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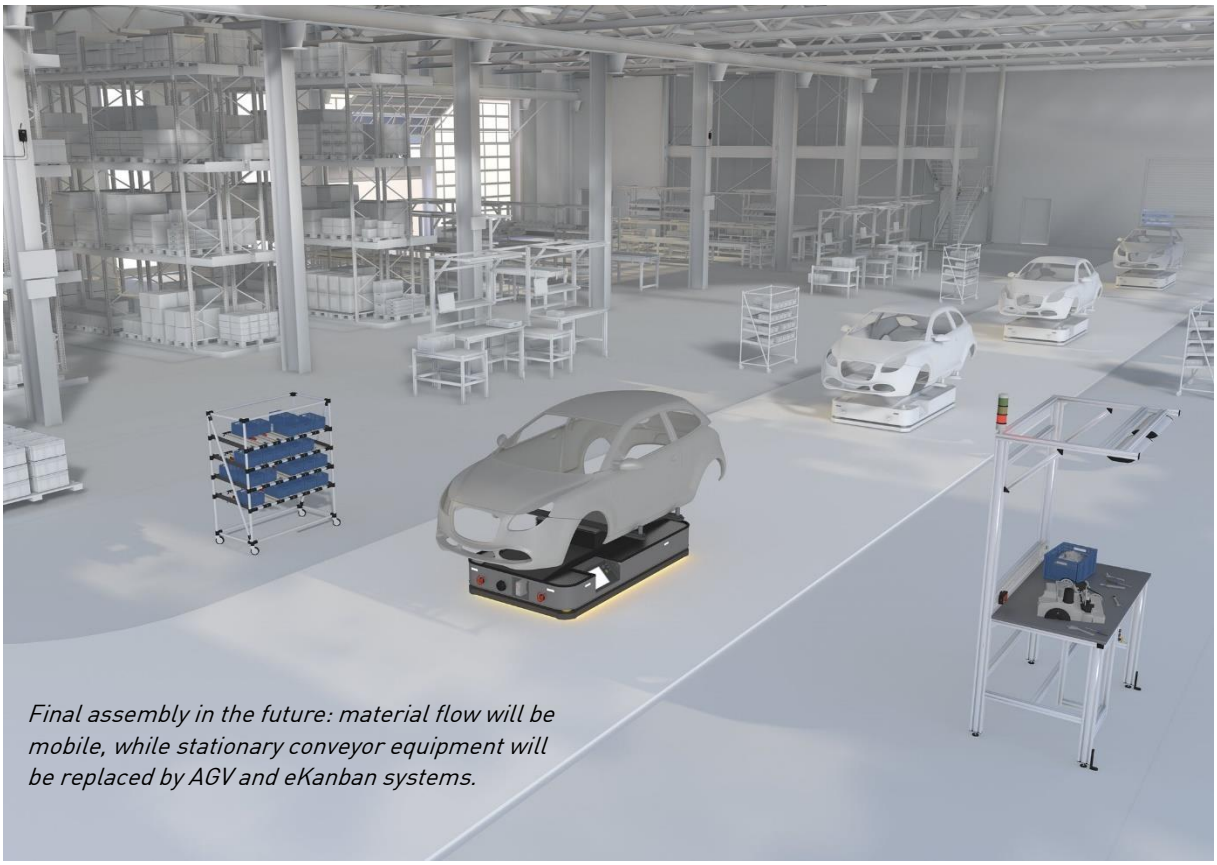

Final assembly in the future: material flow will be mobile, while stationary conveyor equipment will be replaced by AGV and eKanban systems.

Increasing mobility for intralogistics

More flexibility with wireless communication

When tasks within the material flow are assumed by automated guided vehicle systems and mobile eKanban racks, communication has to be wireless. And it is crucial that integration of the wireless signals in the IT infrastructure of the user is seamless.

One of the current in-house logistics trends is that material flow technology itself is also becoming mobile. This is currently being demonstrated by the automotive industry: in test factories, for example at Mercedes-Benz and Porsche, cars are produced not on fixed conveyors, but on top of automated guided vehicles (AGV). Other mobile applications include eKanban systems for the supply of materials to assembly points, as well as autonomous tugger trains which deliver to

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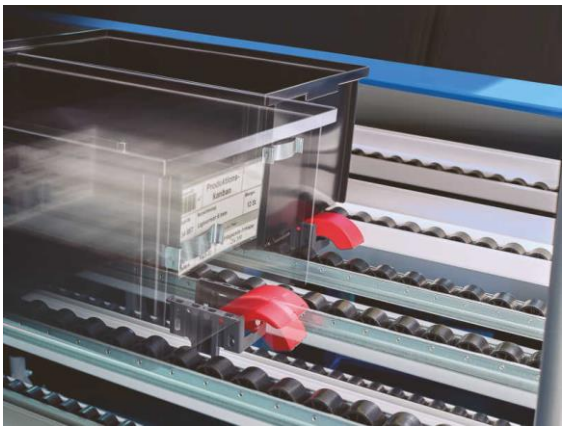

Wireless sensors integrated in eKanban systems can detect which containers or articles need replenishing.

individual production areas and workstations.

