

How Are Mobile Automated Vehicles Used?



- **Mission:** To promote the market awareness, growth, and effective use of driverless industrial vehicle systems (e.g. AGVs, AMRs, and AGCs)
- **Vision:** To be the trusted, independent authority on driverless industrial vehicle systems
- **Members:** To meet the current members of the Mobile Automation Group, [click here](#).





Online Training Module 2: How Are Mobile Automated Vehicles Used?

Today, we're going to learn
how Mobile Automated
Vehicles are used!



Online Training Module 2: How Are Mobile Automated Vehicles Used?





So... Let's look at
where MAVs are used!

Where are Mobile Automated Vehicles Used?

MAG | Ideal MAV Applications

That's a lot of uses!



- Goods Receiving
- Transport to and from Storage
- As an ASRS in High Bay Storage
- Raw Materials Transport to Production
- End-of-Line Transport
- Coil and Roll Handling
- Assembly Process
- Work-In-Process (WIP) Movement
- Linking Manufacturing Cells
- Goods-to-Person Picking
- Transport to Shipping
- Trailer Loading
- Special Applications



Let's look at a few examples, starting with goods receiving.



Examples: Goods Receiving

MAVs are used for the receiving of goods such as palletized loads, containers, bins, etc.

Here is an example of MAVs used in goods transport to and from storage.



Examples: Transport to and from Storage

MAVs move goods such as palletized loads, containers, bins, etc., to storage areas such as high bay racking, ASRS, pallet shuttles, and mini-loads.

Here is an example of MAVs as an ASRS in high bay storage.



Examples: As an ASRS in High Bay Storage

MAVs transport of goods such as palletized loads, containers, bins, etc., within high bay storage areas.

Here is an example of MAVs transporting raw materials to production.



Examples: Raw Materials Transport to Production

MAVs move raw materials such as paper, steel, rubber, metal, and plastic to the production area.

Here is an example of MAVs in end-of-line transport.



Examples: End-of-Line Transport

MAVs transport pallets from the palletizer to stretch wrapping and then to the warehouse/storage and/or to the outbound shipping docks.

Here is an example of MAVs handling rolls and coils.



Examples: Coil & Roll Handling

MAVs move rolls and/or coils in paper mills, converters, printers, newspapers, steel producers, and plastics manufacturers.

Here is an example
of MAVs in the
assembly process.



Examples: Assembly Process

MAVs support load movement in serial manufacturing and assembly processes.

Here is an example of MAVs in a work-in-process (WIP) area.



Examples: Work-in-Process (WIP) Movement

MAVs handle the repetitive movement of materials throughout manufacturing processes.

Here is an example of MAVs linking manufacturing cells.



Examples: Linking Manufacturing Cells

MAVs move products from one process to another within a production facility.

Here is an example of MAVs in goods-to-person picking.



Examples: Goods-to-Person Picking

MAVs bring products to an operator at a dedicated workstation. Operators receive the right SKUs at the right time without leaving their workstation.

Here is an example of MAVs transporting goods to shipping.



Examples: Transport to Shipping

MAVs transport finished goods to the outbound shipping area (docks).

Here is an example of MAVs loading trailers at the dock.



Examples: Trailer Loading

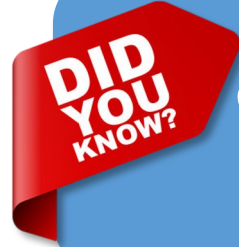
MAVs transport and load finished goods directly into standard trailers without any special dock equipment.

Here is an example of MAVs in a special application.




Examples: Special Applications

MAVs are used in precision manufacturing, clean rooms, amusement park rides, airport luggage cart towing, and more.



MAVs increase efficiency and reduce costs through automation. They can be used in a wide variety of applications to transport many different types of materials.


How do I know if MAVs are the right choice for my business?



Here are a few considerations when evaluating MAVs.

- **Environment:** Layout, available space, humidity, temperature, etc.
- **Load:** Load type (pallet, containers, coils/rolls, boxes, trays, racks, etc.), dimensions, weight, fork pocket, cargo overhang
- **Transport:** Distances, capacities (trips per hour), intake-discharge matrix (# of positions, floor-to-floor, conveyor-to-conveyor/floor, shelf)
- **Rack:** Shelf height, headroom, overhangs
- **Floor:** Wheel load, flatness, abrasion, transitions, electrical resistance, incline/decline, etc.

The choice of a MAV depends on multiple specifications...



The more matches, the better!

- Repetitive movement of materials over a distance
- Regular delivery of stable loads
- Medium throughput/volume
- When on-time delivery is critical and late deliveries are causing inefficiency
- Processes where tracking material is important

MAVs excel in applications with these characteristics...

Let's dial it in and focus on some key industries using MAVs.



COVID-19 brought new challenges to key industries, compounded by a labor gap.




Let's take a look at
Retail & eCommerce
first.

