would bring negative PR to Amazon and potential antitrust regulations. Also, Amazon's desire to maintain its relative advantages in the AGV sector could prevent it from selling any of its technologies to third party manufacturers. Companies, such as GP, should be wary of a large tech company like Amazon, becoming the leading supplier of next generation AGVs because low prices may come at the cost of a dependence upon Amazon.

3. Autonomous guided vehicles assist in the widespread adoption of industry
4. 0 making " smart manufacturing" the industry standard.

Time Frame: Long-term (by 2030)

Level of Certainty: Plausible

In the next twenty years, it is plausible that autonomous guided vehicles will successfully usher in the fourth industrial revolution, or industry 4. 0. This change will be led by the emergence of cyber-physical systems that are capable of monitoring physical processes, making decentralized decisions, and communicating data across an Industrial Internet of Things (IIOT).

Industry 4. 0 would increase the efficiency of production by allowing real-time customization, adaptation, and optimization AGVs will be a critical factor in the revolution for two reasons. First, when businesses adopt AGVs, <https://assignbuster.com/future-predictions-for-autonomous-guided-vehicles/>

they are no longer limited by the movement of materials through production and there is the opportunity to try different production techniques and organizations. Secondly, AGVs are one of the predominate examples of industry 4.0 today, and after businesses experience the added safety, efficiency, and flexibility of AGVs, they will likely push for more automation on the factory floor. This prediction is expected by 2030 due to the timeline of previous industrial revolutions. The previous three industrial revolutions occurred over 80, 45, and 31 years. An exponential regression of those times yields an equation that predicts the fourth industrial revolution could last around 20 years. The internet of things went mainstream in 2008 then AGVs began to develop, then the idea of industry 4.0 was established in 2011. The world is the beginning of a revolution that started around 2010 and that will likely end 20 years later in 2030. There are, however, many roadblocks that hinder the reality of this prediction. AGVs are one of many factors that could enable industry 4.0. Real-time interconnected industry would require a more robust communication framework comprised of mostly Ethernet. The vast amount of data and control involved in automation would require that cybersecurity become more advanced. An industry standard would have to be established to allow seamless integration of both current and future cyber-physical systems. Artificial intelligence would need to become more advanced in order to work across a range of problems.

Finally, legislation might pose a threat as “lights out” manufacturing might lead to rapid job loss. Regardless, this prediction is still plausible because most roadblocks are hot areas of research and innovation today. Industry 4.0 is at the forefront of business minds and was even a primary topic in

multiple world economic forums. In the next five years, nearly half of all planned capital investment will be industry 4.0 related. In other words, the world is already buying into this vision, which makes it more likely to become a reality in the future.