Wireless data networks

In all cases, it is not only components which have to be transported, but also information. This is impossible using cables because the system components are mobile. Best suited for such a task are wireless networks developed specifically for industrial applications. Here, engineers and purchasers have to decide: it is not always a good idea to rely on older mobile radio communication standards; and yet the dimensions of the new 5G networks are often excessive for AGV and eKanban applications.

Standard or proprietary?

A seemingly obvious option is to take a local industrial wireless standard, such as Sigfox or LoRaWan. At first glance, these solutions have the advantage of being open standards not bound to a single manufacturer. And yet the practice shows: in order to guarantee optimal communication in defined areas of intralogistics, these wireless standards need to be adapted to the application in question. The protocols then cease to be open and one might just as well have opted for a proprietary system in the first place, such as the nexy wireless network from steute. nexy is a software-based connectivity solution for the designing of safe and high-performance Low Power Wide Area Networks (LPWAN), as well as large industrial IoT applications. Its features include high transmission reliability in adverse environments typical for industry (multiple wireless networks, reflections from machine enclosures...), good compatibility with other wireless networks and low power consumption. The networks can be scaled to more or less any size.

A reference installation is able to demonstrate the benefits of such wireless networks and the specific tasks they are able to assume. A car manufacturer uses AGV from dpm Daum & Partner Maschinenbau GmbH in its assembly. When one of the AGV is resting because it is not required, it does not – as is usually the case - have to drive to a charging station first. Instead, it switches automatically into a "deep sleep" if it is standing still for any length of time. The power consumption of the vehicle in this mode is next to nothing. When it is needed again, nexy sends a "wake up" signal and the AGV springs back into action.

Signals are transmitted throughout the assembly hall via Access Points, which "collect" the wireless signals similarly to a router and then pass them on via Ethernet to a Sensor Bridge acting as middleware. This middleware acts as an interface to the superordinate IT infrastructure, for example an ERP system, a production planning system or a warehouse

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management system. This ensures uninterrupted communication from the shop-floor all the way to the customer IT.

Software components

Pre-configured software interfaces are available for AGV applications – for the "deep sleep"/"wake up" functions, but also for the communication between AGV and pick-up points during the assembly process.

At the same time, the user can use the wireless network infrastructure to manage the replenishment of materials in mobile eKanban racks. Tilting sensors are installed in the individual lanes of these racks and can detect when a container is removed. When this happens, replenishment is immediately requested from the warehouse via the nexy wireless network. This is possible because the eKanban sensors are connected to the warehouse management system. Here, too, pre-configured interfaces are available. In already realised nexy networks for eKanban systems, as many as several hundred wireless sensors are integrated.

In addition, the existing nexy wireless network can also be used for other applications. Current examples include tugger trains, dolly fleets for material transport, as well as operation and display systems. In such cases, operators profit from synergetic effects because one and the same network can manage multiple tasks. In addition, firmware updates for the wireless components can be centrally installed, and equally easy is the changing of parameterisations for individual wireless participants.

Typical for software-driven systems is continual further development, for example of new functions and communication interfaces. Current new features include an interface to OPC UA for cross-platform data exchange.

For technical purchasers, a closer look at this topic should be well worth it.

AGV are woken up as required – by remote control

One of the very first to benefit from nexy was dpm Daum & Partner Maschinenbau GmbH in Aichstetten. This company develops and produces automated guided vehicle (AGV) systems which are used predominantly in the automotive industry – including in test factories containing hardly any stationary conveyor equipment. The workers can ride pillion on the AGV and assemble components while they are travelling. Mark-Oliver Daum, Managing Director at dpm, told us: "Using the nexy wireless network has clear advantages for us, as well as for the operators of AGV fleets. The vehicles do not have to drive to a charging station when not in use, and can instead stay wherever they were last needed. Because they need next to no power, we can install much smaller batteries, which in turn makes the construction of the AGV less heavy and more compact."

The latest AGV generation for the automotive industry from dpm. Workers can ride pillion and assemble components at the same time.

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Wireless systems will certainly be used more frequently in industrial environments in the years to come. And not only in the automotive industry: because the wireless system is so easy to implement and so flexible to operate, it is equally suited to applications in small and medium-sized companies.

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