HMS@work

2023

Current topics around industrial information and communication technology

All the latest information for stakeholders, customers and business partners

Contents

Publication details

Your reliable technology partner for industrial information and communication technology

Editorial by Thilo Döring, Managing Director

If there's one thing we learned during the coronavirus pandemic, it's that a lot of things can be done quicker than we thought. Instead of working in the office, mobile working from home was suddenly the order of the day. Instead of meeting clients and business partners in person, video conferencing became the norm. And guess what? It worked remarkably well! It showed us that digitalisation is more than just a buzzword. It is now part of the daily work routine for many of us. But we want the best of both worlds. That's why we are very excited about returning to the industry trade fairs in 2023 as exhibitors after a three-year absence. After all, we have greatly missed the personal exchange and direct contact with you – our customers, business partners and interested parties.

We are also pleased that we have managed to maintain our growth trajectory despite the challenging conditions caused by Covid-19, part supply shortages and the energy crisis. Due to the positive business development, our number of employees has grown enormously, especially at our location in Karlsruhe. Therefore, we will move to our new European distribution centre, the HMS Campus, in spring 2023.

Sustainability is a very important topic for HMS. Therefore, we use renewable energy at our own locations wherever possible in order to emit as little CO_2 as possible. A good example of this commitment is the new distribution centre: The energy-efficient building meets the KfW-55 standard. It uses green electricity and is equipped with a photovoltaic system on the partially greened roof. There are also charging stations for e-cars and e-bikes. The building will be fully networked and equipped with HMS solutions to ensure that we use and save energy intelligently.

Even though mobile working has gained in significance, face-to-face collaboration continues to be an important part of our corporate culture. Teamwork has always been a priority at HMS. With space for more than 100 workstations, the HMS Campus provides the appropriate work environment for personal exchange and communication. Our employees from sales, order processing, marketing as well as technical service and support look after customers and partners in more than 25 European countries from there. In order to be able to support you in your projects even better than before, a modern test laboratory will be available for our technical services.

We want to continue to be a reliable and valued technology partner for you in all aspects of industrial information and communication technology. That's why we observe current trends very closely and expand our product and solution portfolio accordingly. Security by design, for example, is an important topic for us. In the context of digitalisation and the Industrial Internet of Things (IIoT), new communication channels are increasingly appearing. Unfortunately, they are targets of unauthorised access, data manipulation and malware, even in the field of industrial communication. That's why we attach great importance to ensuring that our products and solutions meet current and future security requirements.

This much can already be revealed: in 2023, we will expand our product portfolio to include analytical and diagnostic solutions for industrial networks. In addition to our hardware products designed for security, we will also be able to offer you hardware and software solutions that enable continuous monitoring of industrial networks. The goal is to detect errors and anomalies as early as possible to prevent system failures and ensure high system productivity.

Enjoy reading!

Yours truly, Thilo Döring

Everyone wants 5G.
Why is that?
Are there alternatives?

No question about it: The trend in industrial communication is moving towards wireless. 5G is the hot topic. But does it really always have to be 5G? The answer is clear and simple: No! Check your requirements carefully before you decide on a particular wireless technology. Because the best wireless solution is the one that is most suitable for your use case.

Whitepaper Wireless

Wireless technology is a key driver in the future of industrial applications.
The whitepaper provides a brief review of the development of cellular and WLAN standards. It also looks at the similarities and differences between 5G and WiFi 6 and highlights the benefits of wireless technology for industrial applications.

