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Rutronik: Moving towards Industry 4.0 with EnOcean

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EDITORIAL 03

Dear readers,

INVERSARE LE

In recent months and years, there have been so many things that most of us would never have thought possible: the never-ending COVID-19 pandemic, faltering supply chains, high inflation, and the war in Ukraine. Many previous political beliefs and economic concepts are being reconsidered in light of these events and are currently under scrutiny. More and more, our dependence on fossil fuels in particular is proving to be an Achilles' heel for our economy and society. Suddenly, high energy consumption is in the spotlight not just because of climate change. In addition, the short-term consequences of a disruption in gas and oil deliveries are deeply troubling.

However, all these events also unleash innovative power. Take a look at the manufacturing industry. There, digitization is continuing to gain momentum in order to become more competitive, sustainable, and flexible (and thus more resilient to crises). In Industry 4.0, sensors are the eyes and ears for a wide variety of applications. They detect vibrations in motors, monitor the room climate, and reduce the risk of production downtime thanks to predictive maintenance. Market experts thus predict annual growth rates of more than 20 percent for wireless sensor technology. In the latest issue of Perpetuum, companies such as Comepi, Pressac, Rutronik, and Siemens offer insights into how they are using self-powered sensors to implement their Industry 4.0 projects.

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In HR departments, at the managing director level, and in facility management companies, decision-makers are developing innovative workplace models in combination with flexible home office arrangements to bring employees safely back into the office. Sensor-based IoT solutions supply the data necessary for analyzing and optimizing the utilization of space. Based on this, companies can implement flexible desk sharing models to accommodate a future mix of days working at home and in the office. In the current issue, EnOcean partners, including Aruba, IAconnects, T-Systems, and Schweickert, describe their experiences and solutions for these smart spaces.

What we would all like to see is planning reliability for the months ahead and, above all, a peaceful coexistence in which conflicts are resolved without weapons. Surprises are bound to happen – perhaps one of them is



that we as a society are more innovative than we thought and are using good ideas to shape a sustainable future.

Raoul Wijgergangs CEO of EnOcean

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Siemens



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Smart spaces with Aruba and EnOcean



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Sensors are an essential part of industrial production. The recorded data is the first link in the chain, used to check quality criteria, for example, or to monitor and automate processes. Due to rapidly advancing digitalization, the application areas are getting more diverse. Sustainability is increasingly becoming a key driver for Industry 4.0 projects and Industrial Internet of Things (IIoT) applications. After all, industry is responsible for producing around 40 percent of global CO2 emissions.

By Armin Anders, Vice President Business Development, EnOcean

Self-powered wireless sensors for greater Sustainability in Industry 4.0

No batteries or wires required

EnOcean's wireless energy harvesting sensors are ideal for a wide range of industrial applications. They are maintenance-free, flexible, and inexpensive to install – ideal features for ensuring not only high quality standards but also greater sustainability in the Industry 4.0 environment.

The EnOcean sensors obtain their energy from movement, light, and temperature fluctuations based on the principle of energy harvesting and do not require any wires or batteries for operation. As a result, they can be flexibly installed directly onto moving machine parts or in hard-to-reach areas. The combination of wireless technology and energy harvesting opens the door to new applications with no maintenance requirements and no battery waste whatsoever.

Although battery replacement is in itself a relatively fast process, traveling to the site, locating the battery, testing the device, and documenting the process all dramatically increase the labor costs. In addition, conserving resources and protecting the environment are equally important factors when it comes to sustainability: The prices of raw materials such as copper are steadily rising, and the harmful components in batteries present a growing problem as well.

Industrial digitization is also reflected in the rapidly growing sensor market. Market experts at Mordor Intelligence, for example, forecast an average annual growth rate of 23.5 percent for wireless sensors by 2026. They go on to explain: "Autonomous wireless sensor nodes based on energy harvesting are a practical and cost-effective solution. The technology eliminates one of the critical factors limiting the proliferation of wireless nodes by providing enough energy to power the sensor node for years without battery replacement. There are significant economic advantages when using these self-powered sensors as compared to hardwired solutions."¹

Focus on quality

Quality monitoring and assurance play key roles in the production process. It is crucial to ensure that the end product complies with the previously defined parameters. Changing environmental factors such as temperature, humidity, and air quality can result in significant deviations in quality. That is why the so-called golden batch is relevant in manufacturing. This concept involves identifying the precise environmental conditions in which the best batch was produced. To accomplish this, process values must be recorded over time and the data analyzed in order to determine the critical variables and then reproduce them consistently.

EnOcean sensors can continuously monitor the relevant environmental factors and send the measured data to the cloud or to edge components. The self-powered wireless sensors are suitable for these types of industrial applications because they can be used on moving parts or in difficult-to-access

¹ https://www.mordorintelligence.com/industry-reports/wireless-sensors-market







environments, e.g. to measure the flow, pressure, and temperature of liquids or gases or to detect devices or measure motor currents. With the self-powered sensors, companies can avoid the time-consuming hassle of wiring – which is particularly cost-intensive in industrial environments – as well as the need to replace batteries at regular intervals.

Knowing today what might break tomorrow

Predictive maintenance is another application area. With predictive maintenance, sensor-based systems detect incipient damage to machines or to individual parts subject to wear, such as valves or brakes, before it occurs, for example by detecting abnormal temperature developments. To do this, an algorithm links historical machine and production data with the latest sensor data so that the characteristics of an imminent failure prompt the notification of technicians. This approach represents a departure from regularly scheduled maintenance intervals and thus a significant reduction in costs. On the one hand, continuous monitoring guarantees a smooth production process and prevents production downtimes, and on the other hand, maintenance costs are only incurred when they are actually required. The challenge here, too, is often that monitoring must take place on moving parts or parts that are difficult to wire.

Interoperable and secure data transmission

In Industry 4.0, all production steps are fully networked and usually mapped in a digital twin. This process requires data to be continuously sent, exchanged, and analyzed. For this to be successful, it is essential that the data does not remain in data silos within individual applications or plant groups; instead, data needs to be exchanged between the levels in a continuous and application-neutral manner. Standardized and certified protocols are therefore a must when it comes to ensuring interoperability. Security is an immensely important issue in industrial applications. Sensor data is therefore encrypted and does not permit access to the network.

Industry is currently experiencing a further push for digitalization due to COVID-19, and sensor technology is the basis for this. The Internet of Things and hence Industry 4.0 are based on sensor data, without which networked processes and evaluations would not be possible. Self-powered wireless sensors based on energy harvesting technology are suitable, especially when only low amounts of data need to be transmitted and wiring is costly.



