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EnOcean: Smart buildings – more than energy efficiency

T-Systems Multimedia Solutions: Meeting the challenges of
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Dear readers,

EnOcean has come of age. Eighteen years ago, we gave birth to our baby "EnOcean" from the ocean of unused energies with our idea and a piezoelectric wireless switch and proudly presented it at light+building 2002. Many "sponsor companies" helped turn the idea into a system with a wide range of applications, and our company name became synonymous with energy harvesting and a global wireless standard. At light+building 2020, you can experience and gain an understanding of both dimensions – self-powered wireless sensors at the booth of the technology supplier EnOcean in Hall 8 and Smart Spaces partner solutions at the EnOcean Alliance booth in Hall 9.

Using the world's finite resources responsibly is important to us. There is no question that we need sensors to meet the challenges of climate change, digitalization and an aging population. Dispensing with batteries and wires means less trash and less consumption of raw materials. Generating perfectly accurate data and using it intelligently in Edge devices can reduce data waste and energy consumption in data centers. And automatically switching off the lights in U.S. supermarkets, the heat in French hotels and air conditioning in Chinese schools reduces the CO_2 footprint worldwide.

We also put our ideas into practice. In our new office in Sandy, near Salt Lake City, Utah, we have equipped the entire office space with energy-efficient LED lighting, including EnOcean-based, presence- and daylight-dependent control technology. At our insistence and with our financial support, a recycling system for waste paper, plastic and metal was introduced for the entire office complex. In addition, in the land of pickups, our president and co-founder Oliver Sczesny drives to work in a purely electric vehicle with Bavarian automotive technology as a nod to our home country.

With this issue, we have also brought Perpetuum in line with our sustainability goals. If you are holding the printed version of the magazine in your hands, you will feel the lighter-weight recycled paper. The issue was printed in a climate-neutral process. If you are reading the digital edition of Perpetuum, you are experiencing the first issue in a new format, with search functions and access to content from all the many different articles that our partners and we ourselves have contributed to the magazine over the years.

Enjoy this latest edition of the magazine!

The EnOcean co-founders

Andreas Schneider, Managing Director

Armin Anders, Vice President Business Development

Frank Schmidt, Chief Technology Officer

Oliver Sczesny, President EnOcean Inc.

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Jäger Direkt

Every smart city starts with the smallest
unit – the smart home

Smart buildings – more than energy efficiency

Our society is facing major challenges – caused by a global transformation. These include climate change and the need to drastically cut CO_2 emissions. However, global developments such as increasing urbanization and aging populations also demand answers. Business as usual is simply not working anymore. By Andreas Schneider, CEO, EnOcean

In exaggerated terms, this means that simply constructing higher buildings or adding more streets won't solve the problem. Only smart, networked use of existing buildings and infrastructure will produce a sustainable concept. Although technology cannot be the sole answer, when combined with other factors, digitalization, in particular, supports this change and makes it easier for people. After all, digitalization supplies data for new workplaces and living environments and thereby makes for a livable future in a rapidly changing world.

Worldwide focus on CO2 footprint of buildings

Buildings are currently being put to the test, as they are some of the world's biggest CO_2 producers. They account for one third of all CO_2 emissions in Germany and the EU. The energy savings potential is equally high – for example, with smart building control in residential and commercial structures.

The EU has set clear targets for its member states with the European Energy Performance of Buildings Directive (EPBD). Existing buildings are supposed to be CO_2-neutral by 2050, with a focus on networking and smart building control, among other things. For example, the digitalization of heating and air-conditioning systems is intended to provide information about a building's actual energy efficiency. The EU is serious about this: Member states are required to implement the directive into national law by March 2020.

In the U.S. state of California, the government has adopted even stricter building energy efficiency standards, known as Title 24. New apartment buildings, for example, have been required to have a solar plant since January 2020. According to official calculations, single-family homes consume 53 percent less energy based on the new standard than those constructed according to the 2016 standard. New commercial buildings are becoming approximately 30 percent more energy efficient, particularly due to modern lighting technology.[1]

To meet legal requirements, the various disciplines must be intelligently interconnected and digitalized in keeping with a smart building or smart home. Standardized interfaces and open wireless standards like those specified by the EnOcean Alliance, Bluetooth SIG and Zigbee Alliance form the basis for this. The Smart Buildings Alliance (SBA) presented its Ready2Services concept on this basis in 2018. Complete buildings can be certified so that the sensors and gateways used are interoperable with the entire network infrastructure and the various IT applications.

Digitalized building spaces pay off

Employee well-being and productivity can be increased in offices through different parameters such as human-centric lighting (HCL) and demand-based use of space. The use of IoT solutions allows companies to adapt their planned use of space to actual and ever-changing requirements, thereby identifying and cutting hidden costs.

The LaSalle real estate consulting firm has come up with an interesting calculation.[2] The 3-30-300 rule is an example of the average cost ratios incurred by a company. All figures are per square foot (0.09 m^2) per year.

- 3 US dollars for energy, etc.

- 30 US dollars for space

- 300 US dollars for salaries

Because of the legal requirements mentioned above (EPBD, Title 24), companies must take action and lower their energy consumption to reduce the CO2 emissions of buildings. In many cases, a logical step is to invest in a smart, radio-based heating control system. At first glance, this pays off only where energy consumption is concerned, but in fact it is an initial step toward digitalized building spaces and thus offers additional savings potential.

If a certain basic infrastructure consisting of radio-based sensors, gateways and actuators is present, the system can be easily expanded. One common application is to optimize the use of rooms in commercial buildings. For example, if 30 to 40 percent of the desks remain unused on a regular basis, it is worthwhile to introduce a

hot-desking concept, in which the employees flexibly share desks depending on occupancy. To do this, additional presence sensors are needed that record the presence of people in a room or at a desk and send this information to the cloud, where an algorithm controls occupancy. This approach can reduce the cost of space, especially in expensive urban locations.