www.anybus.com/wireless-technology-is-a-key-driver

The trend towards wireless networking is evident in the industrial environment in all sectors. Thanks to the added flexibility, new applications can be integrated into automation systems. As with all mobile applications, data communication (e.g. between autonomously operating robots or driverless transport systems and the higher-level industrial network) can only take place wirelessly. 5G is a key technology in this regard. But there is still a long way to go before 5G is introduced across the board, and most industrial 5G applications are currently in the proof-of-concept phase. It is worth looking at other wireless technologies. Which standard is suitable for which application? That is the question

that needs to be addressed. Bluetooth is a good choice if the robustness of the data transmission is paramount, the amount of data is small and no internet connection is required. For example, communication within machine tools can be handled well with Bluetooth. Among other things, it is used in the measuring system of the tool changer. If you need an internet connection over long distances with low bandwidth, low costs and low power consumption, then a mobile wireless connection with LPWAN standards is a good solution. LPWAN stands for Low Power Wide Area Network. LoRaWAN, LTE-M and NB-IoT are examples that fall into this category. So far, these technologies have mainly been

used in the infrastructure sector to collect data on water and energy consumption, but they are gaining attraction for smart city projects.

WLAN (Wi-Fi 6/Wi-Fi 6E) and 5G are currently the hot topic in factory automation. If your application requires substantial bandwidth, real-time behaviour, very fast transmission rates and high reliability, then the best choice is 5G. The catch: installing 5G networks is expensive and components for industrial use are still rare. However, many applications can still be set up very well with 4G. Configuration, diagnostics and predictive maintenance are typical 4G applications.

4G is also absolutely sufficient for AR glasses or security cameras. WLAN technology also improves with each generation in terms of speed, range, power consumption, subscriber management, etc. A lot has changed with the latest generation Wi-Fi 6.

If you want to make the most of the potential of the new technologies, you should consider Wi-Fi 6E. Wi-Fi 6E has access to the previously unused 6 GHz frequency band in addition to the 2.4 and 5 GHz frequency bands. This means Wi-Fi 6E devices are less susceptible to interference and offer a more stable connection at higher speeds.

Moreover, there is always the question of whether wireless communication makes sense. Not using wired real-time Ethernet for machines that communicate with their servo drives in real time is highly unlikely. The crucial factor is the application itself. Ultimately, you have to decide which technology – wired or wireless – is the best solution for your particular application.

The bottom line is that the chosen technology must meet the specific requirements of the planned application. Anything else is not expedient. 5G or not.

Highlights

Anybus®
BY HMS NETWORKS

Communication module **Anybus CompactCom** for CC-Link IE with TSN support

Ewon®
BY HMS NETWORKS

Ewon Cosy+ industrial remote access gateway now also available as a wireless version

Intesis®
BY HMS NETWORKS

Intesis AC Interface for integration of Samsung NASA air conditioners in BACnet

Ixxat®
BY HMS NETWORKS

Driver software and sample programs for **Ixxat CAN PC Interfaces** available on GitHub

○ GitHub

Anybus Gateways
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Intesis 700 Series
Pages 12-13

HMS
Academy

eLearning
Pages 16-17

Facts and figures

HMS

Field of activity
Industrial ICT
Information and Communication Technology

1988
the company was **founded**. Headquarters in Halmstad, Sweden

400.000+
Machines connected with Ewon Talk2M industrial cloud

7+ Millions
networked devices in factory automation

750
Employees worldwide

Distributors and partners in

+50
Countries worldwide

Brands

Anybus®
BY HMS NETWORKS

Ewon®
BY HMS NETWORKS

Intesis®
BY HMS NETWORKS

Ixxat®
BY HMS NETWORKS

Finger on the pulse

5G

Digitalisation

Wireless

IIoT

Main business sectors

INDUSTRIAL AUTOMATION		BUILDING AUTOMATION
Factory automation and industrial processes	**Digitalisation and IIoT**	**Smart buildings**
Real-time control, smart manufacturing, network analysis and diagnostics, sustainability, cybersecurity	Remote maintenance, data aggregation and visualisation, cloud connectivity, IT/OT integration, cybersecurity	Energy efficiency, networking, sustainable buildings, user convenience

Network uptime and security

Stable production processes need stable network infrastructures. It is not an easy task to minimise disruptions in the production process. There are simply too many causes: they can be triggered by a mundane cable rupture, configuration errors, but also attacks from outside.