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Stable climate in the plant thanks to innovative sensor technology

The Siemens electronics production facility in Karlsruhe, Germany, manufactures a wide variety of assemblies and components. Here, the room climate in production is of crucial importance. Critical production processes and ambient conditions are monitored and evaluated centrally and locally. If deviations from the target state of the ambient air are detected, countermeasures are automatically taken using existing ventilation systems. If these measures are insufficient, production is stopped entirely in borderline cases. Otherwise production faults will occur, something that must be avoided at all costs. By Thomas Reimann, Facility Management Team Leader, Siemens AG



Essential for production: a stable room climate

In the past, situations arose time and again in which outside influences and the uncontrolled entry of outside air into the production areas had such a negative impact on the room climate that production stoppages occurred on a regular basis. The Siemens team searched for a solution to this problem, which they then developed with the help of the EnOcean ecosystem.

The production hall, which has a gross floor area of 14,000 square meters, was illumi-

nated via EnOcean technology. Gateways and the IP-EnOcean-Bridge EnoDiscs from Deuta Controls were used. All doors, roller gates, and emergency exits were equipped with self-powered EnOcean contact sensors. Now all signals and statuses received are collected centrally via the interfaces in the existing building control system and visualized in a MindSphere dashboard in the cloud. If an emergency exit is opened or a roller gate or door is held open longer than a defined threshold, the system sounds an alarm and, depending on the hall section, informs a defined group of people via SMS text message, push notification, and e-mail. They can then immediately check the corresponding exit and ensure that it is closed again as quickly as possible.

Sensor technology warns about carelessness in human behavior

The EnOcean solution has ensured a consistent awareness of critical deviations in room climate, which is imperative for a seamless manufacturing process. Most disruptions are caused by thoughtless routine actions, such as spontaneous conversations between



colleagues, a window that was left open for a quick airing and forgotten, or doors and gates left open for deliveries or service measures.

The use of sensor technology has also brought surprising findings to light. With regard to air pressure, for example, it turned out that individual door closers did not function reliably, depending on the season and climatic conditions. No one had expected this. It's also another indication of the complexity of the entire subject. If the usual tried and tested measures had been used, this would not have been noticed and a remedy would not have been possible.

What does the future hold?

Equipping the entire production hall with EnOcean technology opens up numerous possibilities. In addition to conventional, high-priced, wired temperature sensors, for example, wireless EnOcean sensors are also being placed closer to the actual manufacturing process in order to gather more information. The next application is already under development. This involves connecting wireless contact sensors to material chutes or scales on bulk goods containers. The goal is for the system to independently generate a posting in SAP as soon as the supplies in the production process start to run low, thus triggering an automatic, and in some cases even autonomous, redelivery from the materials warehouse.

www.siemens.com/realestate

Moving towards Industry 4.0 with Rutronik and EnOcean

The intelligent networking of machines, processes, and products in industry using information and communication technologies, or Industry 4.0 for short, is one of the fastest-growing economic markets of the future. The opportunities and benefits are clear, thanks to increased efficiency, reduced costs, and resourcesaving planning. Nevertheless, the implementation of Industry 4.0 is not easy and there are a number of challenges that also need to be mastered with regard to radio communication. Together with EnOcean, Rutronik offers a wide range of wireless and self-powered sensors for use in industrial environments.

By Kerstin Naser, Product Sales Manager Wireless, RUTRONIK Elektronische Bauelemente GmbH

Wireless networking

One of the fundamental requirements for Industry 4.0 is the intelligent linking and networking of all components. The use of modern wireless solutions reduces the need for complex cabling, which in turn opens up new fields of application in which a conventional wired solution would not be feasible, such as drones, mobile tools, and robots. In addition to these kinds of new applications, more conventional examples of Industry 4.0 include process automation, remote control, remote diagnostics and maintenance, manufacturing, and logistics. Each of these application areas poses different technical challenges for wireless communication, including with regard to the transmission environment and range. Data often needs to be collected in areas that are difficult to access or even dangerous. Wireless communication facilitates flexible communication

in these environments. Requirements in terms of latency, real-time capability, reliability, security, and fault tolerance are high for all applications related to Industry 4.0.

Energy harvesting makes wires and batteries redundant

Thanks to the EnOcean GmbH product portfolio, Rutronik can present reliable and flexible solutions, even for industrial applications in which energy efficiency plays a major role. EnOcean's energy harvesting modules generate enough electrical energy from motion, light, and differences in temperature to transmit data over distances of up to several hundred meters. Repeaters are also available to increase the range. Batteries or a wired power supply are redundant, which is why the EnOcean solution is also maintenance-free and extremely flexible. The modules are available with the EnOcean protocol, which operates in the license-free sub-GHz range (868 MHz in Europe, 902 MHz in the U.S., and 928 MHz in Japan), as well as with the 2.4 GHz Bluetooth protocol and ZigBee. The EnOcean protocol is frequently used when the 2.4 GHz band is already at capacity in the application area or when a greater range is required.

Know-how in the industrial environment

Rutronik has been working successfully with EnOcean GmbH and the EnOcean Alliance as a distributor since the end of 2018. Thanks to regular product training courses and seminars, our product experts and engineers have extensive knowledge and a high level of expertise with regard to EnOcean technology and EnOcean module solutions. Sample quantities of

EnOcean modules can be obtained from our logistics centers in Asia, Europe, and North America. Around 44 percent of Rutronik's customers are active in the industrial environment, which is why Rutronik is very familiar with the challenges and issues in this field. In addition to the benefits of EnOcean, Rutronik is able to incorporate the latest innovations from sensor and display manufacturers into its product concepts with the assistance of application engineers.

www.rutronik.com

EnOcean sensors for factory operation monitoring and visualization

EnOcean sensors are used in many different scenarios. The following project at the Kyoto plant of an Osaka-based company in Japan serves as an example. The manager of the Kyoto factory planned to visualize the operational status of production equipment and the progress of processed parts in the factory in order to improve the company's DX and efficiency in the manufacturing process. By Junya Tada, Inaba Denki Sangyo Co., Ltd., Electronic Development Section



The following goals were set:

- Visualization of equipment's degree of capacity utilization
- Reduction of robot and equipment downtime
- Visualization of workers' on-site presence/absence

The project team was tasked with visualizing the production facilities and the efficiency of manufacturing processes. This meant introducing and linking the SCADA system supplied by MXTechnologies with Inaba Electric Industry's Signal Watcher and Optex's Presence Detection Sensor (CPD), which are commercially available as EnOcean sensors.

Initial approach to implementation

The company's business is manufacturing and selling hydraulic cylinders for various general industrial applications and supplying cylinders to machinery and equipment manufacturers in Japan and overseas. The company is unique in its production methods, and some of its products can be shipped only four days after an order is received.

SCADA software (internal server)





Current operational status and effectiveness

When producing cylinders, there are tens of thousands of possible combinations of finished products and several common parts. Consequently, a thoroughly standardized and systematized production system must function properly in order to meet JIS standards.

