

ECON

True Material Traceability to Improve Logistics and Production In Industry 4.0

AT A GLANCE

BUSINESS CHALLENGE

SOLUTION

RESULTS

AT A GLANCE

A leading optoelectronics manufacturer in Taiwan introduced ECON's Automated Guided Vehicle (AGV) system to replace manual processes, which were considered too time consuming and labor intensive. The AGV system was integrated with the MES (Manufacturing Execution System) and WMS (Warehouse Management System) in order to achieve clearer visibility of logistics and production processes.

ECON

Founded: 2000

Industry: Machine ODM

Headquarters: Taiwan

Employees: 60

Results

- True material traceability to improve logistics and production
- 50% labor saving
- 20% space saving



Reduce Labor Costs and Boost Production Efficiency

The Liquid Crystal Module (LCM) process involves dozens of assembling stations and contains the majority of the company's workforce, which means that this department has to spend a significant amount of money on labor. The assembly operators have to spend a lot of time collecting raw materials and bringing them to their work stations, even though this is not the role they were employed to perform. Previously, when operators had to move away from their stations to collect raw materials or bring semi-finished products to the conveyor belt, it resulted in them being temporarily unavailable to attend to their designated tasks, which resulted in low overall production efficiency. To solve these problems, the optoelectronics manufacturer decided to use ECON's AGV to upgrade their material handling processes, so that operators can concentrate on performing assembly tasks.

“Throughout the journey from raw material to finished products, at least 70% of time was spent on internal logistics.”

He Zhiwei

Vice President, ECON



“The complexity and diversity of AGV application scenarios makes it very difficult to find a set of powerful wireless network devices that are suitable for all scenarios.”

He Zhiwei

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The Ideal Wireless Technology for AGVs to Communicate

A few years ago, AGVs did not have strong communication capabilities, so vehicle routes had to be defined in advance in order for material handling to be performed as expected. However, as the system developed over time, the AGVs started to utilize wireless communication technology. This allowed the AGVs to interact with the dispatching system located in the central control room and relay the position of the vehicle to the dispatching system in real time. This greatly enhanced the efficiency of production line management as well as the AGVs. ECON's Vice President, He Zhiwei, emphasized that the key to successful AGV transportation management was the quality and reliability of the wireless communications. For this reason, ECON felt it was necessary to enforce a robust selection process when purchasing wireless APs (Access Points) and clients. As there are many complex and diverse AGV application scenarios, it is difficult to find a set of powerful wireless network devices that are suitable for all scenarios. In order to meet the above requirements, ECON needed to work closely with the wireless device manufacturers to help them overcome any challenges that arose.



Efficient and Dependable AGV Solutions Integrated with the MES

The optoelectronics manufacturer planned to integrate the AGV and MES in order to combine logistics and production processes to enhance operational efficiency. The company chose ECON's AGV for its strong communication capability, ability to integrate with the MES, and a variety of software tools that are intuitive to use. One of the advantages of the vehicle map software is that it allows engineers to quickly utilize map navigation operation procedures after viewing the plant layout, and the path simulation software enables users to quickly execute the route path simulation without relying on mechanical engineers to produce CAD diagrams that can be very time consuming. All of these features significantly helped to minimize programming efforts, which was a problem with the previous solutions deployed.

In order to ensure the AGV operates safely and smoothly, the solution needs to work reliably at every intersection and T junction within the plant, where there is a higher chance of interference. Any disruptions to communications between the vehicle and the wireless AP may result in the location of the vehicle not being sent to the central control room. This will significantly impact the ability to control the AGV or even result in a collision between the AGV and other vehicles or objects. In short, it is impossible to underestimate the importance of the reliability of the wireless network components. He Zhiwei said that ECON had previously purchased wireless networking devices from different manufacturers, but sooner or later their wireless signals suffered from interference that resulted in errors occurring on the AGV. Moxa's AWK Series industrial wireless network products have excellent signal strength and much higher levels of reliability than the products that were previously used. More importantly, Moxa has a clear advantage over other providers as they are able to facilitate real-time services. All of these factors contributed to ECON's decision to choose Moxa's products.

Moxa has an obvious advantage over other providers in terms of provision of real-time services.

He Zhiwei

Vice President, ECON



Flexible AGV Scheduling via a Cloud-based Path Map

Although path maps can be built into AGVs, considering the large number of stations and path maps in the plant, it is not efficient to modify the route for every vehicle in the event that there is a production process change or an area that needs to be avoided. As ECON has the ability to build AGV path maps in the cloud, it allows users to distribute up-to-date map codes to the designated vehicles each time a user modifies the maps in the cloud, thus improving scheduling flexibility.