Attractive work environments have been proven to increase employee productivity. According to LaSalle, optimization has the greatest impact in this area. Concepts such as employee wellness take these findings into account and optimize work environments for employees. They include control of room temperature, air quality, humidity and lights, as well as IoT solutions for demand-oriented cleaning service of restrooms and kitchens.

Such applications create new tasks and business areas for facility management. The idea is no longer to simply manage a building but to offer new services.

Sustainable digitalization

However, smart buildings are the wave of the future and not only for environmental reasons. The ability to charge electric cars must be provided, while demographic change requires new approaches to looking after people in need of care, and crowded conditions in cities demand better use of space.

Raw data collected by millions of sensors can be the solution for all these scenarios.

This data forms the basis for energy efficiency, CO_2 reduction and better use of resources. In light of the large number of sensors required, these devices must be standardized, radio-based, self-powered and easy to retrofit. The energy harvesting technology from EnOcean enables new and existing buildings to be sustainably digitalized and made smart – without any cables or battery waste.

www.enocean.com
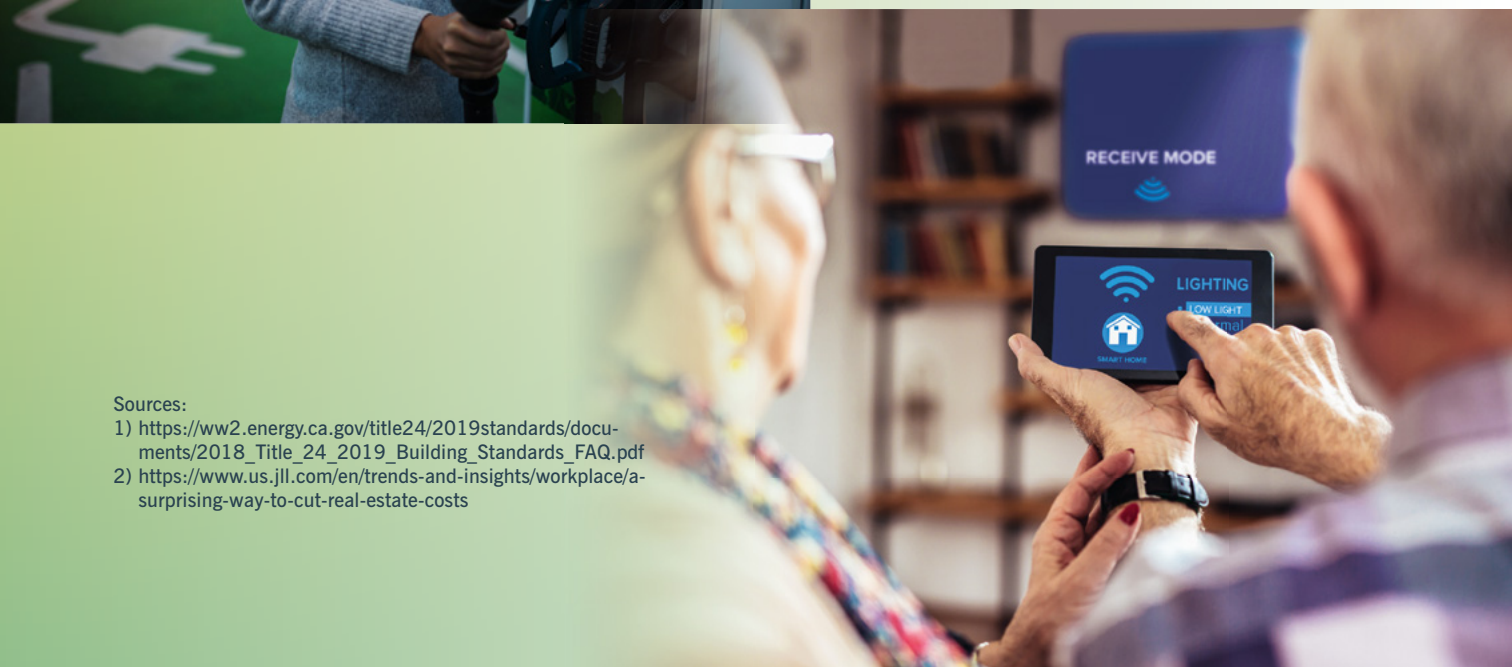
Sources:
1) https://ww2.energy.ca.gov/title24/2019standards/documents/2018_Title_24_2019_Building_Standards_FAQ.pdf
2) https://www.us.jll.com/en/trends-and-insights/workplace/a-surprising-way-to-cut-real-estate-costs

Smart offices for modern workplace

Meeting the challenges of a changing workplace with Smart

Companies are currently facing a complex set of contradictions influenced by different factors. They are facing a tight job market due to a lack of skilled workers. At the same time, employees want their work environment to meet ever greater expectations. This is in contrast to non-digital work areas and illogical processes that have developed over time and cripple individual employee productivity. Agility in the workplace, the ability to adapt quickly to changes, is often stuck in the realm of wishful thinking. The responses to these challenges are multi-layered and are often subsumed under the phrases "new work" and "modern workplace." By Nicolle Quaitsch, Head of Center of Excellence Microsoft, T-Systems Multimedia Solutions

Modern workplaces are more than just a home office

The boundaries between working at home and at the office are blurring in the modern workplace. This means that information exchanges and communication have to be made efficient in order to increase productivity. Employees are at the center of this process, which is why the work environment has to be adapted to their needs.