That's why the company has already semi-automated the production process using its own host computer system and has introduced a retrofit IoT visualization system (SCADA system, etc.). This system displays the status of equipment and workers on pro-

EnOcean gateway

duction lines throughout the plant with a view to consistently increasing the equipment utilization rate and production volume.

The Kyoto factory has a number of machine tools, processing robots, and machining centers that have been in operation for about 40 years, all of which are now equipped with the Signal Watcher. Even in the case of modern equipment that can be directly linked to data, operational information is obtained from indicator lights because direct data linkage requires additional spending just to receive the information. Additionally, the information received from the equipment needs to be integrated into the company's system, which increases the time and effort required to start operation.

Presence detection sensors are also installed on the front of some workstations to track the relationship between workers' presence and the facility's utilization rate as well as time left unattended (rush time) in case of any errors. For this purpose, a system was adopted that utilizes EnOcean wireless sensors, which consume very little power

thanks to energy harvesting technology. This approach eliminates the need for post-installation maintenance, requires no modifications, and allows on-site managers to easily check the

operational status of equipment and workers in the factory.

Future developments

The operation monitoring system currently in place at the Kyoto plant has been well received internally, and the company is planning to expand the system to its Osaka plant as well. The company also plans to test the use of the wireless acceleration sensor "Multisensor," to predict equipment failure and to detect the deterioration and failure of metal processing equipment at an early stage. In addition to this customer, Inaba Electric Industry is planning a new lineup of sensors and EnOcean products in order to meet the challenges of the factory automation industry with EnOcean technology.

www.inaba.co.jp/en/

Vibration sensor for monitoring operation and failure of plants

Dhowa Technos and Japan Microsystems offer a battery-free, wireless vibration and temperature sensor with EnOcean radio. The device uses a solar cell as energy harvester, which means it doesn't require an external power supply. It regularly transmits the vibration and temperature data measured via EnOcean's wireless radio standard.

By Yasuhiro Udagawa, Japan Microsystems Inc.

Two probes with integrated vibration and temperature sensors can be connected to one vibration sensor, making it possible to measure vibration and temperature at two locations with a single unit. Rather than capturing the momentary value, the vibration sensor measures several hundred times within a certain time frame. These values provide information on total vibration, including positive/negative peaks in both directions. They can be used, for example, to diagnose failures and age deterioration. Measuring vibration at predetermined intervals and enabling all-day measurement The vibration sensor wakes up at specified intervals and continuously measures hundreds of acceleration points in one measurement. This means that the values of the three axes x/y/z are measured at the same time and two channels are measured sequentially in one measurement.

The measurement result is sent via EnOcean radio and then the sensor sleeps until the next measurement. If the appropriate interval is set, continuous measurement (24 hours a day, 365 days a year) is possible even in places where lights are turned off at night, thanks to the power stored in the solar panel.

Two probes can be connected to one vibration sensor, making it possible to measure vibration and temperature at two locations with a single unit.

Example (see pictures, right): installing the vibration sensor on a motor

- Monitoring 18 mill motors in a rolling line over 100 m long in a steel mill
- Vibration and temperature sensors: 45 units (38 EnOcean transmission units)
- J-Connect repeaters and receivers: 4 units
- Collected data: vibration and temperature are collected at 12-minute intervals.

Wireless, dust-proof and waterproof – making it easy to install in various environments

The main body provides IP65 protection, meaning it is dust-proof and drip-proof. The pickup part is sealed with silicone resin and is also dust-proof and waterproof. The sensor data is transmitted wirelessly via EnOcean radio. It's powered by a solar panel with an internal capacitor that stores energy. Sealing the device completely is no problem. Because of this setup, it can be positioned in a variety of environments.

http://www.jams.co.jp/j-connect/



1. Sensor location 2. Decelerator 3. Motor 4. Sensor: held by the magnet (easy mounting)





Measurement operation

- Sleep until next notification cycle
- 4. Continuous measurement (several hundred times) 5. Example of target-value measurement



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How smart sensors help some

10A

15A

Reducing energy usage is a key factor in the forward plans of most businesses as they battle to meet climate change targets. For those in the manufacturing sector, this will prove particularly important as they work to make their factories smarter and more connected. By Peter Burbidge, Managing Director, Pressac

60A

Wireless current sensors (CT) measure the alternating current (A) at the machine level every 30 seconds. The self-powered devices use EnOcean wireless, energy-harvesting technology, making them easy to install and maintenance-free.



of the biggest names in manufacturing CUt their energy usage

The key to reducing energy usage is coming to grips with exactly how much energy is currently being used and where – something that many businesses are still unable to accurately picture. Introducing smart energy monitors gives them continuous energy consumption data to help them identify energy waste and potential savings.

Intelligent Energy Management Consultants at Sensorfact work directly with manufacturing companies to help them understand their energy consumption. Companies include Heineken and Henkel.



When creating its software solution, Sensorfact needed a sensor that could be installed quickly and easily without requiring that clients stop production. They discovered the UK-based sensor manufacturer Pressac, which uses EnOcean technology in its range of smart sensors.

Real-time insights into energy consumption

Using Pressac's wireless current clamp sensors, Sensorfact was able to create a solution that measures energy consumption at the machine level. The ultra-low-power, wireless sensors are perfect for installation on machinery – which often means in hard-to-reach areas – because they simply clip around a phase in the machine or distribution panel. The accurate, real-time data they produce feeds seamlessly into Sensorfact's software to help its customers understand, control and reduce energy consumption. And because these sensors use EnOcean's energy harvesting technology, they're incredibly low-maintenance with no need for a power supply or battery, resulting in minimal disruptions in a busy manufacturing setting.

Every 30 seconds, the sensors measure the amount of energy consumed by each machine. The data is fed into Sensorfact's software, which then provides accurate, real-time insights into the energy usage of machines and components. This gives manufacturers greater control over their production process because they can know how each machine is functioning at any given time.

Continuous energy monitoring also allows businesses to find ways to reduce consumption – for example, in the case of machines left running after operations have finished and outdated machines causing suboptimal performance. Anomalies in machines' energy patterns are also a key indicator that maintenance or repairs are needed – an advance warning that could prevent breakdowns and unplanned downtime. These insights have helped Sensorfact's customers to use an average of 10% less energy.

Pressac, which has EnOcean Level 3 Certification, recently expanded its range of wireless sensors to include air quality, light, sound, and room conditions such as humidity and temperature.

Sensors are the backbone of future factories

The factories of the future are smart, connected and energy-efficient, with sensors playing a huge role. The use of EnOcean technology in Pressac's products means that they are particularly appealing to companies looking for an easy-to-fit, low-maintenance solution. The energy harvesting technology makes them ideal for use in manufacturing settings where downtime is not an option.

www.pressac.com

COMEPI's wireless, battery-free system A.A.G. Stucchi is an Italian company that has been designing and

producing lighting solutions for over 75 years. The company philosophy focuses on the development of new products and the optimization of all production processes.

