

Pepperl+Fuchs GmbH – Lilienthalstrasse 200 – 68307 Mannheim – Germany

Please indicate the following contact information for publication:

Tel.: +49 621 776-2222, Fax: +49 621 776-27-2222, www.pepperl-fuchs.com, pa-info@de.pepperl-fuchs.com

Editorial contact: Christa Blas (extension: -1420, fax: -1108), cblas@de.pepperl-fuchs.com

***WirelessHART™* Is Ready for the Real World**

Pepperl+Fuchs introduces first products for new wireless standard

In the late fall of 2009, NAMUR and the HART Communication Foundation (HCF) started a field test at BASF in Ludwigshafen/Germany, which was actively supported by Pepperl+Fuchs. This test clearly demonstrated that *WirelessHART* technology has great potential, and is ready for mobile and flexible applications. At the 2010 Hanover Fair, Pepperl+Fuchs will introduce the first products featuring this new wireless technology.

For some time, wireless communication for process automation has been the subject of countless press reports. A number of proprietary systems, which were installed at an early stage of development, quickly raised the demand for the development of a standard. NAMUR also showed interest in this subject at an early stage. Recommendation NE124 was published at the beginning of 2009, describing their requirements for wireless communication for the worldwide process industry.

Three years ago, *WirelessHART* was introduced as the first wireless standard for process automation. However, until now, no products were available on the market — for good reason.

Compatibility as a primary demand

One major reason for this delay was the need to guarantee the interoperability between different *WirelessHART* devices. The goal was to ensure the seamless combination of devices from multiple manufacturers in order to avoid any dependencies on one single manufacturer. For this reason, *WirelessHART* devices needed to be designed with compatibility in mind.

The importance of compatibility became evident during the introduction of fieldbus systems. At that time, fieldbus components not fully conforming to the standard resulted in instable systems or even prevented the operation of such systems.

With wire-bound communication systems, each individual protocol package can be traced with diagnostic tools. In this way, errors can be detected and diagnosed by simply monitoring the activity on the bus. With wireless systems, such diagnosis is more difficult, since it is not possible to trace the communications path with conventional diagnostic tools. For this reason, such systems must work flawlessly before reaching the market in order to ensure reliable operation in the field.

Field test clears the way

In order to operate the network seamlessly, all *WirelessHART* devices must be compatible and interoperable with each other. To ensure this, the HART Communication Foundation (HCF), NAMUR, and BASF teamed up with the leading manufacturers of *WirelessHART* products, including Pepperl+Fuchs, for a field test. With the help of BASF, NAMUR examined *WirelessHART* in terms of NE124. Pepperl+Fuchs took advantage of the test to determine how well our products conformed to the specification.

Pepperl+Fuchs took part in the field test with the *WirelessHART* Gateway and the *WirelessHART* Temperature Converter. The *WirelessHART* Adapter, which also will be offered by Pepperl+Fuchs, was provided by the cooperation of our partner, Endress+Hauser.

Strengths and weaknesses

The field test revealed positive results, but also pointed out to aspects requiring additional attention.

A positive result was the reliability of the wireless communication. Even under adverse operating conditions, communication worked fine. The temperature transmitters provided by Pepperl+Fuchs also worked without problems, even though it was assumed that their integrated antenna might lead to disadvantages, as far as radio communication is concerned. *WirelessHART* is based upon the self-healing mesh network, which is defined by the worldwide IEEE802.15.4 standard. One interesting aspect for the future application of this technology was to find out how reliably messages are routed.

The safety mechanisms of *WirelessHART* also demonstrated positive results. The 128 bit AES encryption in CCM* mode cannot be switched off. This means, it is practically impossible to hack the key in order to monitor communication. In addition, the key is renewed at regular intervals, which further improves the resistance against hacking attempts. Hacking attacks, as they are known from WLAN networks, are excluded a priori, since the MAC layer does not correspond to that of WLAN and does not accept respective messages right from the start. This means, there is no need for a firewall.

But where there is light, there are also shadows. Unfortunately, the integration of *WirelessHART* into the process control systems is still at the same level as the field buses. Currently, tools such as DTM (Device Type Manager) and DD (Device Description) are not standardized. There are also different DD versions that do not run on all host systems. As a result, a number of different software versions for DD, as well as host systems, need to be managed. An additional problem is that not all combinations will work. This subject is presently addressed by the HCF with full force in order to arrive at a standardization of the host systems. The goal is that any DD must run flawlessly on any certified host system. In order to guarantee the seamless integration of *WirelessHART* devices into the process control systems, Pepperl+Fuchs will support all required DD and DTM versions, until all hosts are made compatible.

