

Technical article, published in: materialfluss (6/2019)

When material flow management goes mobile

Automated guided vehicles (AGV) which are resting can be woken up by remote control and then sent back to sleep when they are no longer needed. This is made possible by a low-energy wireless system including a "deep sleep" mode which is already used by several renowned AGV manufacturers and which is also responsible for communication between the vehicles and their control centre.

Several automotive manufacturers are currently testing a new production system in their "smart factories". They have eliminated stationary conveyor technology, such as assembly lines and overhead monorails, and instead

every vehicle – starting with the body shell – is assembled on an AGV. The many different components required for this process are brought to the mobile assembly point by additional, smaller AGV.



Vision E AGV have been developed for the flexible production of electric vehicles. Via the sWave.NET® wireless technology, they can be "woken up" from their low-energy "deep sleep" mode in no time at all.



When material flow management becomes mobile, signal transmission via wireless systems is a good idea. The steute wireless network sWave.NET® was developed for precisely this situation.

Everything is mobile – even the assembly itself

Production like this permits greater flexibility because the AGV can drive to different stations, making the concept suitable not only for mass production, but also for niche and luxury vehicles, as well as electric cars. The company dpm Daum & Partner Maschinenbau GmbH is an AGV specialist for the automotive industry and has developed an AGV concept especially for the assembly of electric cars: called Vision E. One of the special features of Vision E is its "on board" safety engineering which, according to the manufacturer, facilitates assembly in continual flow from all sides of the vehicle for the first time ever. Transport flow is thus uninterrupted.

Innovative wireless battery management

A further feature of Vision E is its energy-efficient battery management system. For downtimes of up to 3 weeks, the entire AGV system (or single vehicles) can be put into a "deep sleep" mode, in which the power supply is completely switched off. One of the many benefits of this feature is that the

AGV do not have to drive to a central charging station, but can simply remain wherever they happen to be. During the downtime only a buffer battery is in operation, supplying a wireless receiver with electricity. This receiver can restart the whole system and all its vehicles at the push of a button in next to no time. In previous systems, batteries supplied the power and a restart was required for each individual vehicle. The batteries also sometimes required recharging.

The AGV are restarted using the steute sWave.NET® wireless technology. Access Points are installed in the production or assembly halls, each of which connect up to around one hundred network-compatible terminal devices. Numerous Access Points can be integrated within each network.

Low-energy wireless technology with short "wake-up" time

The sWave.NET® wireless technology belongs to the class of Low Power Wide Area Networks (LPWAN). The low-power functionality guarantees long battery lifetimes of up to 10 years. At the same

time, transmission reliability is high, even in unfavourable conditions. This is partly due to the possibility of multiple transmission: if transmission to the first Access Point should fail, the next Access Point is addressed, and so on.

The Access Points send the signals to a "Sensor Bridge", a middleware which guarantees uninterrupted communication between the sensors and the customer IT infrastructure – in this case the dpm fleet manager software. Configuration of the Sensor Bridge is web-based via a central dashboard and, amongst other things, enables dpm to adapt the various functions of the wireless network to individual requirements. This in turn has the benefit that wireless-based battery management with sWave.NET® can be used as a standard for all AGV within the company in the future.

Several applications – one wireless technology

In a further step, a wireless network of this kind can assume additional functions – for example replenishing supplies to automotive factory workstations. In this case, stationary or mobile eKanban racks, or even ones installed on AGV, detect the presence or removal of boxes and send this information to the material flow management system. Or wireless sensors can be installed at the transfer points between

stationary and mobile conveyors, for example signalling to an AGV that a box is ready for transporting and generating a corresponding command that it should set off and collect it.

For such uses, preconfigured applications are available which can be installed without any programming. They include several different applications for AGV fleets and eKanban systems (eKanban for fast- and slow-moving items, with rack occupancy detection or with manual call function). This enables material flow from the point of view of the user to be even more flexible. And that is also true for other areas, such as the management of consignment systems or the flow of materials and batches to packing stations.

nexy: platform for wireless sensors in intralogistics

This wireless system becomes even more flexible when opened up for other wireless technologies and providers of hardware components. For precisely this task steute has now created its nexy platform. If, for example, an application demands integration of sensors which are not part of the steute "Wireless" range, these sensors can be fitted with an sWave.NET® module to make them fully network-compatible. This considerably widens the options for use and expansion of the wireless network.

Author:



Andreas Schenk
Product Manager Wireless
steute Technologies

Images: dpm Daum & Partner Maschinenbau / steute Technologies GmbH & Co. KG