Without reliable, robust industrial communication, nothing works in today's highly automated production plants. Continuous monitoring as well as efficient troubleshooting and network diagnostics are becoming increasingly important to ensure the availability of network communication. Requirements resulting from digitalisation also demand new technologies and communication channels. The topic of (cyber-) security is moving more and more into focus.

HMS sees itself as a technology partner that supports its customers in implementing the latest security standards with regard to industrial communication. Therefore, a lot of emphasis was also placed on cybersecurity with the new Anybus gateways. Anybus CompactCom IIoT Secure modules are ready-to-install industrial communication interfaces for automation equipment manufacturers who prefer an embedded solution that addresses current security requirements while ensuring robust data communication.

Furthermore, network diagnostics and network monitoring solutions will soon be added to the Anybus portfolio.

PROFINET IO

20 YEARS

Gateways for sophisticated requirements

The second generation gateways combine 20 years of know-how.

Thirteen new versions have been added to the Anybus gateway product family. These second generation gateways are based on the proven Anybus NP40 network processor and meet even the most demanding requirements in terms of performance, reliability and security.

The gateways enable transparent data exchange between two industrial networks. They support very fast data transmission of up to 1,500 bytes in both directions, which meets most requirements of current and future control applications.

With the new web-based configuration interface, commissioning is quick and easy. Neither additional software nor special configuration cables are required for configuration. The gateways also support secure booting. This ensures that the firmware cannot be manipulated. Configurations can additionally be locked directly on the gateway and protected against unauthorised access.

The operating temperature ranges from -25 °C to +70 °C, allowing the gateways to provide reliable service even under demanding industrial conditions.

Cybersecurity
Secure booting and security switch

High performance
Fast cycle times and up to 1,500 bytes of data in both directions

User-friendly
Fast installation and configuration

Durable
For harsh industrial environments

Step by step to digitalisation

Digitalisation has many advantages, but there is conflict between user acceptance and new service offerings. Concerns must be dispelled – for plant operators and machine builders alike. The Ewon solution helps everyone involved get through the learning curve of digitalisation projects more quickly.

■ Acceptance as a precursor to digitalisation

Many plant operators are sceptical when it comes to giving machine builders access to machines within their plant. This is because they want to retain control over access from outside. Security concerns play a major role. Moreover, remote machine access is often only offered as an option by machine builders, and cybersecurity is a relatively new topic for them. Machine builders could increase user acceptance by addressing the issue of remote access strategically, implementing reliable security procedures and focusing on the added value of remote access for the plant operator. Machine builders would benefit from remote access starting with the first service case, because they could respond directly without the need for time-consuming travel, thus creating higher customer satisfaction.

Connecting the system

The first step towards digitalisation is to establish connectivity in a system. However, most systems are not designed for remote access, even though the benefits are quickly apparent to system operators. They benefit from faster troubleshooting, which improves system availability, and basically have a direct line to the machine expert. At the same time, the machine builder benefits from lower costs for service calls, as service technicians have to travel less. To increase user acceptance, the solution must support high security standards, as is the case with the Ewon solution. The system operator always has the option of enabling the remote connection for remote access via a 'key switch' directly on the machine. The investment in the required remote access gateway pays for itself with the first remote service call.

Increased service performance

Once remote access to the system has been set up, the machine builder can offer added value to the system operator as part of an improved service offering. For example, the machine builder could grant access rights to the system operator, the production manager or maintenance employees so that they can monitor the machine status themselves. And this would be independent of whether they are currently on site or not. It would be sufficient to grant the system operator and his employees read-only access. Additional steps would be to only query relevant machine data for the system operator locally in order to monitor machine key performance indicators (KPIs) or to send alerts and notifications in case of setpoint deviations. Since the machine data remain in the system, no complex connection to a cloud platform is necessary. User acceptance is usually higher with these types of solutions, as the barrier of entry for the system operator is low. All of this can improve efficiency and customer satisfaction and increase the competitiveness of machine builders and system operators alike.