Linking the conventional workplace with aspects of new work can simplify a whole range of organizational processes or shift them away from the employees altogether. A new understanding of leadership, a change in corporate culture and innovative work organization are extremely important aspects of this transformation. The goals to be achieved are giving individuals greater freedom to shape their own work routines, encouraging employee productivity and cutting costs.

The Smart Spaces project team for the "Ambassador House" in Zurich (from left to right): Rico Schmidt (T-Systems Switzerland, Project Manager Smart Spaces), Florian Baumann (T-Systems Switzerland, Business Development Executive), Nicolle Quaitsch (T-Systems MMS, Head of CoE Microsoft), Tino Mager (T-Systems MMS, Senior Technical Solution Architect, Smart Spaces), Stefanie Uhlig (T-Systems MMS, Project Manager Smart Spaces), Armin Anders (Vice President Business Development EnOcean)

New work in Switzerland

Implementing these goals will require not only an innovative understanding of leadership but also a rethinking of the technologies or processes used. T-Systems Multimedia Solutions was therefore approached by colleagues at T-Systems Switzerland. The Swiss colleagues are moving into new offices equipped with EnOcean sensors in order to analyze and optimize the use of space. The sensors measure how meeting rooms, think tank areas and workstations are used to ensure smooth work routines.

Spaces

The Swiss employees expect to see the following scenarios during the first phase:

1 Employees increasingly work on projects in groups in the think tank areas, which means that the latter are always booked solid, while other work areas remain unused. The answer would be to create more think tank spaces, a measure that increases productivity and ultimately further motivates the employees. To ensure a smooth workflow, staff members have the ability to book rooms via their O365 application.

2 Sensors record whether the rooms are then actually occupied. If they determine that a room is not being used, this is pointed out, and depending on the response, the room is made available again to avoid empty space.

The use of sensors intensifies collaboration with facility management, thereby tapping previously unrecognized optimization potential. For example, drawing up staff and work schedules can be optimized when planning cleaning frequency and room availability.

In addition, the use of such innovative technologies increases employee loyalty to the company and thus employee satisfaction. This is becoming increasingly important, especially against the background of recruiting new employees.

This is only one example of the end-to-end solutions for Smart Spaces projects that T-Systems Multimedia Solutions offers its customers. The focus on office environments makes it possible to digitally map space, inventory, processes and employees. The Smart Spaces platform, based on Microsoft Azure, allows both standardized and individual solutions to be implemented internationally. In collaboration with our partner EnOcean, we continuously integrate new sensors to map additional scenarios.

This approach is a journey into a new workspace for everyone. T-Systems Multimedia Solutions sees helping to shape change as one of its core functions.

www.t-systems-mms.com/en

Big data
for public restrooms

Hospitals, airports, railway stations and commercial buildings – all these places have a high number of public restrooms, which are frequently visited. They require a lot of maintenance to keep them clean and working. Additionally, it would be convenient if queues could be controlled to avoid waiting times, paper towels or hand sanitizer could be replenished before these items run out and the air could be kept fresh. By Nanjing WinShine Network Technology

WinShine Smart Toilet Visualization

WinShine Smart Toilet

The Internet of Things offers many new possibilities to manage public restrooms and make full use of the space to improve the wellbeing of people.

WinShine's smart restroom solution is based on big data technology and is a great example of an Internet of Things application. It can not only analyze the air quality in real time, but also integrates cleaning services, enables environmental inspection and provides an app for users. It helps to improve the management of restrooms and thus provides users with many conveniences.

WinShine uses sensors to detect the occupancy and air quality of restrooms and display them on a screen to guide users to nearby free restrooms to avoid queues. Statistical reports can be generated for facility managers to learn about the usage patterns, such as regular peaks at a certain time of day.

Depending on the actual volume of people and change in air quality, the system instructs the cleaning service to clean via an automatically generated work order. After cleaning, the status can be submitted, for example, by mobile phone or swipe card. The system automatically saves the data after verifying certain quality factors. A cleaning supervisor can randomly check the hygiene situation on-site, record the results via a mobile phone and upload photos to continuously improve cleaning quality.

When paper and hand sanitizer are running out, the sensor automatically reports the data to remind the cleaning staff to replenish them in time. In the restrooms for the physically disabled, an SOS call button is also installed.

Users benefit from an app that can check the availability of nearby restrooms in real time and show them the quickest route. It can also contact customer service to report the queuing situation and give a rating to help to constantly improve the environment and service.

WinShine uses a variety of self-powered sensors by EnOcean for this solution. These sensors are easy to deploy and do not require any maintenance. In the future, many other spaces will be equipped with intelligent systems to further improve efficiency and service.

www.win-shine.com

The Artificial Intelligence
of Things – AIoT as facilitator of digitalization

Artificial Intelligence (AI) and the Internet of Things (IoT) are natural companions: IoT technologies provide the platform for capturing and concentrating data from huge numbers of devices. AI can transform that data into valuable insights and automated responses, enabling new and hitherto impossible services. Combining the two, leveraging AI in the cloud as well as embedded in IoT edge devices, creates the Artificial Intelligence of Things (AIoT). **By Andrew Bickley, Director of IoT, Arrow Electronics EMEA**

Arrow Electronics adds EnOcean to its IoT product range

Arrow Electronics supplies EnOcean's portfolio of patented energy harvesting wireless technology globally. The initial focus is on EnOcean's Internet of Things (IoT) solutions, which Arrow has already integrated into its own end-to-end IoT offering. Arrow addresses every layer of an IoT solution stack, ranging from electronic components to IT solutions, including consultancy and development.

Best practices: water leaks and predictive maintenance

By bringing learning capabilities to IoT solutions, AIoT can add value in numerous scenarios. Water utilities, for example, incur significant costs due to leaks. With AI embedded in edge devices and/or in the cloud, a system can learn the water usage behavior of properties to identify leaks and pinpoint their location.