By Dario Broggi, Product Manager, COMEPI

MIIII



The production managers at A.A.G. Stucchi face these problems with an innovative mindset – thanks, in part, to the application of the Lean philosophy throughout the production process.

Energy harvesting as the secret ingredient

In line with this approach, A.A.G. Stucchi implemented a wireless and battery-free COMEPI system to monitor quality and performance on four production lines using the Andon system. Andon in Lean manufacturing is a system designed to alert operators and managers of problems in real time so that corrective measures can be taken immediately.¹

All the COMEPI products in this setup use EnOcean technology. For example, the control stations don't require cables, batteries or an external power supply. Thanks to energy harvesting, they themselves generate the necessary power to send radio telegrams. They simply harvest kinetic energy with every push of the button.

Significant productivity increase The team leaders were equipped with a receiver (RRH8) installed inside a box and connected to four indicator lights of different colors. Each color represents one of the four monitored production lines, where each operator has a wireless control station that includes a pushbutton (SW14-004-RFH8). If they need assistance from the team leader, they simply press the button. This practice is very effective in reducing downtime caused by interrupted production lines, thus improving production efficiency through timely and targeted interventions. This implementation resulted in an increase

production line downtimes

in productivity of 60 to 80 percent. Moreover, use of the COMEPI system allows a dynamic and flexible organization of the production lines, enabling workers to quickly change layouts and reorganize spaces according to current requirements.

No batteries, no maintenance

Because this EnOcean-based COMEPI system is battery-free, it eliminates maintenance time for battery replacement and is therefore perfectly in line with the principles of a Lean factory. Certified product quality and the ability to function in an industrial environment without interruptions are also essential aspects of a working environment such as the A.A.G. Stucchi factory. This is just one example of the many possible applications of the COMEPI system. COMEPI is ideally suited to support customers with unique problems, especially in industrial environments.

www.comepi.eu

¹ Source: https://www.planview.com/resources/ guide/what-is-lean-manufacturing/ andon-lean-manufacturing/

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In the fall of 2021, Schweickert employees moved into the new company headquarters in Walldorf, Germany. This new construction features a number of innovative ideas and technologies, so much so that the building itself has become a reference project. With regard to networking in particular, Schweickert made the most of its expertise and created a valuable show-CaSE. By André Herb, Pre Sales Consultant, Schweickert

Smart spaces with Aruba and EnOcean

Building digitization with Wi-Fi access points from Aruba and EnOcean sensor technology

The idea behind the concept was that offices need modern IT networks more than ever to meet the needs of employees and their increasingly dynamic work requirements.

The Covid-19 pandemic has clearly accelerated what had already been foreshadowed in the past, namely that the demands placed on an office building are changing. Flexible workplace models, changing team structures, and New Work concepts are just a few of the keywords in this context. Being an employer who attracts new skilled workers and promoting productivity and employee retention also fall within this same context. What does the IT infrastructure need to accomplish to support these cross-business requirements?



What can smart spaces achieve? As part of the new building, Schweickert implemented an Internet of Things (IoT) project on the first floor, showcasing how the office space can be used flexibly and in line with demand. Throughout the building, one Aruba Wi-Fi access point was installed for every 140 m2 of floor space, bringing the total to 50. On the first floor, this network infrastructure serves as the foundation for analyzing and optimizing room and space utilization.

Wireless sensors collect the necessary data and transmit it directly via the Aruba Wi-Fi access points to a software platform for processing. The easier it is to transmit sensor data to the cloud or to on-site computers, the faster it is to implement IoT projects. One simple and cost-effective option is to use the existing IT infrastructure. In concrete terms, this involves four conference rooms and several open-plan offices that are equipped with various wireless sensors based on EnOcean technology for measuring air quality. The sensors monitor the room climate, taking into account variables such as CO2 levels, temperature, and humidity. This results in a pleasant room climate that increases productivity and comfort for employees.

As a next step, the solution will be expanded to include occupancy sensors that anonymously determine whether people are present. The aim is to optimize the use of the conference rooms and workplaces. The sensors report the status as "free" or "occupied" to a booking system, thus enabling employees to see occupancy in real time. The same applies to workstations in the offices, which are being upgraded to include occupancy sensors at the desks. As part of a shared desk concept, this will give employees full flexibility when choosing where they work in the future.



From sensors to the cloud via Wi-Fi access points

The solution uses EnOcean wireless sensors from Deuta Controls. The EnoPuck multisensors transmit all measured data to the Aruba Wi-Fi access points via the EnOcean wireless protocol. From there, the data is forwarded within the existing IT network to the application software platform from Thing Technologies. The software creates a digital twin of the space and makes all bookable assets, such as rooms and tables, available to employees in real time.

IT security concerns often stand in the way of implementing these kinds of IoT projects. That's why EnOcean integration with Wi-Fi access points uses the local IT network as a transport medium without mixing IT and IoT communication. It achieves this by employing secure tunnels for transmission between EnOcean USB radio and EnOcean gateways. This approach ensures that IT and IoT data remains separate and its security is guaranteed.

Use of existing IT infrastructure results in substantial cost savings

When installing the proof of concept (PoC) described above, Schweickert was able to cut costs by about 80 percent with regard to the radio receiver infrastructure by using the existing Aruba network infrastructure. This approach eliminated the need to build a complete EnOcean environment with additional gateways and required no additional cabling.

Aruba's Wi-Fi access points, in combination with EnOcean sensor technology, offer extremely profitable added value when it comes to analyzing and optimizing space and room utilization in a building. With relatively little technical effort and cost – and above all, without any IT security concerns – this approach makes it possible to implement flexible workplace models and other IoT projects.

www.schweickertgroup.com

Dynamic IoT security to a changing world

Change is the only certainty for facilities and IT teams. Endless, unforeseen new IoT requirements sail in from building owners, tenants, and regulators. Today it could be adding EnOcean temperature and occupancy sensors to an existing BACnet IP network, tomorrow a ModBus motor control interface for predictive failure analytics, and the day after food safety refrigeration monitoring. By Michael R. Tennefoss, Vice President of Strategic Partnerships, Aruba, a Hewlett Packard Enterprise company

> One would be forgiven for believing that IoT gateways are the solution, because from a data gathering perspective, that might be true. From a cybersecurity perspective, however, gateways are anathema to Chief Information Security Officers (CISOs) because they introduce a variety of security vulnerabilities. Increasingly, facility owners and tenants simply won't allow IoT gateways to connect to their secure IT networks, or the installation of a parallel Ethernet network that is outside of IT's control. The only safe harbor comes from leveraging existing secure IT infrastructure in a way that addresses the CISO's concerns and adapts automatically to the tides of change.

> Aruba and EnOcean have partnered to address these security-related headaches by leveraging the security features built into Aruba IT infrastructure to protect EnOcean networks. For example, space utilization in office buildings can be analyzed by EnOcean sensors, and then securely shared with hoteling and room booking applications. IT and IoT data are both securely segmented and reliably transported over one common network.

