

Intelligent mobile robots **take logistics to unprecedented levels.**



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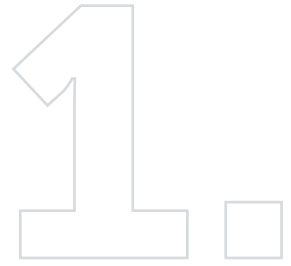
Automating goods transport can boost productivity and help eliminate bottlenecks in production. The need for further logistics optimisation, higher efficiency and to manage operational supply chain costs is also contributing to the advancement of computer-controlled mobile transport. But what types of mobile robot are there? How do you know which solution is right for you? And what are the challenges? Find out in this white paper.

There has never been a greater need for mobile automated systems. The market now offers a wide range of solutions and Automated Guided Vehicles (AGVs) have long ceased to be the only answer. Modern vehicles are more intelligent, more cost-effective and more flexible.

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What forms of mobile automated system are there?



Automation of internal logistics is a recurring issue in companies large and small, not least because of the difficulties in finding suitable labour. Employees are hard to find; skilled workers harder still.

Employees on the warehouse floor spend a lot of their time simply 'travelling', moving goods from A to B, something that is easy to automate. Automating goods transport can boost productivity and help to eliminate bottlenecks in production. The need for further logistics optimisation, higher efficiency and to manage operational supply chain costs is also contributing to the advancement of computer-controlled mobile transport. Automation also frees employees to focus on other, higher-value activities.

Mobile automated systems are nothing new and the market already offers various solutions. This white paper will consider two alternatives – the Automated Guided Vehicle (AGV) and the Autonomous Mobile Robot (AMR). How are AMRs or AGVs used? When is one solution preferable to another? What are the challenges with each alternative? And what are the key considerations for automating mobile transport?

AGVs

It was a predictable and reliable solution. AGVs have accurate positioning and can be used continuously. They are also capable of picking up a wide range of load carriers without difficulty. Conventional AGVs do, however, have a drawback in that they are not particularly flexible. A conventional AGV always follows its onboard navigation system - a pre-programmed route.

AMRs

Like the AGV, an AMR is a computer-controlled, mobile load carrier, but the technology it uses is different. The most important difference is in its navigation. Where most AGVs use laser navigation, AMRs use natural navigation. Using state-of-the-art technologies, such as SLAM (simultaneous localisation and mapping), cameras and even body-sound microphones, an AMR compares the current environment with the virtual environment loaded into the onboard computer. This allows the robot to understand its environment so that it can navigate autonomously. It can adjust its route independently if it needs to.



Consequently, AMRs are more intelligent and more flexible than AGVs. There are other important benefits too: the infrastructure required is minimal and changes to the process are easier to implement, with no need to bring operations to a halt or to physically modify routes. It is easier to scale up and scale down with a simple software update. The in-built intelligence of an AMR makes it a more cost-effective option. An AMR's intelligent technology also means that it can be used in work environments in which there are people present, with no need for additional safety measures. Compact AMRs are made for safe cooperation between human and machine, with no compromises.

Which automated system is right for you? There is no standard answer to this question, but a thorough analysis of your existing processes and the data available will provide greater clarity. The one thing that is certain is that automated systems require standardisation, both in load carriers and processes. The following indicators will also have an impact on the ultimate decision.

Load carriers

Which load carriers need to be transported? Is there multi-tier shelving with containers? Do workpieces need to be transported from one workstation to another or just pallets? Do all pallets have the same dimensions or are they different?

Another consideration is how the load carriers should be picked up. AGVs can pick up pallets of different sizes from the floor without difficulty. AMRs cannot yet do that.

Space

The space that is available can partly determine the form of mobile automated system. Will the automated system be in an existing or new warehouse? If it's a new warehouse, is it on existing or new premises? With new builds, there are scarcely any restrictions and all options are on the table. This may not be the case with existing premises where space, layout and the quality of the floor may all impose restrictions.

Another aspect to consider is whether processes can be automated without endangering the continuity of ongoing operations.





Scalability

Not every organisation is in a position to reliably predict future scenarios. Some organisations operate in volatile markets that are sensitive to fashion trends, weather conditions, innovations, exchange rates and trade embargoes, which means systems need to be easily expandable or scalable.

The scalability of manual transport is usually much greater than that of an automated concept, but the latest generation of mobile automated systems has improved in this area. Generally speaking, the user-friendliness of the software and the availability of standard vehicles mean AMRs can be scaled up quicker and more easily than AGVs.

Amortisation period

The amortisation period is an important factor for any organisation and can often be decisive in choosing one system over another. Although modern systems tend to be more affordable than conventional mobile automated systems, they still require considerable investment that often needs to be amortised within one or two years. Whether this is feasible depends on the reliability of future scenarios - how far into the future can the company see?

The amortisation period itself is largely determined by labour costs, which in warehouses are usually the most significant cost component. In a warehouse operating two or three shifts, a mobile automated system is likely to offer a greater return than one operated in a warehouse running just day shifts – simply because it saves a greater number of labour hours.

When it comes to the amortisation period, the investment plays an important role

Even though an AMR uses sophisticated technology the investment is frequently lower than for AGVs. One reason for this is the minimised need for expensive infrastructure modifications. With relatively low initial costs and rapid process optimisation, AMRs offer a remarkably rapid return on investment, often in under six months.



Examples of mobile automated systems.