Paving the way for digitalisation

HMS offers a solution that enables machine builders to provide service offerings with significant added value compared to traditional trouble shooting. System operators retain control over remote access at all times and know what is happening in their system. Since both sides benefit, acceptance of remote access increases and drives standard machine networking forward. It is a prerequisite for other digitalisation topics such as asset optimisation and predictive maintenance.

3 Data integration and cloud connection

2 Proactive remote monitoring

1 Remote access and maintenance

Flexy 205
Industrial remote access and IIoT gateway

Cosy+
Industrial remote access gateway

Using energy wisely and reducing energy costs

The energy crisis has drastically shown us how dependent we all are on reliable and affordable energy supply. Saving energy is the highest priority. Buildings are by far the largest energy consumers in Europe. They are responsible for 40% of energy consumption in the EU. Intesis solutions as part of building automation help save energy and thereby reduce energy costs.

700series

Shorter delivery times through shared hardware

The protocol converters of the new 700 series have shared hardware for several building automation protocols (BACnet, KNX, Modbus and ASCII). The converters connect two different networks, for example to integrate electricity meters, water meters and other consumers with a Modbus output into the building control system. The desired network combination (e.g. KNX to Modbus) is only determined during configuration via software.

■ Relatively speaking, HVAC systems (**H**eating, **V**entilation, **A**ir **C**onditioning) in a building cause the highest operating costs, as they consume the most energy. Building automation plays a key role in reducing energy consumption, and even simple measures have a major impact. Examples include turning off the air conditioning when the window is open or when no one is currently in a room or office. Other examples include adding calendars to turn the system on or off according to office or shop opening hours; or setting a set point range so that the room temperature cannot be set too high or low. Due to the energy crisis, the focus has increasingly shifted towards automatic control and regulation of room temperature. It is no coincidence that the European Union has taken measures to deal with this crisis. In order to save energy, legislation was passed in European member states that sets upper and lower limits for room temperature in government offices and commercial buildings. In Germany, for example, the Energy Saving Regulation stipulates that a maximum air temperature limit of 19 °C must not be exceeded in public non-residential buildings during the heating season. In Spain, rooms may not be cooled below 27 °C in summer and heated above 19 °C in winter. Assuming that lowering the heating temperature by 1 °C can save about 7% energy, solutions that automatically control and regulate the room setpoint temperature make an important contribution to saving energy.

Energy reduction of up to 30%

By integrating HVAC systems into the building control system (BCS), the energy consumption of these systems can be optimised. The biggest challenge in integrating HVAC systems into BCS lies in the fact that the communication protocols used by HVAC systems are vendor-specific. Gateways connecting HVAC systems to BCS should be developed in close consultation with air conditioning manufacturers and approved by them to ensure proper functionality with the air conditioning system. Conversely, air conditioning manufacturers face the predicament that different control technologies such as BACnet, Modbus or KNX are widely used in building automation. This is where the Intesis AC interfaces can be of good use. These gateways enable integration of air conditioning systems from all well-known manufacturers into the building control system. The gateways were developed in collaboration with the manufacturers and support their proprietary communication protocols. At the same time, BACnet, Modbus, KNX, etc. are supported for connection to the BCS. According to customer estimates, energy reduction of up to 30% can be achieved with the AC interfaces. In combination with the Intesis solution 'AC Cloud Control', upper and lower limits for the room temperature can also be stored. This ensures that temperature adjustments by people in the building are only possible within the defined temperature range.

