



WLAN communication with smartwatches for targeted machine information available 24/7

Highlights

- The Asys Group is a leading supplier of machines and systems for electronics production in the electronics, solar, and life sciences industries.
- The Asys Group recognized a need for machine operators and users to be better integrated into the flow of communication in production processes.
- The Asys Group developed the Pulse smart assistance system that makes it possible to monitor an entire production line via smartwatch or tablet, for the direct exchange of information between the production line and the operator.

“Using Pulse reduces response times to problems that occur during production by 48 percent. Users can access additional data, such as service and status information, measured values, or live camera images from anywhere as needed.”

– Jürgen Weczerek, Wireless Network
Technology Product Manager, Phoenix Contact
Electronics GmbH, Bad Pyrmont, Germany

Customer profile

The Asys Group, founded in 1992, is a leading supplier of machines and systems for electronics production in the electronics, solar, and life sciences industries (Figure 1).

The Asys Group's overarching goal is to create the smart factory of the future. The company's 1,250+ employees work every day to achieve this in more than 40 countries across all continents. Processes outside of the production line are always considered as well. Because of this, the Asys Group can

offer a fully integrated logistics solution for the transportation and storage of PCBs, components, and stacks that allows autonomous supply of the lines from centralized warehousing solutions.

Challenge

When it comes to smart manufacturing, it is not only important for machines and systems to communicate with one another. Machine operators and users also need to be optimally integrated into the flow of communication.

Solution

The Asys Group developed the Pulse smart assistance system that makes it possible to monitor an entire production line via smartwatch or tablet, for the direct exchange of information between the production line and the operator. This makes it possible to forward important information to the responsible



Figure 1: The Asys Group, headquartered in Dornstadt, is a leading supplier of machines and systems for electronics production.



Figure 2: The Pulse assistance system is used to monitor individual line configurations.

employee in a targeted manner. If, for example, the fill level of magazines and containers starts to decline or problems occur on one of the machines, the responsible employee's smartwatch communicates this information in a prioritized manner in real time, allowing the user to take action immediately.

The lightweight smartwatch is comfortable and can be worn by the operator during his or her entire shift, allowing for greater mobility. The data collected by Pulse from all the equipment and systems is reduced to the essential in advance and made available to the user through practical apps. Since missing information is often the reason for inefficient working methods in production facilities, "Alerts&Info" is one of the most popular Pulse apps.

Reliable operation

For an assistance system to be accepted by the user, it must be both useful and reliable. In addition to a sufficient operating time for the mobile end device of at least one full shift, a permanent, reliable communication connection must be guaranteed throughout the entire area surrounding the equipment. Wireless LAN (IEEE 802.11) has proven itself as a reliable transmission solution because smartwatches work independently with this wireless standard, which means it allows them to be used without smartphones or tablets. All that is required is a wireless network with good signal coverage in the production line area. This requirement sounds obvious, but in practice, it is frequently a problem that quickly results in a great deal of frustration on the part of the user because the transmitting and receiving capability of mobile end devices is often rather limited. For this reason, operators must ensure excellent wireless performance of the WLAN connection when planning and designing the solution. Furthermore, the optimal installation position for the wireless devices on the production line is extremely important. This is the only way to guarantee comprehensive, fail-safe, and energy-efficient

WLAN communication. If these conditions are taken into consideration, a smartwatch battery life of much longer than a single shift is not a problem in practice.

Seamless interoperability

Industrial Wireless LAN technology from Phoenix Contact is used for data transfer (lead). The Pulse community has come to include all equipment manufacturers whose products have been determined to be compatible with Pulse thanks to connection via the open interface. As a result, individual line configurations can be seamlessly monitored with Pulse (Figure 2).

Secure protection against unauthorized access

Protecting networks and data against unauthorized use and manipulation is becoming increasingly important. That is why the Access Point from the WLAN 2100 series complies with the latest WLAN security standards and offers hardware-based AES encryption. Furthermore, different WLAN Access Points can be set up for two different user groups, such as service technicians and operators, each with their own password and access filters. For example, service technicians might have unlimited access to all devices in the network, while operators might only be able to access the visualization server.