Different business types and industries will continue to demand different production and warehouse environments. That degree of diversity requires flexible, autonomous technology that can be integrated into production and warehouse logistics in whatever way it's needed, both within existing facilities and at brand new locations.

That's why the rise of AMRs does not mean the end for AGVs. There is still a need for both solutions, not least because situations differ. AGVs and AMRs are complementary solutions. As we have already seen, AGVs are limited to a strict route, which means that the overall number of possible applications is limited. AMRs are more flexible and can carry out different tasks at different locations, with the vehicle adapting automatically to changing environments and production requirements.

While an AMR does not usually transport loads heavier than 1,000kg, AGVs can move many times that weight with ease. An AGV can pick up a load from the floor and raise it to any desired height, enabling automated storage and removal. By contrast, an AMR can be used for horizontal transport, such as for 'underload transport' and for goods-to-person order picking.

For ever-increasing numbers of warehouses, mobile automation can help to achieve maximum performance when it comes to efficiency, productivity, throughput time, quality and costs. Mobile robots (AGVs and AMRs) offer new levels of flexibility and control. Companies get access to an unrestricted workforce, providing more resources and freeing up employees for value-added activities.

Nevertheless, there remain challenges for AGVs and AMRs.

Shift to smart navigation

In the coming years, conventional AGVs will shift to new and more intelligent, more flexible navigation. How this shift occurs will determine the future success of AGVs.

In addition, the new DIN EN ISO 3691-4:2020-11 standard also demands a higher level of safety from AGVs. Load-detection sensors must be configured in duplicate, for example. Stricter tolerances also apply.

New usage areas

The challenges for AMRs are more practical in nature. Their use in combination with conveyors or for heavy loads is currently limited and they can't yet be used in combination with racking and/or ground locations.

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What does the future hold?

Developments are happening quickly, including developments in standardisation. Modern AMRs meet VDA 5050 requirements. Combined with a fleet management system based on the standardised VDA 5050 AGV Communication Interface, a single fleet management system has the capability to coordinate AGVs and/or AMRs from different providers and control and manage different use cases with systems from different manufacturers in a single solution.

If the fleet management system uses the API (Application Programming Interface) standard, rapid implementation moves within reach. The simplicity of implementation also means a significantly shorter amortisation period (ROI) for a large number of applications. It all means innovative, automated solutions are paying dividends for an ever-increasing number of companies.

The software platform also offers the ability to make changes to systems quickly and easily, such as adding or moving picking stations when material flows or order profiles change.

Source of knowledge

Fleets of robots are increasingly a source of essential knowledge. Performance and usage data from AMRs in the field are constantly collected and used throughout their service lives to introduce improvements that deliver added value to customers. By combining that continuous stream of data with innovative algorithms to train the robots to become increasingly effective and intelligent, we can create new levels of efficiency.

Ease of implementation and change is the key to a flexible, responsive intralogistics model.

It is the combination of AMRs and AGVs that takes intralogistics processes to new levels of automation. A versatile system solution provides the flexibility that is essential to modern supply chains. With appropriate automation for different sub-processes, goods can be collected and dispatched more quickly, more efficiently and without errors. In addition, the mixture of innovative robotics and 'traditional' AGVs makes further optimisation down the line more readily achievable.



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And finally - tips for a successful project.

Which form of mobile automated system is best? The answer depends on a wide range of factors which vary from one warehouse to the next. You should, therefore, start with a thorough analysis of the current situation and ask:

- How effective are current processes?
- What are the current operational costs?
- What are the properties of the load carriers?
- What boundary conditions are determined by the premises?
- What are the organisation's future expectations?
- What amortisation period is acceptable?

Tip 1

Request a thorough analysis of the current situation in advance. An analysis of this kind - removed from any subsequent project - can help to ensure better decision making when it comes to investing or not investing in a mobile automated system. It may be useful to reserve a separate budget for the analysis phase. The additional costs will be earned back several times over in any subsequent project.

Tip 2

Think big, start small, grow fast! Go after the low-hanging fruit. Not everything can be automated easily. By focusing on standard processes as a starting point, you can achieve a quicker return on investment, certainly in a three-shift operation.

Tip 3

Choose a provider who can provide all systems, including the WMS, from a single source. That way, you can be confident that all systems are mutually coordinated and can communicate with one another. Doing this also ensures that there is only one point of contact for the project as a whole.



Get the answers you need with our automation survey.

5.

Any warehouse automated system study should start by mapping the current situation. How is the warehouse set up? How effective are processes? What are the characteristics of the material flow?

With this inventory list, you can then map much of your operation by yourself. Your answers will give you a clearer picture of how things currently stand. In addition, the list will enable your supplier to give you some initial advice on points for improvement in your operation and on possible automated system solutions.

Take a few minutes to complete our online questionnaire and take the first steps to optimising your operation.

[Start survey >](#)



Jungheinrich Intralogistic Solutions

Jungheinrich Intralogistic Solutions is the division of Jungheinrich that is responsible for the design, sales and realisation of warehouse equipment projects. Jungheinrich is one of the largest suppliers of intralogistics solutions in the world. We are specialists in the equipment and optimisation of warehouse and distribution centre logistics; from installing warehouse racks through to warehouse software, warehouse automation and robotisation.

We not only offer a wide range of warehouse and transport systems, but also retain all expertise in house. We analyse existing processes, identify potential and develop optimised strategies, including for your future requirements. And we do all of this on the basis of your individual needs.

Want to know more?

Please get in touch for a no-obligation chat: call 0800 357 457 or visit:
www.jungheinrich.co.uk