Another aspect that resulted in criticism was the variety of batteries used. Each manufacturer developed his own battery pack optimized for a specific field device. Although there are technical reasons, such a development is anything but user-friendly. For plant operators, a wide variety of batteries leads to increased handling, storage, and maintenance. For this reason, NAMUR started an initiative intended to lead to the development of uniform battery formats. Pepperl+Fuchs as realized this problem right from the start of product development. For this reason, the *WirelessHART* temperature converter uses a standardized, D-cell sized battery that can be exchanged even in Zone 1 environments.

In order to improve network diagnostics, BASF suggested unified key performance indicators (KPIs) to determine whether a *WirelessHART* network performs well and indicate the possible source of problems. The user only needs a few indicators that allow him to diagnose or at least determine the malfunction of the network without the need of detailed knowledge or comprehensive statistics. Pepperl+Fuchs will integrate such KIPs into its products as soon as possible.

Conclusion

According to Pepperl+Fuchs, the overall result of the field test is positive; the technology can be viewed as mature. Wireless communication between devices from different manufacturers works well. In other words: basically nothing speaks against the market introduction of *WirelessHART*. Host integration and integration into production control systems certainly still call for some improvements. However, the support of all DD and DTM versions by Pepperl+Fuchs is a way to overcome this problem.

Being an expert in the field of communication infrastructures, Pepperl+Fuchs continues to drive the development of the new technology. At the Hanover fair, Pepperl+Fuchs will present the *WirelessHART* Gateway, the *WirelessHART* Adapter and the *WirelessHART* Temperature Converter as the first products available.

About Pepperl+Fuchs

Pepperl+Fuchs is a leading developer and manufacturer of electronic sensors and components for the global automation market. For more than 60 years, our continuous innovation, high quality products, and steady growth has guaranteed us continued success.

One Company – Two Divisions

Pepperl+Fuchs – PROTECTING YOUR PROCESS

The **Process Automation Division** is a market leader in intrinsically safe explosion protection. We offer comprehensive, application-oriented system solutions, including customer-specific control cabinet solutions for the process industry. A large portfolio of components is available from our various product lines: isolated barriers, fieldbus infrastructure solutions, remote I/O systems, HART interface solutions, level measurement devices, purge and pressurization systems, industrial monitors and HMI solutions, power supplies, separator alarm systems for oil and petrol separators, signaling equipment, lighting as well as emergency shutdown equipment and accessories.

Pepperl+Fuchs – SENSING YOUR NEEDS

With the invention of the inductive proximity sensor in 1958, the company set an important milestone in the development of automation technology. Under the motto “Sensing your needs”, customers benefit from tailor-made sensor solutions for **factory automation**. The main target markets of the factory automation are machine and plant construction, the automotive industry, storage and material handling, printing and paper industry, packaging technology, process equipment, door, gate and elevator construction, mobile equipment, renewable energies.

The division offers a wide product range of industrial sensors whether it's inductive, photoelectric or ultrasonic sensors, rotary encoders, identification systems, barcodes, code readers for data-matrix-codes and vision sensors.

Key words: *WirelessHART*, field test, standard, standardization, wireless communication, *WirelessHART Gateway*, *WirelessHART Adapter*, *WirelessHART Temperature Converter*

Authors: Dipl.-Ing. Gerrit Lohmann, Product Manager
Division Process Automation

Dipl.-Techn.-Red. Xenia Döbling,
Technical Editor Global Marketing
Division Process Automation

Characters: 6,181, without space characters

Characters short text: 455, without space characters

Pictures: No. MC7522_090216_02, MC7522_090213_01,
MC7522_091109_01

March 2010



Bild 1: Key image



Bild 2: Pepperl+Fuchs will present first *WirelessHART* products at the Hanover Fair 2010.

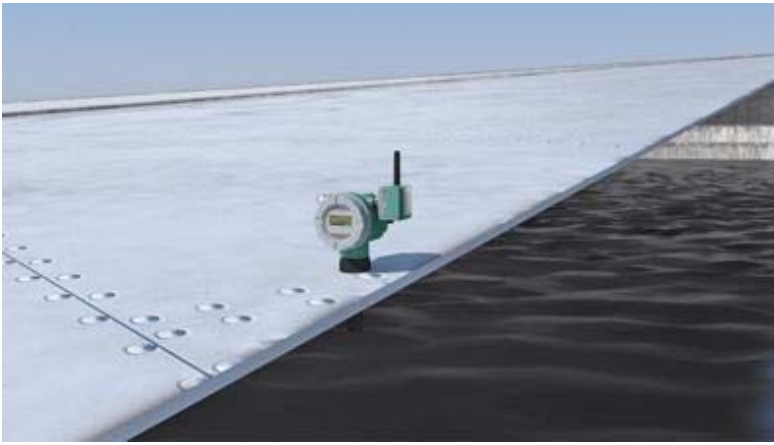


Bild 3: Possible application of *WirelessHART*: Level measurement