Flexible
One hardware
for several protocols

User-friendly
Simple configuration with
Intesis MAPS

Powerful
Supports up to
3,000 data points

Certified
For building automation
protocols

Versatile
Flexible protocol transmission

New EU regulation forces manufacturers of mobile machinery to act

■ The 'EU Machinery Directive' (Directive 2006/42/EC) is part of the national product safety laws in the various EU countries. Compliance with the directive is therefore legally required for all machines that are sold or placed on the market in the European Union.

The requirements set out therein are the basis for the CE marking and certify to the customer that the machine is mechanically and electrically safe at the time it is placed on the market. It is also based on the declaration of conformity to be drawn up by the manufacturer, which in turn is based on a comprehensive risk analysis and a few other things.

The machine manufacturer is supported by various harmonised standards (e.g. ISO12100 for safety of machines or ISO13849-1 for safety-related components of control systems), which help to comply with the requirements of the Machinery Directive.

Similar requirements exist for certain products in the Chinese market with CCC certification. In the North American market, there is currently no comparable legally defined minimum standard for machine safety. However, placing safe machinery on the market to prevent personal injury and financial loss is just as important there, which makes it also worthwhile for manufacturers there to take a look at the European regulations.

New version of the Machinery Regulation: What changed? What must be observed?

Since the state of the art is constantly changing, the EU Machinery Directive has also been reviewed to ensure it is based on the latest technology. As of November 2022, a new, revised version of the Machinery Directive is in the process of being adopted by the European Parliament. Publication of the final version is expected at the end of 2022 or beginning of 2023.

The revised version will then be an **EU regulation** (not a directive). This means that it will automatically become **part of the national legislation in all EU member states** with identical wording after a fixed transition period (probably 36 months).

A profound change in the new version will be the inclusion of additional safety requirements, IT and cybersecurity as well as artificial intelligence. Manufacturers will be **required** to protect their machines reasonably against attacks, manipulation or other malicious acts by third parties from outside.