THE CHALLENGE

- There are only three keys to growth: save time, save money, and sell more. While most businesses focus on the third ingredient, the irony of high-volume eCommerce is that selling more can be its own worst enemy.



Retail and eCommerce




Here are more challenges in Retail & eCommerce.

THE CHALLENGE

- The problem is dead simple: people don't scale.
- Even more painful... People are costly.
- Neither of these statements undercut the value of people. If anything, they reinforce it. People are the most valuable resource and what they need is time.



Retail and eCommerce



So, what's the solution for Retail & eCommerce?

THE SOLUTION

- Automation... Simply put, eCommerce automation is the combination of software, processes, and mindsets that allow multiple roles within an eCommerce organization to:
 - Reduce manual workloads and redundant tasks
 - Simplify front- and back-end workflows
 - Eliminate the patchwork of multiple, disconnected apps
 - Scale for growth quickly and efficiently



Retail and eCommerce

Now, let's look at automotive.



THE CHALLENGE

- Automation is already a serious consideration where automotive manufacturing is concerned. Human labor is costly and unpredictable, while selectively implemented industrial automation helps automakers eliminate human errors and ensure precision work.
- Let's face it... The COVID-19 pandemic has created one of the largest labor gaps in history. By all indications, the end goal for most automakers is a fully-automated factory floor, packed with the most cutting-edge technologies.



Automotive

Here's another
challenge in
automotive.



THE CHALLENGE

- The movement of heavy loads creates a huge concern when it comes to safety. Safety is the number one priority in automotive, as it is for any industry.



Automotive

So, what's the solution for automotive?



THE SOLUTION

- Automation... Automation in the automotive sector offers huge advantages, including:
 - Increased operational efficiency through just-in-time (JIT) delivery of parts to production lines
 - Correct deliveries
 - 24/7 usage and maximum system availability
 - Reduced product damage
 - Continuous confirmation of the location of each load
 - Increased operator safety



Automotive

Now let's look
at consumer
packaged goods.




THE CHALLENGE

- Every day, humans consume massive amounts of “made-for-consumption” goods. Everything from toothpaste to shampoo to air fresheners to laundry detergent. The volume of CPGs moving through the supply chain creates an extremely inefficient process and adds incalculable cost.
- The majority of the material movement throughout the supply chain is non-value added.



Consumer Packaged Goods



Here's the solution
for consumer
packaged goods.

THE SOLUTION

- Automation... Automation streamlines the material movement of CPGs and provides the manufacturer many benefits, including:
 - Reduced manual workloads and redundant tasks
 - Efficient transportation of goods
 - Elimination of costs associated with non-value material handling
 - Labor savings
 - Reduced product damage



Consumer Packaged Goods

Now, let's look at food & beverage.



THE CHALLENGE

- What is the consumer really good at? Changing their mind.
- More than ever, food and beverage companies need to be flexible in their operations as Super Bowl specials and last-minute stock keeping unit (SKU) pushes can wreak havoc if the manufacturer is not set up to handle such a dynamic process.
- As havoc ensues, safety is compromised.



Food & Beverage

I think there's a pattern here. Could the solution for food & beverage be automation?




THE SOLUTION

- Automation... Automation creates a discipline within the process and can bring many more advantages, such as:
 - Reduced product damage
 - Cost-effective movement of materials
 - Improved safety in work area
 - Ability to overcome labor shortages and turnover
 - Flexibility



Food & Beverage




Now let's look
at pharmaceuticals
& healthcare.

THE CHALLENGE

- There are a number of challenges facing the pharmaceutical and medical device manufacturing industries. Those challenges include labor shortages and developing supply chain resilience.
- There is also an increasing requirement to become more agile, where production facilities can react faster to changing demands and expectations.



Pharmaceuticals & Healthcare



Here's another
pharmaceuticals &
healthcare challenge.

THE CHALLENGE

- Pharmaceutical and medical device companies also have to deal with changes in medical device regulations, such as the recently introduced European Union Medical Device Regulation (EU MDR), while there are always pressures to improve productivity and profitability.



Pharmaceuticals & Healthcare

Can you guess what the solution is for pharmaceuticals & healthcare?



THE SOLUTION

- Automation... Automation streamlines the material movement of pharmaceutical ingredients and products, providing many benefits:
 - Improved processes with minimal footprint
 - Minimized implementation timelines
 - Enhanced agility and flexibility
 - Labor savings
 - Increased accuracy in product delivery
 - Faster pace to new product introduction



Pharmaceuticals & Healthcare

Let's summarize...
Which industries
use MAVs?



How Are Mobile Automated Vehicles Used?

Let's summarize...
Here's how MAVs are
used in these sectors.



- Goods Receiving
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How Are Mobile Automated Vehicles Used?

Congratulations!

You've finished the
second training module!



**Next Up... Online Training Module 3:
Why Would I Want A Mobile Automated Vehicle?**

For More Information...

Contact MHI's
Mobile Automation Group (MAG)
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