Results

Real-world measurements show that using Pulse reduces response times to problems that occur during production by 48 percent. Users can access additional data, such as service and status information, measured values, or live camera images from anywhere as needed using the corresponding tablet (Figure 3).



Figure 3: The data collected by Pulse is shown to the user through practical apps on his or her smartwatch or tablet.



Figure 4: Before the Access Point WLAN 2100, the WLAN 5100 with external antennas was used in the first years after market launch.

The Asys Group uses industrial wireless LAN technology from Phoenix Contact for reliable data transfer with mobile devices. While an Access Point from the WLAN 5100 product family with external antennas (Figure 4) was used for the market launch of Pulse in 2015, today the technology company uses a Machine Access Point from the WLAN 2100 series (Figure 5) that was specifically developed for this kind of application. What sets this wireless device apart is its unique design: as a

complete solution, the Access Point combines the WLAN module and the antenna technology in a compact, impact-resistant housing that is installed on the exterior of the machine with a simple one-hole assembly in place of separate antenna installation. This results in a number of advantages. On the one hand, it means that expensive accessories, such as antennas and cables, are no longer

required, installation is fast and easy, and no space is required inside of the machine or in the control cabinet. On the other hand, the WLAN 2100 can be easily attached to the machine in a position that is ideal for sending wireless signals. Furthermore, the Access Point has proven to be less expensive than a conventional WLAN module with external antennas.

The use of the right kind of high-quality antenna technology is what guarantees large-scale coverage and stable wireless transmission in an industrial environment with a lot of reflective surfaces. After all, even a high-performance WLAN module will have little impact when the signal power fizzles out due to the use of poor-quality, unsuitable antennas. That is why so much attention was paid to the antenna technology used when developing the WLAN 2100. Two specially designed antennas that are integrated into the Access Point, in combination with MIMO (multiple input, multiple output) antenna technology, allow for interference-free wireless communication, even in challenging industrial ambient conditions. In addition to a classic 360-degree omnidirectional antenna, a circularly polarized special antenna is installed in the housing that allows for particularly good results in a highly reflective environment. Both antennas support the 2.4 GHz and the 5 GHz bands, which provides the system operator with flexible WLAN channel support.

The Pulse assistance system from The Asys Group demonstrates that smart production is not a long way off but, rather, is already possible today. Since its launch in 2015, more than 100 production lines have been equipped with the solution, including smartwatches. Thanks to its reliable, easy-to-use technology and significant advantages, the solution has proven itself time and again in real-world applications.

More information: www.phoenixcontact.com/wireless

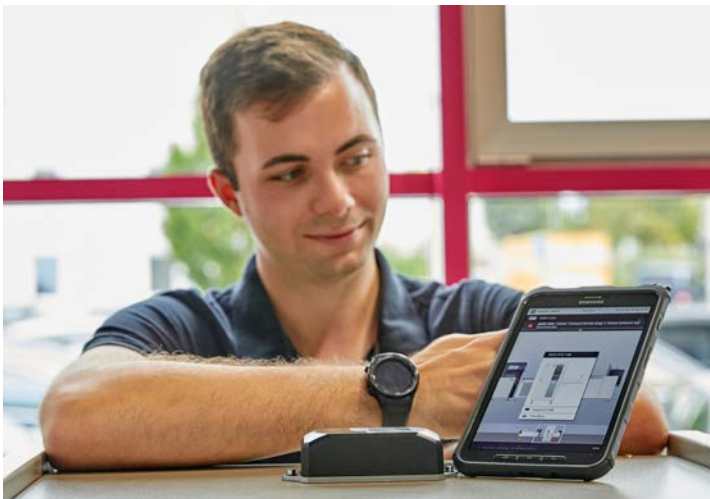


Figure 5: Today, the compact Machine Access Point WLAN 2100 with integrated antenna technology is mounted directly on the machine in an optimal position for wireless transmission.