In an industrial context, AIoT can accelerate equipment vendors' transition to service-based models based on customers' usage. One potential service that's topical at the moment is predictive maintenance, which promises major cost savings for service providers and greater efficiency and utilization for customers.

Technical requirements for AIoT

AIoT devices and platforms designed for manufacture require hardware design, embedded processing, wireless technology, hybrid hardware-/software-based cyber security, data aggregation through gateways, and cloud or hybrid edge/cloud machine learning. There are often additional challenges, such as implementing robust wireless connectivity in difficult environments, and minimizing latency for critical applications through the selection of appropriate edge technology.

Data analysis is a key condition

Organizations looking to leverage AIoT themselves as a means of achieving digital transformation face altogether different types of issues. The big challenge comes when users start generating data. Many strands must be woven together, including accessing data, aggregating that data, analyzing it and then feeding the result back in to improve operation. All of this must be achieved on a large scale and in a cost-effective manner. With the deployment of EnOcean's battery-free and wireless sensors, companies can generate the raw data for AIoT use cases very conveniently.

Success requires multidisciplinary expertise. This can only be achieved through cooperation between trusted partners that can assemble between them the requisite skills, from sensing and connectivity to data aggregation and analytics.

www.arrow.com

CO2 reduction in practice –
networked energy systems combine comfort with climate protection

Viessmann, a company of long-standing tradition and a member of the EnOcean Alliance, supports customers all over the world with seamless climate-friendly solutions that supply optimal room temperature, hot water, electricity and good air quality in equal measure for human environments. In the future, all systems will be networked via the Microsoft Azure cloud platform, making them even more efficient and comfortable to operate. The wibutler system, which supports the EnOcean wireless standard, is part of the Viessmann solution. **By Thomas Frahler, Business Lead IoT, Microsoft Deutschland**
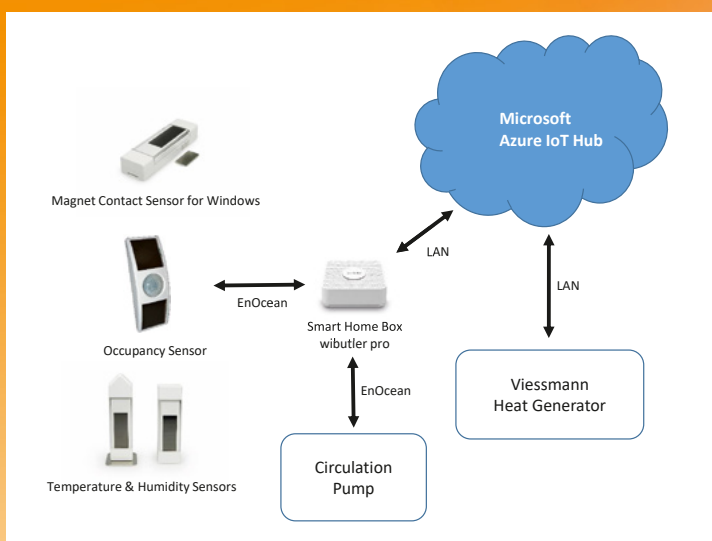
The pending energy transition can be managed only with future-oriented energy systems. Networked and smart devices are almost indispensable in this regard. Viessmann therefore wanted to combine more than 100,000 devices that are managed from 150 control interfaces. The company also faced the challenge of retrofitting a complete range of products that have been in operation since 2004 and making them part of the overall solution.

IoT platform based on Microsoft Azure

At its heart, the solution consists of a scalable microservice architecture based on Kubernetes and Azure Service Fabric, which enables Viessmann to respond quickly and flexibly to changes and customer or partner

Magnet Contact Sensor for Windows

EnOcean

Occupancy Sensor

Smart Home Box wibutler pro

Temperature & Humidity Sensors

EnOcean

LAN

Microsoft Azure IoT Hub

LAN

Viessmann Heat Generator

EnOcean

Circulation Pump

requests. Another key element is the use of Azure IoT Hub for the secure and reliable connection of and communication between the devices and the cloud. All Viessmann heating systems that have been launched since 2004 are being retrofitted for communication with IoT Hub, and new equipment generations will be connected directly to the IoT platform. The use of Azure IoT Hub enables Viessmann to react flexibly to the growing number of devices and the increasing volume of telemetry data.

Remote access to the heating controller

The new system has been in use since June 2018 and offers remote services for heating control, among other things. Based on the example of the cross-vendor wibutler system, which Viessmann has purchased and which supports the EnOcean wireless standard, heat pumps, for example, can be controlled in the smart home platform. With the aid of wibutler, installers and end users can set heating times and desired temperatures,

among other things, right on their smartphones. The compatible heat pumps can also be networked with a large number of devices from other manufacturers and be automated collectively. For example, a temperature sensor measures the current room temperature for demand-driven individual room control. wibutler subsequently determines the exact heat requirements of the particular room and automatically transfers them to the Viessmann heat pump, so that only the heat really needed is generated.