Segmentation of IT and IoT data The standard today for accessing a network is called zero trust network access (ZTNA), under which segmentation, isolation, and control are fundamental tenants. New gateways and IoT devices that need network access must be definitively identified, security roles assigned, and device traffic routed through secure micro-segmented tunnels to target applications. Ideally this process is automated and tunnels are dynamically segmented to lower the chances of misconfiguration and manual error.

Workloads are increasingly being moved to remote servers and both private and public clouds, which means that dynamic segmentation often needs to extend beyond the local area network. The system should permit users to access on-premises applications using ZTNA principles, while point-of-sale (PoS) data is tunneled to the PoS processing application, video conferencing traffic to the Internet, IoT gateway traffic to Azure IoT, and so on. The result is both an improved security posture and better user experiences versus sending all

accommodate

traffic to a data center and then hair-pinning it back or redirecting it to another site.

Aruba's dynamic segmentation features built-in identity-based access control, and automatically applies consistent policies across wired, wireless, and WAN networks to keep traffic for any user or device separate and secure, regardless of the application or service. Dynamic segmentation seamlessly extends across SD-WANs to remote sites and cloud services, and provides channel bonding for non-stop operation across Internet, MPLS, cellular, and other media for high reliability applications.

A Layer 7 stateful firewall runs natively and works with Aruba ClearPass Policy Manager to eliminate the configuration of individual virtual LANs (VLANs), a traditional security approach that becomes unmanageable as IoT devices proliferate. If you need to deploy IoT gateways on secure IT networks, Aruba's ZTNA solution will ensure that wherever data needs to land, secure tunnels will guide the way. The solution is completely automatic and enables segmentation and enforcement to be achieved in any location for any IoT gateway.

www.arubanetworks.com/solutions/ dynamic-segmentation

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From smart spaces to power spaces

Isolated solutions, new platforms, and the ongoing digitalization of buildings – what kinds of solutions are available for the real estate industry?

Landlords, homeowners, and tenants use sensors, gateways, digital (wireless) networks, and core systems (ERP) to pursue a variety of goals, such as monitoring building infrastructure, digitally recording consumption, enabling access control, or making workstation reservations. The essential part of this process is that data is created that comes together on different platforms – and thus in SilOS. By Nicolle Quaitsch, Head of Center of Excellence Microsoft, T-Systems MMS, and Tino Mager, Senior Azure Architect, T-Systems MMS



The raw data relating to area and room usage, for example, comes from the wireless EnOcean sensors. They are self-powered and use energy harvesting technology to operate without cables, batteries, or external power supply. This data has to be brought together with the core systems of the company (such as CRM or ERP systems) so that it can be analyzed in the proper context. This approach, for example, allows the data to be directly incorporated into space management as a basis for evaluation. The direct integration of the individual solutions into the core systems is usually expensive, maintenance-intensive, and hence not very attractive.

All in all, this results in an IT zoo revolving around actual core data management, with the associated challenges of manual synchronization and bringing data together without losses. Discussions with stakeholders and the Smart Spaces team at T-Systems MMS resulted in a new approach. Both customers and stakeholders expressed their desire to establish a data-driven and standardized model.

More data for more comprehensive building management

An expansion was made based on the Smart Spaces solution from T-Systems that allows the data from the various individual systems to be merged into a uniform digital image. A business process framework layer was integrated into the solution to control and incorporate relevant data into company processes. In addition to monitoring and booking rooms and workstations, it is now also possible to integrate ticketing processes and process catering orders.

This creates new use cases for implementing efficient building management. For the real estate industry in particular, it is important for services and systems to be able to exchange information with each other so that they can act quickly - for example, triggering a contractor's order based on IoT data. This is made possible by a standardized data model that ensures interoperability when different manufacturers and service providers connect to the platform. The decision was made in favor of the International Building Performance & Data Initiative (IBPDI) because it relies on existing standards already utilized on the market and develops a uniform data language for international use.

The diagram depicts a rough architecture of the Power Spaces solution from T-Systems MMS. The Power Spaces solution makes it possible to provide the former IT zoo with various individual applications and apps in a central and homogeneous manner. All services from external providers, such as the IoT data from EnOcean as well as the company's core application, are connected via various integration interfaces and then incorporated into the digital twin. This wealth of data and information results in new services for property users and property management agencies as well as for external service providers. Moreover, these services can be provided on the platform as an application or via Power Platform.

What does this look like in practice?

Examples include end-user portals or apps that enable employees to make digital room or space bookings or display the occupancy levels in the cafeteria. Management is able to see how heavily the rooms are being used, what cleaning intervals are necessary, and how this affects energy costs. The integration of the Microsoft Power Platform is a new feature. The existing data and process capabilities facilitate data-driven decision making and activities, such as:

- · Decisions to initiate or terminate leases
- Energy-saving opportunities
- Automated communication with affiliated service providers, such as commissioning contractors for a defective window or service technicians for elevator maintenance

Manual workflows are replaced by automated workflows in a low-code environment. This means, for example, that regular information is sent to the responsible parties regarding when the next fire safety inspection will take place.

As the volume of data increases, so does the number of use cases that can be implemented for the efficient digital management of a building. Due to the current pandemic situation, it is important for the customers of T-Systems MMS to learn how spaces are being used and how an optimal workplace experience can be created. The important thing is that employees be offered a safe workplace in accordance with hygiene guidelines.

www.t-systems-mms.com

Shopping center in Beijing

upgrades smart restrooms with EnOcean sensors



As the main commercial real estate brand of Longfor Group in China, Paradise Walk is positioned as a regional shopping center for young, middle-income families and a one-stop commercial complex integrating shopping, catering, leisure and entertainment.

By Marketing Department, Nanjing WinShine Network Technology

Longfor Beijing Changying Paradise Walk covers an area of about 270,000 square meters. Recently, 52 men's and women's restrooms and 15 multipurpose restrooms were digitized and combined with the mall's brand-new electronic signage system, bringing more convenience to customers.

Self-powered IoT sensors

This restroom renovation adopts WinShine EnOcean wireless energy harvesting technology. The self-powered door lock sensors used in the restrooms are based on kinetic energy. A status signal is transmitted when the door is either locked or opened. These sensors are connected to the Longfor IoT platform via a gateway and the data is displayed on an electronic signage system. By analyzing this data, facility managers can also identify fluctuations in the daily flow of people, which will provide data for the operation of shopping malls.



Electronic sign indicating restroom availability EnOcean door lock sensors are maintenance-free and easy to install

Fast installation

In order to reduce the workload of construction and commissioning personnel, the WinShine and Longfor technical teams preconfigured the equipment according to the spatial layout. Following on-site installation, they only needed to connect the power supply and network to the gateway. The equipment was then automatically activated and started working immediately, saving significant commissioning time. In addition, construction was carried out at night and had almost no impact on the daily operation of the shopping mall.