Safety requirements using the example of mobile robots (AGV)*

In the new version of the Machinery Regulation, the safety requirements for mobile machines are explicitly specified for the first time. Among other things, it calls for the option of safely switching off and restarting mobile machines from the outside via a 'supervisor function' (Annex III – 3.2.4: Supervisory control function). One approach to realise this option is the integration of a wireless emergency stop system.
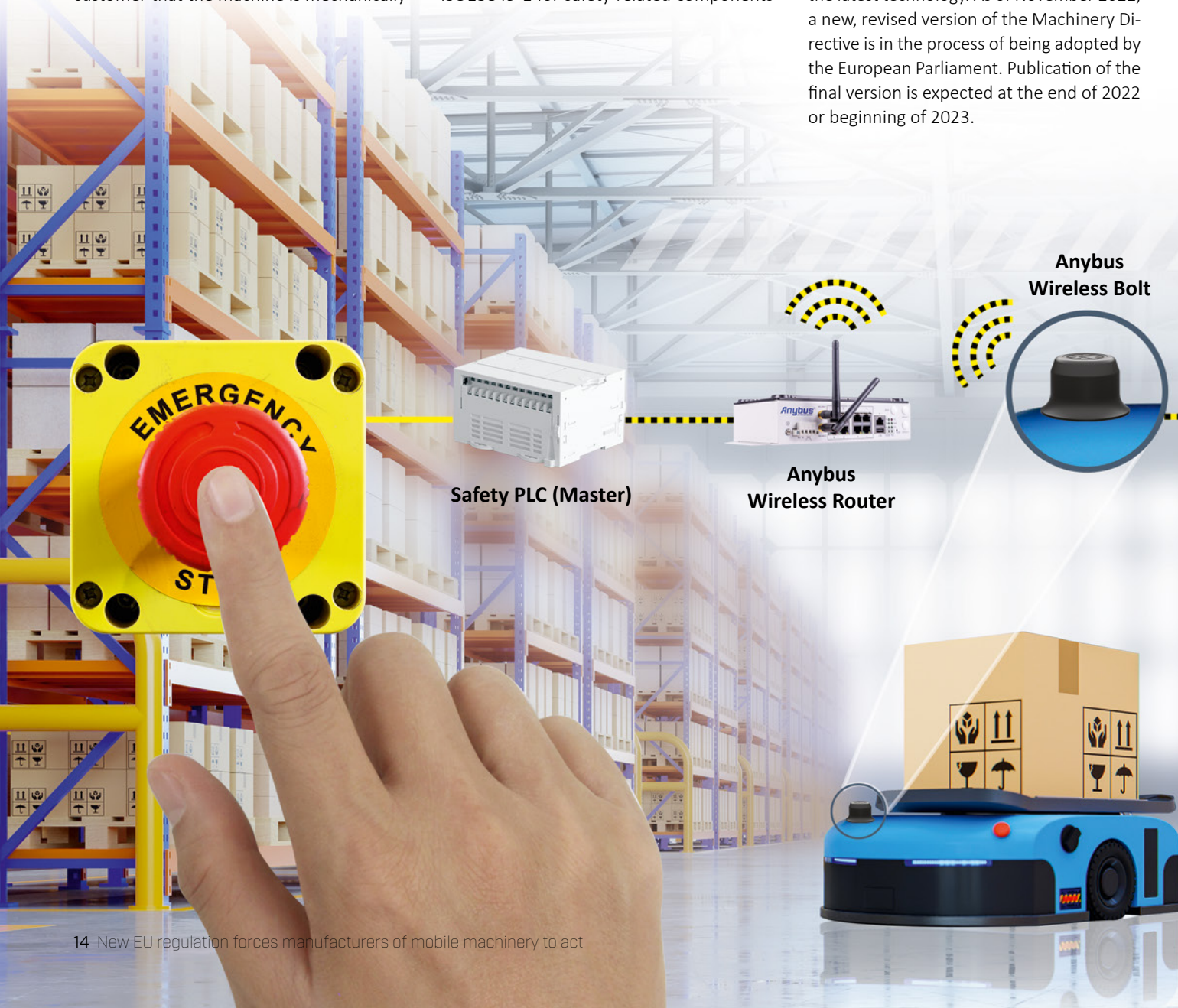
This presents manufacturers, integrators as well as end customers with new challenges that need to be tackled. Safe wireless transmission of the signals required for the emergency stop system is a key element that requires a lot of expertise in the safety field. It can either be elaborately structured in-house or outsourced to experienced service providers and manufacturers of safety solutions.

There are various protocols and hardware concepts on the market for implementing the safe wireless network structure. They must be carefully selected to meet the target market and technical requirements. Consequently, there are some stumbling blocks on the way to a safe mobile robot system, especially when it comes to implementing sophisticated safety solutions.

Focus on your core competence

Let HMS assist you as an experienced safety communication specialist. With over 15 years of experience in developing solutions in the field of functional safety, HMS is a reliable partner when it comes to implementing safe data communication. You can benefit from our expertise as well as our protocol stack and I/O module products to develop solutions that are perfectly adapted to your requirements, regardless of whether you are working with PROFIsafe, CIP Safety or FSoE.

We support you from the needs assessment and implementation phases to the final certification and delivery of your safety communication solution. This way, you can significantly reduce your development risk, budget your expenses more effectively and minimise the time-to-market of your products.

