



► In the assembly of e.g. car parts or drive systems, wireless-based management of box occupancy can be truly beneficial.

Automated material requisition on the shop floor

Wireless has the advantage

For a long time, wireless networks had a bad reputation in factories regarding their reliability. But the trend towards flexible (serial) production, e.g. in car assembly plants, has led to them increasingly being integrated in communication structures. Wireless protocols developed specifically for such applications are favoured.

From Wi-Fi and Bluetooth to Wireless Profibus to (very soon) 5G: the communication protocols used in industrial automation are increasingly wireless-based. There are many good reasons for this. When no cables have to

be laid, the installation costs fall, especially when the number of sensors and actors is high. Flexibility is increased because the terminal devices are simple to move if needed elsewhere. And if the sensors and actors – as is

the case more and more frequently – are located on moving storage and transport units such as AGV, tugger trains or mobile eKanban racks, there simply is no alternative to wireless communication.

In addition, extremely robust wireless standards which have been especially adapted to the requirements and ambient conditions of industrial production are now available. A robust industrial wireless system uses an automated material requisition system such as nexy, developed by steute and generating a digital twin of the in-house material flow.

More precisely, everything began with the wireless system sWave which enabled wireless switches and sensors to communicate with each other via a point-to-point connection. In a second step, this proprietary wireless system was then adapted to make it network-compatible, after which the nexy system was continually expanded and further developed.

Standard solution or proprietary system?

Both the developers and the users of a wireless system must decide which type of wireless protocol is best suited to the application in question and is best able to be integrated in existing processes. In theory, open networks appear to have the advantage because they can be used independently of a single manufacturer. This is especially the case for open-source low-power network standards such as LoRaWAN and Sigfox. In practice, however, standardised wireless systems often have to be so heavily adapted to individual industrial applications that the result is ultimately just another manufacturer-bound and inflexible solution.

In such cases, the seeming advantage of standard solutions loses its impact, and proprietary wireless systems designed specifically for Smart Factory solutions come into focus. Here there are some very specific requirements. For example, there must be a



► Flexible and seamless material requisition: the wireless network can integrate e.g. mobile eKanban racks in its stock management system.

very good coexistence with other wireless networks, as well as reliable signal transmission from many sensors all communicating within a crowded space – for example a production hall.

These requirements can be met using the sWave.NET wireless protocol developed by steute. Its features include very high availability in conjunction with very low power consumption. Different strategies of collision avoidance facilitate operation of these wireless systems with high reliability, as well as zero interference when combined with other wireless solutions.

Complete ecosystem

On this basis, steute has designed a complete nexy system solution which can be adapted flexibly to the requirements of the application in question. This is true at the software level, but also for the entire hardware infrastructure: from wireless terminal devices in the field to Access Points, Sensor Bridge and Gateway, to integration in the customer IT systems. The wireless switching devices from the steute Wireless range (and sensors from other manufacturers with an integrated sWave.NET wireless module) communicate with Access Points distributed throughout the transmission range. Each Access Point can manage a



▶ Access Points pass on wireless signals transmitted within the assembly or production hall to a Sensor Bridge, the interface to the ERP system.

maximum of 5,000 switches and sensors, whereby the number which is actually practicable drops in accordance with the level of traffic.

Interface to customer IT

The Access Points in turn pass on the signals to a Sensor Bridge. It links the customer-specific applications with the wireless network and data from the wireless sensors (via multiple standard protocols) and also facilitates management of the complete wireless sensor network. In addition, it is the dashboard for operating the software and provides a graphic user interface for the configuration and monitoring of the entire sWave.NET infrastructure.

The nexy system features preconfigured options for specific applications, e.g. AGV

fleets, eKanban systems and mobile Andon terminals. They simplify the initial operation for customers, as well as operation of the wireless system, because basic functions are already programmed and only have to be adapted to individual requirements. The users of a nexy network can operate multiple applications within a single network infrastructure. They can, for example, wake up individual vehicles in their AGV fleet and, at the same time, control the material management of their eKanban system, or request the placing of items in or out of stock via mobile Andon command devices. Especially for eKanban systems, steute has developed a wireless sensor which detects the presence of boxes in mobile racks.

Simple campus-style structure

Despite the extensive functionality and large potential number of wireless switching devices, this wireless system is so simple in its structure that users can create and operate their own network campus-style. This makes nexy, as a complete solution for industrial wireless networks, an alternative to LPWAN-based standard wireless networks and also well suited to use in small and medium-sized companies. And because industrial production and material flow are certain to become even more mobile in the future, a flexible wireless network open for new applications is a sensible Smart Factory investment.

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