WinShine has a comprehensive range of EnOcean technology products and solutions in its portfolio that cover environmental monitoring, space occupation, power control, and communication gateways. These products are not only used in Chinese office buildings, hospitals, shopping malls and scenic spots, but are also exported to Spain, Germany, the UK and other countries worldwide.

www.win-shine.com

Wireless room operating units for integrated room automation SAUTER ecos

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ecoUnit146 EnOcean room operating unit

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ecoUnit110 EnOcean room sensor

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ecosCom581 EnOcean gateway

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Using a BACnet Gateway to configure EnOcean devices

Contemporary Controls' EnOcean to BACnet Gateway allows BACnet devices to receive data from EnOcean devices. It can also be used to control EnOcean devices from connected BACnet devices. By Bennet Levine, R&D Manager, Contemporary Control Systems

The gateway creates virtual BACnet devices to store the received EnOcean data. These virtual BACnet devices can also be controlled by other BACnet devices, allowing the gateway to control EnOcean output devices via BACnet commands.

The gateway can work with EnOcean devices that support EnOcean Remote Commissioning and can read link tables from these devices and remove or add entries. This includes adding entries that contain the gateway itself to allow the gateway to control these devices via BACnet commands sent to the gateway.

The EnOcean Remote Commissioning specification supports the remote configuration of EnOcean devices. An EnOcean device manufacturer provides a Device Description File (DDF) that documents the remote commissioning parameters supported by the EnOcean device, as well as the range for these parameters. These DDF files can be uploaded to the gateway. This allows the gateway to provide the user with a webpage that shows the current remote commissioning settings of an EnOcean device and allows these parameters to be modified.

The gateway also checks the version of the EnOcean device and utilizes the appropriate DDF file. The user can upload DDF files to the gateway as provided by the EnOcean device manufacturer.

For example, the EnOcean LEDRU Zone Controller has more than 60 parameter settings that are defined in a DDF file and can be modified by the gateway – for example, activation of the EnOcean repeater feature or the light level to be used after a power loss.

www.ccontrols.com/basautomation/enocean.php

How integrated room automation combines energy efficiency, flexibility and Usability



Room automation plays a significant role in the energy consumption of real estate. With SAUTER ecos, all room functions can be seamlessly integrated in the building management system with the automation of the primary system. This allows energy targets to be controlled while providing convenient operating options for both building operators and users.

By Roland Hofstetter, Product Manager Building/Room Automation, SAUTER Head Office

The building sector accounts for nearly half of the world's energy consumption. There is definitely room for a gain in efficiency. If building technology is geared to actual demand, significant reductions in energy consumption are possible. This requires an integrated implementation, and the user must be placed at the center of an overall solution that is safe in terms of investment.

Overall solution from a single source

Integrated room automation planning forms the basis for efficient project implementation that takes all interfaces and systems in the building into account, including indoor climate (heating, cooling and ventilation), lighting and sunshading. SAUTER meets these requirements with a comprehensive system solution.

SAUTER ecos is at the heart of room automation. The room automation station communicates with BACnet and integrates all common standards, including wireless sensors, window contacts and operating devices, via the EnOcean wireless standard. A connection to cloud services for IoT applications is also being considered.

Data on actual usage is collected via sensors and energy meters. Open communication

allows 24-hour control of the energy level by means of a building management system. SAUTER's package is rounded off with different operating options for adjusting room functions using room operating units, which range from individual setpoints for local controllers to control via smartphone.

Benefits for building operators and users alike

In addition, sensors for measuring consumables such as those in coffee machines or soap dispensers can also be integrated into SAUTER ecos room automation. This enables predictive maintenance that is adapted to actual use. With its worldwide network, SAUTER's decades' worth of project experience makes it possible to support planners, architects and system integrators in integral automation planning, technical implementation, and system renewal – for intelligent building automation that ranges from critical environments in hospitals to production facilities, commercial office buildings with flexible room concepts, and digital user requirements. The result is smart spaces where people can feel comfortable and energy efficiency can be controlled.

www.sauter-controls.com



Plug loads in commercial buildings

Commercial buildings cost around \$2.14 per square foot in energy alone, amounting to about a third of the total non-fixed operating expenses. Depending on the energy efficiency of the rest of the building, plug loads can account for 25-50% of the total energy consumption. Plug load refers to energy used by any equipment that is plugged into an outlet.

Up to 30% of this can be attributed to "parasitic" or "vampire" loads – power drawn by equipment that is not performing useful work and may even be switched off. While some equipment such as fridge/freezers and air conditioning needs to have access to power 24/7, PCs, printers and micro-waves are some of the worst offenders for drawing unnecessary power. By Giovanni Frezza, Director of Product Management (CoreSync), Molex Connected Enterprise Solutions



Plug monitoring technology

Plug power draw is not straightforward to manage because the use of plugs is not typically managed by a single department. For example, the teams that manage office equipment and vending machines rarely oversee data centers or air conditioning. Power outlets are not naturally networked and can be physically difficult to access.

Integrating plug load control into a smart building solution

Connecting plug load management to a central smart building management system eliminates the need for a second system that will have to be maintained and monitored. It enables facility managers to easily take ownership of plug loads as part of equipment management or energy efficiency mandates.

Smart buildings use information from a range of sensors to control systems such as HVAC and lighting. That same data can also be used to inform decisions about plug power – for example, based on whether or not a room is occupied at any given time. Room utilization patterns generated from smart building data can be used to inform plug scheduling across a building on a room-

to-room or even device-to-device basis, ensuring that energy savings are optimized.

Connecting plug load sensors to a PoE system

PoE smart building systems such as the Molex CoreSync solution offer a range of options for building owners and managers to dynamically manage their assets and energy usage. By running data and power over the same cable, Power over Ethernet (PoE) eliminates the need for additional wiring installs, which in turn reduces costs and redundant cabling and makes changes and upgrades easy. Moreover, a low-voltage IP-based network backbone is ideal for powering, controlling and managing multiple applications, such as connected lighting, automated shading, IP cameras, and access control – all via the same infrastructure.

But unlike other PoE systems, CoreSync is not limited to wired connections. Wireless gateways allow the system to connect to self-powered devices such as plug load relays, meters, sensors and keypads. EnOcean energy harvesting technology enables the plug receptacles to power back up when mains power is switched off. The ability to port EnOcean wireless devices into the IP/Ethernet-based CoreSync system offers unique advantages when it comes to plug loads and line voltage loads.

Multiple CoreSync EnOcean-based wireless relays can be paired with CoreSync PoE gateways during the commissioning phase. Through the CoreSync software, they are then zoned or grouped together with other wired and/or wireless devices such as occupancy sensors and wall switches. This approach offers considerable cost savings because plug load control shares the sensors and controls used, for instance, in smart lighting and shading control. Design, installation, commissioning and maintenance are also drastically simplified and, ultimately, all these systems can be seamlessly managed from a Single-Pane-of-Glass CoreSync smart building dashboard.