Predictive maintenance of the heating system

At the same time, the initial predictive maintenance trials are in progress. Viessmann evaluates the data from the devices with the Microsoft Azure cloud platform and a wide range of artificial intelligence tools and looks for certain patterns that can identify the need for maintenance. For example, if a heating burner cycles more often than necessary, this indicates that it is dirty, which may result in failure. The installer receives a notification and can intervene before the installation breaks down.

https://azure.microsoft.com/en

Sources:
https://customers.microsoft.com/en-us/story/740567-viessmann-robotron-azure-energy-en

https://www.viessmann-newsroom.com/wibutler-pro-innovative-cross-manufacturer-smart-home-platform-ebe5e59475af765c

Digital data is key
– optimized work processes in the office

Tracking occupancy of meeting rooms, cafeterias and restrooms in real time using EnOcean wireless sensors. **By NTT Communications**

Meeting rooms

## Making life easier for office workers via the IoT

In recent years, the working population has been decreasing due to declining birthrates and an aging society, and not only in Japan. Work process reforms and productivity improvements have therefore become a big subject in various industries. NTT Communications is convinced that the usage of digital data provided by the "digital transformation" (DX) is the key to solving those problems. In other words, the evolution from data to "information," or a step further to "intelligence," is one of the necessary factors of the DX.

As one example, the visualization of meeting rooms, cafeterias, restrooms and other shared facilities at the NTT Com headquarters and an accompanying reformation of the work style of office workers led to increased productivity.

Currently, headquarters has implemented 120 occupancy sensors based on EnOcean technology in the meeting rooms and cafeteria. The IoT platform "Things Cloud" that is an in-house service accumulates data so that the company can detect the presence of people in real time. If no presence is detected in a meeting room during a fixed time, the schedule management system assumes it's not being used and automatically deletes the reservation.

Occupancy sensors are also installed in the cafeteria and free space areas, so that if they need to be used for eating or as a work space, it's not necessary to check them in person. Employees can check online whether a space is crowded or not.
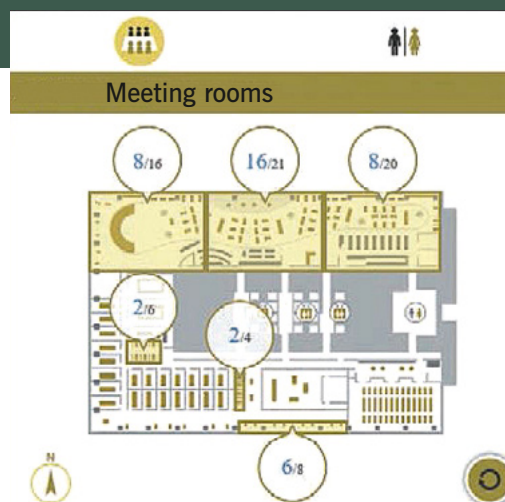
No queues thanks to sensor data

Especially during peak times like lunch breaks, queues at the toilets can be avoided. On the headquarters' 25th-34th floors, NTT Communications installed about 400 EnOcean magnet sensors. Occupancy can be visualized based on the raw data provided. Furthermore, by analyzing the data, cleaning frequency by the cleaning workforce can be reviewed and cleaning times can be planned more efficiently.
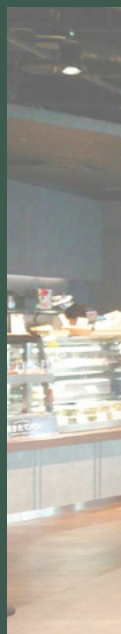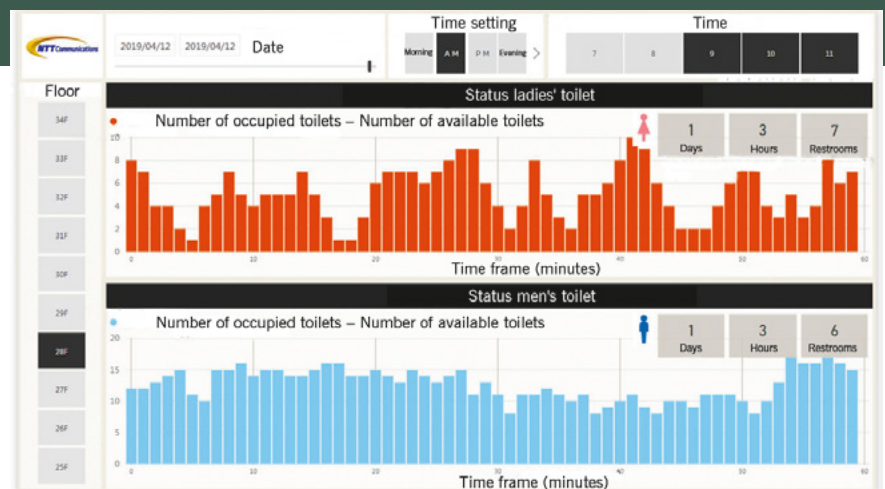
Above: IoT-based management reduces the total cost of ownership. Employees do not stand in front of occupied toilets and cleaning is done according to need.

Food hygiene management in the cafeteria

In 2020 a food hygiene management method called "HACCP" (Hazard Analysis and Critical Control Points) has become obligatory in Japan. In the kitchen of the in-house cafeteria, appliances such as fridges and hot plates have been equipped with EnOcean-based temperature sensors, thus providing a food hygiene solution for food suppliers.

Concerning the upcoming HACCP, NTT Communications is proceeding with implementing this initiative in the food industry so that incidents are not only recorded, but warnings are also visualized and sent if an abnormality is detected. At food chain stores, regular temperature monitoring and reporting that was previously done by staff is now being handled by DX.

www.ntt.com/en/iot

Smart
office
solution

Digital Catapult requested a smart office solution for employee use and showcase purposes in its Future Networks Lab. The focus areas specified by Digital Catapult were desk and meeting room utilization and air quality monitoring. By Peter Smith, Head of Business Development, IAconnects Technology

Hot desking

Digital Catapult needed a quicker way of checking whether hot desks or meeting rooms were available. The company has a number of flexible desks, private booths and meeting rooms for multiple occupancy in the office on Euston Road, London.

Smart technical environment

IAconnects installed a smart office solution enabling employees to check individual and multiple desk and meeting room availability, along with the temperature and CO2 levels in different areas of the office.