In addition to safety products under the Ixxat brand, HMS also offers a wide range of wireless products and bus couplers under the Anybus brand. The combination of these product areas enables us to offer you customised wireless safety solutions from a single source.
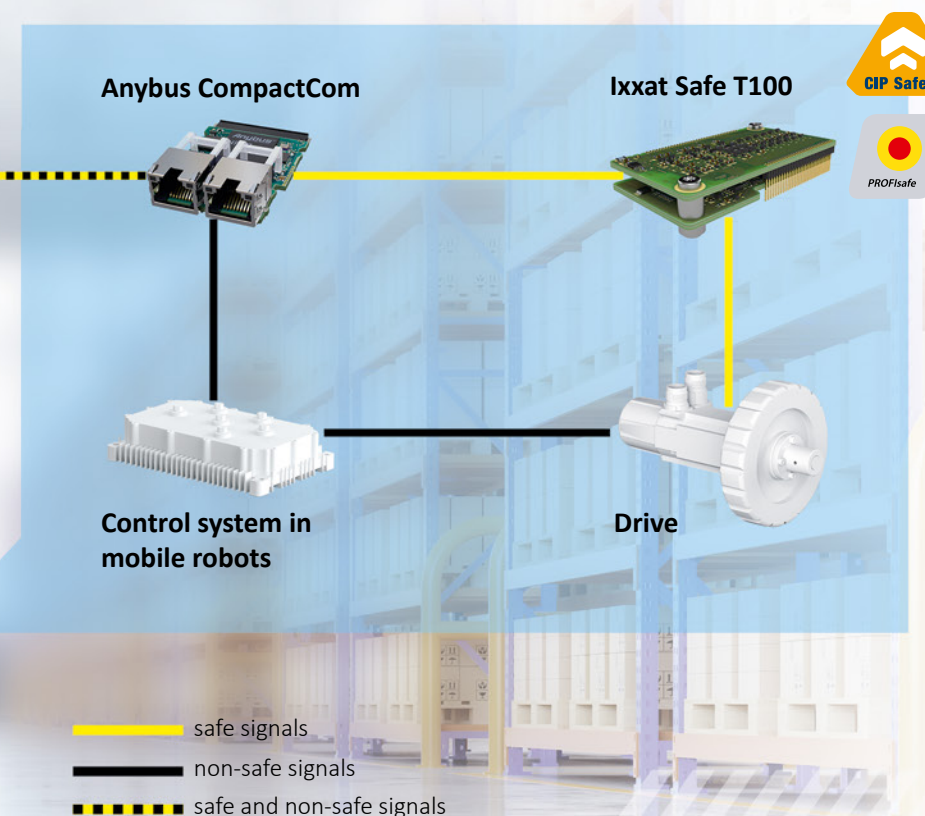
Whitepaper Wireless

Communication and safety for mobile robots (AGVs, AMRs).
What challenges do mobile robot manufacturers have to master?

www.hms-networks.com/en/solutions-for/mobile-robots-whitepaper

Example: External emergency stop switch for mobile robots

Anybus Wireless Bolt

Anybus CompactCom

Ixxat Safe T100

CIP Safety

PROFIsafe

Safety PLC (Master)

Anybus Wireless Router

Control system in mobile robots

Drive

— safe signals
— non-safe signals
┅ safe and non-safe signals

*AGV: automated guided vehicles

HMS Academy

HMS eLearning – compact, profound, entertaining

HMS eLearning is a new offering from the HMS Academy. It is aimed at product managers, commissioning engineers, decision-makers and anyone dealing with industrial communication.

In addition to product-related eLearning courses that make it easier for users to commission and configure HMS products, the academy will soon also offer courses focusing on new technologies such as 5G or current topics such as security. The academy is also planning solution-oriented courses that address the special aspects of industrial communication in various industries, such as the food industry, transport & logistics, etc.

It's worth taking a look!