Facility managers can implement effective plug load energy-saving strategies based on time schedules and granular occupancy-based data and can finally take ownership of the "plug load orphans" with drastic savings in time and effort.

www.molexces.com



Gain insights into building utilization by tracking people's movements

Organizations place increasingly high demands on their facilities and working environments. The overall focus is currently on a healthy working environment, cost control, and sustainability with a view to reducing CO2 emissions. Consequently, "floor space" must be arranged and utilized as optimally as possible – starting with the measurement of occupancy within the building. By Martin Rengers, Office Manager, IMBuildings



The Office Occupancy Counter (OOC) from IMBuildings provides data on how rooms or office spaces are used. By measuring peoples' movements in passageways, occupancy can be analyzed and the information can be used to determine the utilization of a building or office space. The OOC provides insight into buildings by looking not only at



how many people are in a room, but also at how they are moving.

No camera is needed because the active infrared signals ensure the accurate measurement of people's movements. This approach also means that no personal data is collected. Measurement is done by the sensors anonymously. The wireless sensors work with the EnOcean protocol.

Facility managers can gain more precise control over cleaning staff. Restrooms can be cleaned as needed rather than according to a set schedule. If a restroom is rarely used, it doesn't have to be cleaned as often. In The Office Occupancy Counter works with active infrared technology and is installed above a door.

addition, the insights gained help to reduce energy consumption, improve working efficiency, and reduce costs. For example, heating can be lowered when occupancy is high (in relation to utilization). But the heating can also be lowered if occupancy is low. Based on data provided by the OOC, users can also respond to room air quality (CO2 level).

www.imbuildings.com

Low power communication technologies such as EnOcean allow plug & play installation of the Office Occupancy Counter.

Saving space

New MCS SR Multi Compact Sensor with EnOcean interface

Compact, versatile and featuring energy-efficiency, the new MCS SR Multi Compact Sensors from Thermokon support the efficient automation of buildings. The small multi sensor can be mounted virtually anywhere and is connected to the building management system (BMS) via EnOcean Wireless. By Cornelius Berns, Head of Sales, THERMOKON Sensortechnik GmbH

Discreet design – wide range of applications

Barely 15 cm long and only 1 cm high, the slim sensors are ideal for inconspicuous mounting on ceilings, walls or desks. The enclosure, which is identical to that of the SRW03 wireless window contact, ensures a consistent and homogeneous design. The standard colors are white and anthracite.

As versatile multi-talents, the MCS SR sensor family is available in three versions with different sensor values/detectors. In addition to a model that measures temperature and humidity, customers can choose between a version with a motion detector and a version with both a motion detector and a brightness sensor. This ensures maximum flexibility and contributes to noticeable energy savings. The sensor reliably reports unoccupied rooms to the building management system and thus initiates the deactivation of air conditioning or lighting in order to save energy.

Desk sharing made easy

The compact motion detectors are an excellent data provider for desk-sharing corporate cultures. Installed underneath a desk in a matter of seconds, the sensors reliably detect whether the desk is currently occupied and immediately provide the BMS with this data, making double occupancies and tiring searches for an available desk things of the past.

The MCS SR sensors also excel when it comes to maintenance. The EnOcean radio protocol is characterized by extremely low energy requirements, which means that a AAA battery can last for several years. The MCS SR series also features fast mounting in order to save time. The sensors can be installed using the accompanying adhesive pad or can be fastened in place with screws.

www.thermokon.com



MCS SR in the standard colors anthracite and white.



- which is better for a connected home?

The smart home is "in". Networking your own four walls is becoming easier than ever as the number of corresponding end devices and professional system solutions increases. However, hardware alone doesn't make a home intelligent. It depends on whether the networking is wired or wireless. A new study by the Technical University of Applied Sciences Rosenheim compares the common smart home standards KNX and EnOcean in different living scenarios. By Graham Martin, Chairman & CEO, EnOcean Alliance

Digital networking is a prerequisite for the smart home. It is what enables seamless communication between the individual components in apartments or residential buildings and can be accomplished with or without wireless technology. In addition to proprietary solutions from individual manufacturers, there are also open standards for both variants. KNX (wired) and EnOcean (wireless) are each representative in their segment. KNX (Konnex) is a widely used wired bus system for building automation. As a further development of the EIB (European Installation Bus), KNX is an open, manufacturer-independent standard that is supported by a large number of manufacturers. As a uniform standard, KNX leaves a great deal of room for design and is considered to be particularly secure.

EnOcean was defined in 2012 by the International Electrotechnical Commission (IEC) as a global wireless standard (ISO / IEC 14543-3-10) for decentralized building automation. Today, more than a million buildings have such radio networks. The EnOcean ecosystem of self-powered wireless sensor solutions currently consists of 5,000 product variants based on 1,500 basic products. The products can be combined with one another using standardized interoperable sensor profiles.

Who is ahead in the smart home?

The study¹ by Julia Winkler and Prof. Dr. Michael Krödel compares smart homes of different sizes based on KNX or EnOcean technology in two equipment variants in terms of costs, sustainability, and health and well-being. Both cases refer to a conventional building without intelligent networking.

A comparison of the conventional "dumb" installation with smart equipment reveals an unsurprising picture. Smart initially costs more money. The additional smart functions initially make living space more expensive.





In the medium and long term, however, the investment is well worthwhile because a higher quality of living has an intangible impact on comfort and safety from day one. In concrete terms, up to 10 percent of heating energy costs can be saved through intelligent heating. The potential is significant, given that heating accounts for around 60 percent of energy consumption by private households, which are usually heated continuously, especially in winter.

Wired or wireless technology in the smart home?

When comparing the smart home variants "wired" (KNX) and "wireless" (EnOcean), wireless is significantly less expensive. With comparable functionality, the difference is 20 to 30 percent. This applies to all buildings and equipment variants and is due to the higher expense of cabling and the cost of the wired devices and their installation.

The smart variants are initially more expensive than the conventional equipment. A wired smart home requires the highest initial investment overall.

Switches and sensors based on EnOcean do not need cables. They can simply be attached and implemented as required, which is a major plus in terms of flexibility – for example, when retrofitting or converting. The use of fewer cables also saves PVC – according to the study, up to 8.5 kg per smart home – and improves the overall environmental footprint of the construction project.

Conclusion

The intelligently networked home initially costs more, but these investments are well worthwhile in terms of the intangible gain in comfort and safety as well as lower energy costs. The installation costs of the wireless smart home are up to one third less than the wired version. Wireless also scores in terms of flexibility and environmental protection.

www.enocean-alliance.org

¹ Winkler, J. (2021). Comparison – Building Automation: With and Without Wireless Technology. Study performed as part of a Bachelor's thesis by Julia Winkler at the Technical University of Applied Sciences Rosenheim.