The installation included:
• MobiusFlow IoT Edge gateway
• NodeRed dashboard, allowing employees to make an informed desk choice based on a number of factors
• Desk occupancy sensors to show which desks are available
• EnOcean door and window magnetic contact sensors to show which doors and windows are open/closed
• EnOcean presence detection sensors for meeting rooms and communal areas
• A combination of EnOcean temperature and humidity sensors and air quality (temperature, humidity, CO2 and VOC) sensors which will push alerts to the building and office managers informing them when levels are too high and action needs to be taken

By processing live data via a gateway into an employee-accessed web application, Digital Catapult was able to quickly view available desks or meeting rooms and make an informed decision on which area to use, thus saving valuable time. The option to view the temperature, humidity and CO2 levels in different areas of the office helped to improve the wellbeing and work rate of the employees.

www.iaconnects.co.uk

H$_2$O Degree Smart Thermostat communicates with radiator actuators utilizing EnOcean energy harvesting technology

Energy harvesting actuator

key to thermostat control

H$_2$O Degree's radiator control system features actuators utilizing EnOcean technology. By Don Millstein, President of H$_2$O Degree

Numerous multi-family apartment buildings, particularly on older properties, utilize a central plant hydronic heating system circulating hot water to radiators throughout the property to deliver heat to each apartment.

H$_2$O Degree, a manufacturer of advanced two-way wireless submetering systems, in partnership with Micropelt, has implemented a Hydronic Radiator Control System providing wireless control of energy harvesting radiator actuators. This new capability combines H$_2$O Degree's programmable, wireless HCB0104 Smart Thermostat with a Zigbee-to-EnOcean wireless bridge interface and one or more wireless HCV0104 radiator actuators per unit.

Single platform for property managers

The HCV0104 wireless radiator actuators feature EnOcean energy harvesting technology, eliminating the need for cable connections or batteries. H$_2$O Degree is the first to introduce this wireless energy harvesting technology into the U.S. on the FCC approved frequency band of 902 MHz, successfully integrating its wireless mesh and EnOcean technology into a single platform.

Property managers can view all the thermostat values such as set points and temperature readings on H$_2$O Degree dashboards and adjust units individually or adjust all units site-wide. Residents can be given access to their in-unit thermostat through a web-based portal or mobile application that allows remote control of their temperature setpoints that wirelessly actuate the radiator valves.

Pay only for consumed energy

In addition to the advanced control, the system can be used to generate utility data to bill tenants for their specific usage of energy for heating through the run-time feature in the thermostat. This not only allows property managers to pass the cost on to tenants but creates an incentive for behavioral change among tenants to conserve energy. The anticipated savings could exceed 20% on the heating bills. The energy harvesting feature of this new wireless radiator actuator makes the unit ideal for retrofit installation and cost-sensitive projects where cabling cost is prohibitive.

www.h2odegree.com

Migratory Bird School becoming
smart

A well thought-out lighting concept ensures a pleasant atmosphere. The modern designed living area offers space for the whole family, the outdoor area entices with a play area.

The Migratory Bird School located at the Menred Oujiangkou Campus in the Chinese Zhejiang Province is not a school in a strict sense: Each year, primary students – like migratory birds – arrive here in July and August only. This school was built to allow employees of Menred to reunite with their children during summer vacation and teachers are hired for this period. To make sure the families have a great experience, many new applications including heating, ventilation, intelligent control and renewable energy have been integrated in the building. By Chen Lin, General Manager, Menred Intelligent Systems (Shanghai)
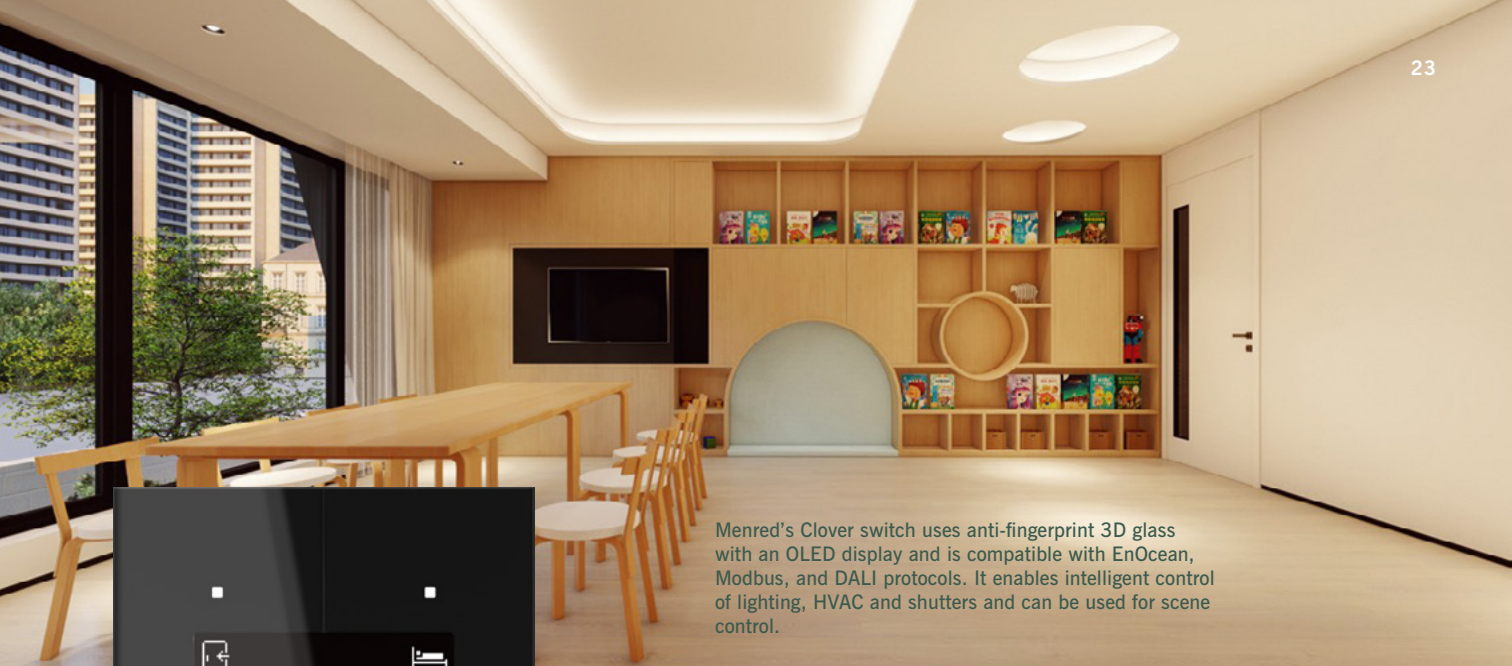
Menred's Clover switch uses anti-fingerprint 3D glass with an OLED display and is compatible with EnOcean, Modbus, and DALI protocols. It enables intelligent control of lighting, HVAC and shutters and can be used for scene control.

