

Closing gaps to the very last metre



Autonomous mobile robots (AMR) increase the flexibility of intralogistics, yet often reach their limits in connection with material flow. Wireless-based real-time networks close information gaps, automate material requisition and facilitate the seamless integration of AMR fleets in production and logistics.

The advantages of mobile robots over stationary conveyors are obvious: they take up very little space, navigate flexible routes and can be scaled up indefinitely. Even though automated guided vehicles (AGV) have been around for decades, these benefits are only just coming into their own, for which there are different reasons. One is the abovementioned flexibility: unlike AGV, AMR can navigate freely, drive

anywhere and avoid obstacles as they go. Via standardised interfaces (VDA 5050), mobile robots from different manufacturers can be operated by one generic fleet manager. There are also many, very different AMR series available – from industrial truck market leaders, from robot manufacturers, and from start-ups.

Market research institutes are currently predicting stable growth rates for the

mobile robot market of between 15 and 20%.

Gaps in the information flow

In practice, however, users of mobile robots, for example to supply assembly workstations, often notice that individual non-inventory-managed articles are being over- or undersupplied. If the supply zones are additionally located within a mixed area, where workers also drive conventional industrial trucks, a mobile robot could also drive to a slot that is already occupied.

These gaps in the information flow can be closed with an automated material requisition system (AMS), for example the 'sWave.NET' wireless network from the steute business division Leantec. The network comprises end devices, such as

sensors, switches, indicator lamps, etc., which communicate with an Access Point via an integrated or external radio module. The module forwards the signals to a Sensor Bridge which can interface to an existing ERP, PPS or WMS, but also (via Modbus-TCP) to PLCs. The Sensor Bridge is provided as an on-premise solution for installation on the customer IT platform. The wireless 'sWave.NET' system, developed by steute, is based on low-power technology.

Real-time monitoring of material flow processes

A practical sWave.NET solution for assembly workstations could incorporate wall and/or ceiling-mounted wireless laser sensors which monitor pallet parking slots from a distance of up to 5 m, and which



A constituent part of replenishment management: laser sensors detect, for example, the fill levels of palletized goods or containers.



sWave.NET wireless sensors 'count' dollies in consignment hubs.

trigger a material requisition order if no pallet is detected. Also possible is the use of laser spot sensors which 'look' directly into large load carriers to detect their fill level, for example, or which monitor the height of tray stacks.

Depending on the desired application, logisticians can then be informed that they need to take care of replenishments, or sWave.NET can pass on the information directly to the automated vehicle system and tell the AMR which empty pallet slot needs attention.

Since the sensors send their signals remotely, it is also possible to integrate mobile locations – for example boxes in mobile eKanban racks, on dollies and tugger trains, or on automated vehicles. The result is uninterrupted material tracking which is also in real time, without delay. Parallel integrations can

For eKanban applications: wireless sensors detect containers in flow racks and transmit signals via a Sensor Bridge to the ERP, WMS or PPS.

include display boards, Andon systems, or similar.

This means seamless and transparent real-time monitoring of all to-dos at assembly points, resulting in assembly parts always being available in sufficient quantities, and empty boxes or packaging material always being removed from the shop floor. Ongoing and previous steute projects involving such wireless networks cover areas such as pharmaceuticals production, the automotive industry and the manufacturing of medical and electrical devices.

eKanban and dolly hubs

The flexibility of this wireless system is shown in application fields for which steute has developed special fit-for-purpose software and hardware. For example, in the assembly of electrical and drive components, sWave.NET wireless sensors designed specifically for this task monitor the occupancy of eKanban flow racks. And in intralogistics 'supermarkets' and consignment hubs, application-specific



and robust wireless sensors manage dolly fleets.

One network, multiple functions

sWave.NET features include multi-client capability, allowing the applications described here, plus others, to be operated within a single wireless network. The sensors and actors in the field, as well as the interface parameters, are assigned solely to the responsible 'client' or application. This guarantees conflict-free parallel operation of different applications and responsibilities within one production area with a single, superordinate infrastructure, increasing its utility value. On the hardware side, many different switches, sensors and application-specific end devices (also for box detection in Kanban racks and the 'counting' of dollies in empties hubs) are available for such applications, as well as stack lights and wireless hand controls.

Improved cybersecurity

Features of the latest version of the wireless network include new interfaces

for connecting sWave.NET to heterogeneous AGV/AMR fleets on the basis of VDA 5050, providing a link to the 'Synaos' platform. Interfaces to additional platforms, such as Agilox, Hartwall and MHP, also permit direct communication between AGV/AMR and sWave.NET, so that, for example, the information generated by sWave.NET is displayed on the dashboard of the fleet manager in question. Seamless integration of the AMS in existing processes is thus possible, increasing the efficiency of intralogistics processes.

Last but not least, the latest sWave.NET platform provides a higher safety standard, partly due to user requirements in medical device production and the pharmaceuticals industry. Their wishes included, for example, the logging of all material requisitions sent from the shop floor via sWave.NET to SAP. The latest sWave.NET software also incorporates additional cybersecurity measures which make the wireless network fit for future requirements such as the Cyber Resilience Act.

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