The world of smart living at HirschQuartier



Eltako is a pioneer in the Smart Building Control market and has been for many years. With its continuing innovations, the Eltako team is constantly developing new possibilities that make the everyday lives of our customers easier without sacrificing functionality. By Anna Oberascher, Head of Marketing, Eltako

The centerpiece is the Professional Smart Home range that comes equipped with EnOcean energy harvesting technology. This product portfolio includes wireless and self-powered sensors as well as flexible actuators for indoor and outdoor areas. Thanks to automation and simple installation and control, these products provide users with tremendous comfort.



The EnOcean-based Eltako sensors ensure energy efficiency, security, and a sense of well-being in the home.

Modern life within your own four walls

What happens when you combine this smart technology with modern architecture? KME 24, a project company of tempus24 GmbH and a company of Wohngroup GmbH, joined forces with Eltako to consider this question. The solution can be found by taking a closer look at the HirschQuartier project in Erfurt, Germany.

This residential complex consists of 151 newly built apartments equipped with the Eltako Professional Smart Home System, which covers virtually all requirements. The team of experts wanted to create a space where everyone feels at home.

Eltako Professional Smart Home

Whether it's lighting, shading, room temperature or security: Eltako's intelligent products can be controlled by pushbutton, smartphone, tablet, and/or voice control, making them the epitome of smart living. You can find these products not only in apartments, but also in the courtyard, underground parking garage, common areas, and bicycle storage area. Everything can be personalized, remotely controlled, interconnected, and automated.

If you take a closer look at the apartments, you will see that convenience starts right at the front door, which is unlocked with the help of a sensor instead of a key. This feature saves you the trouble of scrambling to find the right key. The cutting-edge door and video intercom system also lets you use your smartphone to view visitors and let them in. The wibutler Smart Home controller paves the way for this kind of state-of-the-art control while also ensuring that connected devices respond to voice commands.

It is possible to personalize Eltako's Professional Smart Home devices so that, for example, they lower all shutters by a desired percentage at a certain lux value. Intelligent lighting control additionally ensures optimal lighting conditions at any time of the day or night. Depending on the room and individual preferences, you can adjust the temperature and even create entire heating plans.

Needless to say, the smart home can be expanded to include additional devices. Simple commissioning renders the installation of additional pushbuttons, motion detectors, or similar devices at the desired without an electrician.

The products can be used to create a veritable residential oasis, providing occupants with plenty of time for other things. Together with KME 24, Eltako is planning to get more projects like HirschQuartier up and running in the future, ensuring that this unbeatable combination of smart home and modern architecture will give even more people a comfortable home.

www.eltako.com

Working from home – environmental monitoring for greater Well-being

It is commonly believed that the working environment will not return to normal immediately. The much talked about shift towards hybrid working, or permanently working from home in some cases, is likely to become reality. By Peter Smith, Head of Sales and Marketing, IAconnects

As the world slowly starts to emerge from the restrictions put in place to combat the transmission of COVID-19, some employees will begin to return to the workplace. But for those who continue to work from home, new challenges have started to become the norm, including environmental factors.

Improve indoor air quality

Recording air quality data is one way to monitor ventilation in spaces – not only to reduce the COVID-19 risk but also to improve indoor air quality with regard to CO2 levels, temperature and relative humidity. Studies undertaken in the last few years have found that higher levels of CO2 have a negative impact on productivity. The reduction of CO2 and relative humidity levels can be an additional benefit to employees and the organization as a whole.

Environmental monitoring in your home office?

Adding EnOcean indoor air quality sensors to monitor CO2, temperature, humidity and much more, and sending alerts when levels are approaching an unsafe level, are simple but effective ways to potentially improve poor concentration and productivity levels.

The most effective action to take when CO2, temperature and humidity levels are high in your workspace is to increase ventilation and bring as much fresh air into the space as possible. By opening windows and doors to increase airflow, you will see an almost immediate decrease in CO2 levels and a gradual decrease in temperature and humidity.

www.iaconnects.co.uk

EnOcean products

	EnOcean Self-powered modules	EASYFIT by EnOcean End products
Kinetic Switches	Our wireless switches work 100% battery-free, need no ca placed anywhere.	ables and can therefore be
Self-powered Sensors	EnOcean sensors provide the data for applications in digit of Things (IoT).	ized buildings and the Internet
Actuators & Gateways	Actuators implement building automation functions like I Sensor data is forwarded by gateways to automation networks and the sensor data is forwarded by gateways to automation networks and the sensor data is forwarded by gateways to automation networks and the sensor data is forwarded by gateways to automation networks and the sensor data is forwarded by gateways to automation networks and the sensor data is forwarded by gateways to automation networks and the sensor data is forwarded by gateways to automation networks and the sensor data is forwarded by gateways to automation networks and the sensor data is forwarded by gateways to automation networks and the sensor data is forwarded by gateways to automation networks and the sensor data is forwarded by gateways to automation networks and the sensor data is forwarded by gateways to automation networks and the sensor data is forwarded by gateways and the sen	ighting or heating control. works and into the cloud.
IoT Software & Tools	EnOcean offers software and tools for easy installation and	I data processing.
enocean° Bluetooth°	868 MHz products: EnOcean for Europe and other countries adopting RED 902 MHz products: EnOcean for North America adopting FCC/IC 928 MHz products: EnOcean for Japan adopting ARIB	www.enocean.com/en/products

2.4 GHz products:

for Bluetooth® and Zigbee networks

💋 zigbee



Renewed sales power in North America

By Raoul Wijgergangs, CEO of EnOcean

Bent Soerensen

At the end of August 2021, Bent Soerensen was appointed to lead the North American sales team as Senior Vice President Sales. His particular focus is on the Internet of Things (IoT) with solutions for Smart Spaces that enable the efficient and sustainable use of building space.



Bent holds an MA in Business Communication and an MBA in International Management and has more than 25 years of successful international sales experience. He spent 15 of these years working in the field of wireless IoT and smart home technology and devices. EnOcean welcomes his experience and extensive network as he continues to develop the company in the smart spaces, lighting control, building automation, HVAC, industrial IoT and smart homes business areas.

Federico Aguilar

was added to our NA sales team in January 2022. He is mainly in charge of sales and business development for Eastern North America. His responsibilities include developing the fast-growing smart buildings market with EnOcean's Smart Spaces, IoT and building automation solutions.



Federico Aguilar holds a degree in Industrial Engineering and has years of experience in the IT industry. In his previous roles as Cisco Advisor and Customer Success Manager for Microsoft Azure, he successfully expanded business fields such as lighting control, cloud infrastructure, IT networking and IoT. At his most recent job, he was responsible for business development and lead generation as well as qualification of industrial clients.

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