Smart from the start

The building has four floors: one underground and three floors above the ground. The building fulfils the zero energy building standard. Several different HVAC systems are used for comparison experiments:

- The first floor is the teaching area and uses VRV + water floor heating.
- The second floor serves also as a teaching area and uses an integrated fresh air and cooling control system plus radiant cooling and heating.
- The third floor accomodates the living area and a fresh air dehumidifier plus radiant cooling and heating are used.

Intelligent control

Menred's miBEE intelligent system collects all HVAC-related data through a SMARTHIVE gateway and uses it for additional scientific control. The system integrates a third-party intelligent circuit breaker device, which can also measure power consumption. Because the second and third floors use radiant cooling, all windows are equipped with EnOcean-based wireless window sensors. Once a window is opened and the cooling system is operating, the radiant cooling stops immediately and sends the information to the facility manager.

In order to achieve the best indoor environment, a five-in-one (temperature, humidity, CO_2, PM2.5 and formaldehyde) air quality sensor is installed in each independent area of the room. Using the air quality data gathered, it controls the air conditioning, floor heating and fresh air supply accordingly.

EnOcean switches

EnOcean light switches are used as wall switches throughout the building. For the teaching area on the first and second floors, the more "traditional" looking, self-powered wireless switches are installed whereas, for the living area on the third floor, Menred's clover switches with touch screen have been chosen for design reasons and to reduce the number of switches. The clover switch also contains EnOcean modules and the tenant can switch control menus with a simple swipe of a finger. It can be connected to the gateway via the built-in Modbus protocol, which perfectly combines wireless and wired technologies.

www.menred.com

Smart and connected
shutters at

Closing shutters centrally or directly

Consequently, the high school chose to transform all its shutters into motorized equipment. To ease management and save time, the high school chose a smart solution: the EnOcean battery-free solution. The main goal was to be able to remotely close all the shutters while keeping track of status feedback to avoid security breaches and to be sure to include every shutter.

The high school also had other requirements: centralizing shutter control and maintaining autonomous control of all the shutters in a room. It was also necessary to find a solution to control the shutter near the board during video projection. The teacher

French high school

Every day after class, someone from Givors' high school (near Lyon, France) had to go around to all the classrooms to close all the shutters. This task required time, caused building heat loss and was a security breach. It was no longer possible to verify that more than 600 roller shutters were properly closed. By Coralie Feillault, Marketing & Communications Project Manager, NodOn

had to be able to control it directly via a switch when needed. The solution to this problem had to be simple and quick to install during holidays.

Wireless solution for easy retrofitting

The school opted for a connected solution with wireless switches to avoid renovation work, maintenance and recurrent battery changes. One of the benefits of this solution was the ability to prepare the installation before on-site implementation thanks to the EnOcean remote commissioning feature.

The high school was thus equipped with 607 NodOn EnOcean roller shutter relay switches: the installation was quick and setup simplified thanks to the auto-calibration feature. More than 150 battery-free controllers were installed, one per room near the blackboard for video projection and one to centralize the control of the class shutters.

Higher security and energy savings achieved

To complete the installation, the high school needed gateways to automate shutter opening and closing. Once installed, gateways allowed the facility manager to independently control the system. Thanks to status feedback, the system can now make sure that all shutters are closed at the end of the day, for efficient security management and more energy savings. Moreover, a central switch was installed at the entrance box that provides central control of all the school shutters.

Givors' high school now benefits from efficient roller shutters management. The battery-free EnOcean solution is permanent because it doesn't need maintenance. Very little energy is required to operate this mesh network. This solution is cost-effective over the long term. Construction preparation and installation were also cost-effective.

nodon.fr/en

Smarter controls for low-carbon, high-productivity workplaces

The advent of smart building systems has introduced a wealth of opportunities for building and estate managers to automate processes, optimize resources, improve energy efficiency and boost environmental performance. By Mark Davenport, Smart Buildings Director, ENGIE

The combined expertise in facilities and energy management enables ENGIE to develop new smart building technologies and services that increase efficiencies, meet the demands of today's flexible workforces, and fulfil the financial and environmental priorities of building managers.

Machine learning capabilities for smart building systems

ENGIE smart building systems collect and continuously analyze data from multiple feeds within a building to create meaningful insights. By applying software-based analytics, machine learning and AI-based programming, the systems extract maximum value from this data to inform the control and management of building assets.