New courses are being added all the time. The newest course, 'What is Anybus CompactCom', introduces you to the world of our embedded communication solutions.
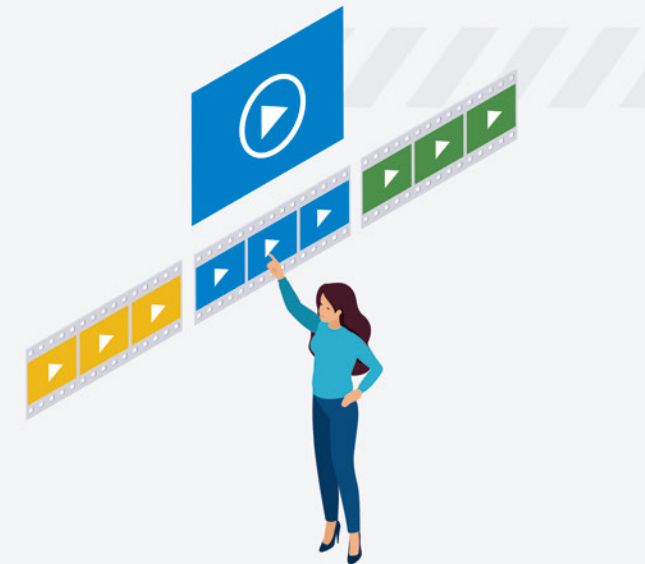
https://elearning.hms-networks.com

24/7: Flexible schedule

Learn when you want: Our eLearning courses are available on demand around the clock and run on all major internet browsers.

Short sequences

Not too much at once: Courses are split into several short units, so you can interrupt courses at any time and continue them later.

Didactic structure

Structured learning: Learning modules and courses compliment each other. Information is filtered sensibly so that you can learn all the desired information in the shortest time possible.

Individual learning style

Everyone learns at their own pace: You can work through one or more courses at a time. You can also tackle just one or a few course modules.

Entertaining & interactive

Learning with fun: Different materials make learning diversified. It includes videos, eBooks and even a quiz to check the learning progress.

CO$_2$ net positive in 2025!

Ongoing initiatives at HMS

- **Complete conversion of the company car fleet to electromobility**
- **Renewable electricity for our operations**
- **Optimisation of energy consumption at HMS**
- **Less air travel by HMS employees**
- **Environmentally sound disposal and recycling of HMS products**
- **Optimising transport and logistics for goods to/from HMS**

Sustainability and environmental protection are firmly enshrined in the HMS Strategy 2025. The primary goal is to be CO$_2$ net positive in 2025.

For HMS, sustainability means using resources responsibly and sparingly, minimising negative environmental impact and maximising positive effects in the value chain. Reliable, high-quality and environmentally friendly products and solutions play an important role in achieving this objective.

Our products also help our customers do something for the environment. For example, every service trip that is avoided through the use of Ewon's remote maintenance solutions saves CO$_2$ and thus protects the environment. The Anybus and Ixxat solutions are designed for long-term use in challenging industrial environments. The solutions optimise production processes and increase the efficiency of machinery and equipment. In building automation, Intesis gateways from HMS are used to control air conditioning systems centrally via the building control system. According to customers, this can reduce up to 30% energy.

Environmental guideline

HMS has devised an environmental policy that serves as a guideline for suppliers, selection of materials and use of resources. In this policy, HMS commits to developing, using and promoting environmentally friendly technologies, products and services. It also regulates recycling of electronic waste by specifying to reuse as much metal as possible from the available raw metals.

Building a sustainable future

HMS is also part of the United Nations (UN) Global Compact – a network of over 13,000 companies and 3,000 non-commercial participants committed to building a sustainable future. As a signatory, HMS has voluntarily committed to actively promote sustainability and report the progress annually to the UN. The commitment also includes the responsibility to promote the UN's global sustainability goals – the 2030 Agenda.
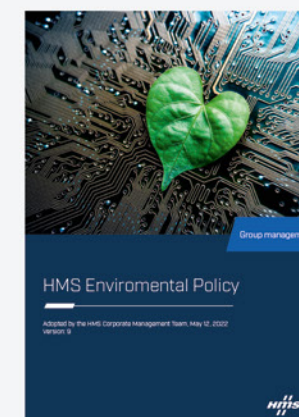
Environmental protection and sustainability

Our environmental policy and further information on sustainability can be found on our website.

HMS Enviromental Policy

www.hms-networks.com/about/quality-and-sustainability/sustainability-in-focus

www.hms-networks.com