- Seamless integration of software and hardware: Integration of AGV, MES, and WMS.
- AGV path planning and design tools that are easy to use and do not require programming.
- A vehicle map software suite can meet the needs of a wide range of customers.
- Wireless communication technology that allows remote monitoring and scheduling of vehicles.
- Path maps on the cloud improve the scheduling flexibility.

Increased Transparency and Efficiency in Logistics and Production

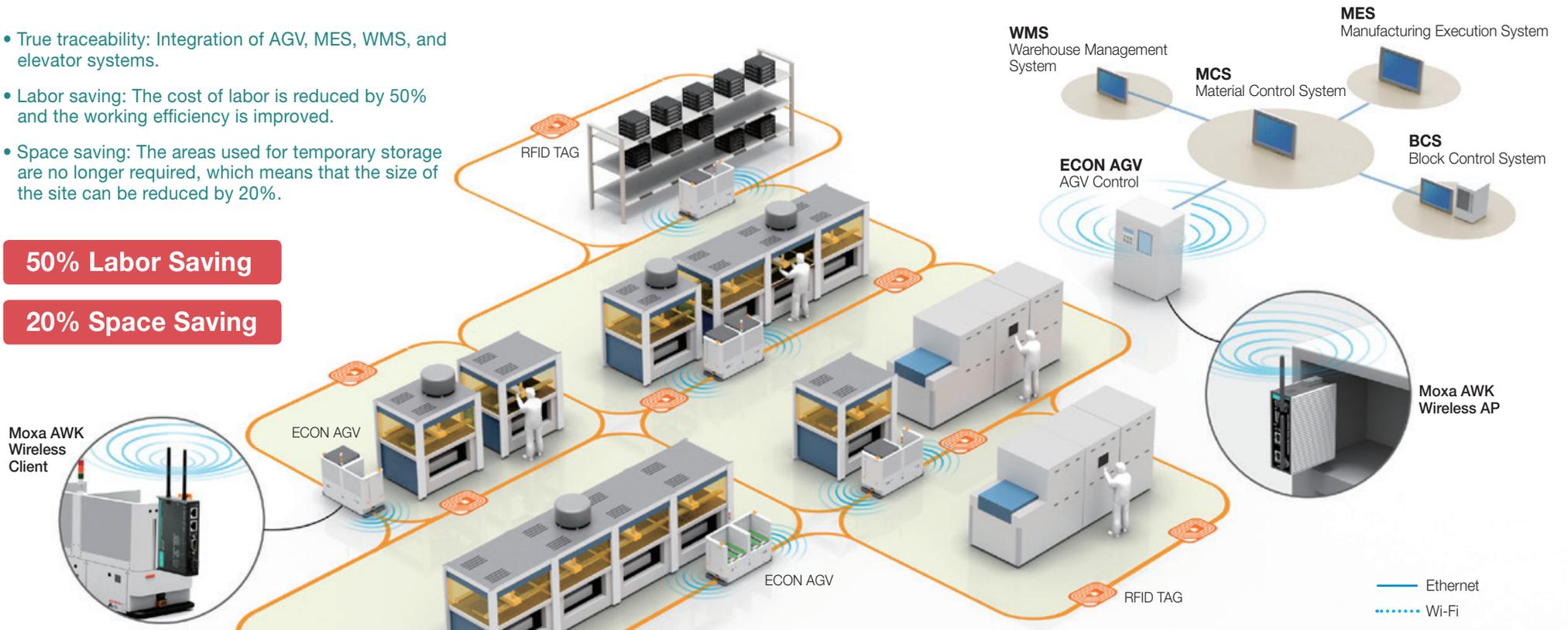
By integrating the information flow of the production lines and logistics, the MES can keep track of the materials at each station in real time and in case of a material shortage, send an instruction to dispatch materials to the AGV controller, which then ensures that the AGV that is most suitable for the current transportation task performs it. The updated AGV system has greatly improved the working conditions of station operators, allowing them to focus on their

own work and remove the need for them to leave their stations to handle logistics. As the elevator control system is linked with the AGV control system, it is able to instruct the AGV to move the materials to different floors when required. In addition, the AGVs run automatically 24 hours a day and will self-charge when their battery is low, which further decreases the need for personnel to perform tasks.

- **True traceability:** Integration of AGV, MES, WMS, and elevator systems.
- **Labor saving:** The cost of labor is reduced by 50% and the working efficiency is improved.
- **Space saving:** The areas used for temporary storage are no longer required, which means that the size of the site can be reduced by 20%.

50% Labor Saving

20% Space Saving



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