The latest innovations enable single devices to monitor, control and manage multiple building assets and technology, regardless of manufacturer or wireless protocol. Modular by design, these products can connect with EnOcean, Zigbee, Bluetooth and any new wireless technologies, simply by adding plug-in boards – creating future-proof devices that can be customized to individual building needs.

Improved working conditions

The Smart Light Manager is a wireless lighting system and communications manager. Utilizing the Zigbee self-meshing network to communicate between the lighting and fitted with sensors to detect ambient light levels and occupancy, it allows users to effi-

ciently control and monitor all aspects of lighting. The device's communications manager allows integration with multiple wireless and wired technologies, EnOcean, BLE, Dali & RFID.

Smart product interaction

Smart Multisense is a retrofit product, providing advanced automation services. It

The Smart Multisense Sensor is a modular enabler for the IoT.

contains motion and luminosity detectors to manage light levels according to occupancy, plus a Bluetooth Smart module to provide location-based services to users within the area.

Both Light Manager and Multisense have optional plug-in modules, which allow communication with multiple assets in order to control heating, cooling, window blinds, radiator valves, security access systems and much more.

The new Air Smart sensor can be connected to both of these products. Uniquely, this single device can detect and monitor 17 different gases or airborne elements. It constantly monitors air composition and manages air quality by controlling AHUs, window openings and other assets to maintain a productive working environment. The device meets global RESET air-quality standards.

Together, these new smart products help to optimize working conditions, while helping building managers to minimize energy consumption, costs and carbon emissions.

www.engie.co.uk

Direct communication with smart home systems, thanks to 2.4 GHz enhancement

The ViACT platform from ViCOS has taken up permanent residence in professional installations and in the smart home. The flush-mounted actuators for lights, ventilation and shading are a key element in room-centric building networks with EnOcean wireless technology. **By Thomas Rieder, CEO, ViCOS**

ViACT now also supports the 2.4 GHz wireless range. This gives the ViCOS actuators the ability to communicate directly for the first time with the smart home systems from Amazon, Apple and Google. ViACT also communicates directly with the PTM 215B self-powered switch module as well as the EMDCB battery-free motion detector, both of which are 2.4 GHz EasyFit products from EnOcean GmbH.

ViACT can be integrated into all known EasyFit-compatible switch programs. This unique decor capability forms the basis for the successful product platform.

Professional commissioning
The ViACT functionality and reliability during operation and wireless EnOcean communication ensure customer satisfaction, as does

the ability to fully commission installations that use ViACT as the actuator system.

ViCOS offers its OEM customers the EnOcean ConfigTool for commissioning, which also permits installation and service work in the field as well as comprehensive electronic documentation for an installation. ConfigTool is based on the remote commissioning function standardized by the EnOcean Alliance and supports not only ViACT and ViSENS – the sensor platform from ViCOS – but also many other interoperable 868 GHz EnOcean products. These 2.4 GHz products and the associated NFC interface will be added to the EnOcean ConfigTool by the middle of the year.

www.vicos.at/en

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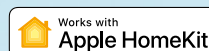
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Learning methods

In establishing sensible AI methods, a distinction is made between unsupervised learning, supervised learning and evolutionary learning methods.

The first method evaluates and groups (large) amounts of data – for example, to discover dependencies (such as commonalities among customers of a certain product).

Supervised learning uses a neural network and subjects it to training phases. However, the main shortcoming of neural networks is that they are suitable only for performing tasks similar to those of the training phase.

Methods that independently (meaning without a training phase) determine which

Making everything smart

Artificial Intelligence (AI)

in smart buildings

Back in 1950, Alan Turing developed the "Turing test" in which a machine has to emulate human behavior without revealing itself to be a machine. Specifically, this means that an evaluator sends questions to a machine or a woman via telex. Both present themselves as a woman. If a machine could fool the human often enough, the machine would be viewed as capable of thinking. Turing identified two key criteria for "artificial intelligence": necessary computing power and the actual learning methods. By Prof. Dr. Michael Krödel, IGT - Institut für Gebäudetechnologie

actions are appropriate in a situation are the highest form of artificial intelligence. The best-known method in this category is reinforcement learning.

Opportunities and consequences for building automation

Operating buildings or entire properties is becoming more and more complex. It is thus an excellent application for computer-supported evaluation or optimization of operating procedures.

Due to the necessary computing capacity requirements, corresponding algorithms in the form of building management systems (BMSs) can be found on the management level.

Basic building operation remains the responsibility of the controllers (DDC systems) on the automation level. However, it is vital for these controllers to interact harmoniously with the BMS system and to agree on which one is responsible for primary functions and which handles supporting tasks.

On the field level, it is important that components such as sensors and actuators be able to be fully integrated. In this case, radio-based sensors play a special role. The right infrastructure is essential to a powerful, radio-based system in order to integrate the number of necessary sensors in buildings and to also operate them, for example, in furniture or in variable locations. EnOcean remains the technology of choice here,

because it is supported by many controller manufacturers and consistently uses energy harvesting, resulting in maintenance-free operation.

Conclusion

The requirements imposed on "smart" building operation and data evaluation are growing. Increasingly, the actual "intelligence" is shifting to the management level and requires a harmonious division of work as well as modern protocols between controllers and the BMS. The components on the field level are also becoming more communicative, including infrastructure for mobile and maintenance-free sensors.

www.igt-institut.de

A compact powerhouse

The new Omnio miniSO1 switch actuator fits into any flush-mounted box and can switch all electric loads, thanks to cutting-edge hybrid technology and zero-cross switching. It is based on EnOcean technology, and the TCM 515 is used as the wireless module. By Beat Zbinden, Product Manager Omnio, AWAG Elektrotechnik

Despite its minimal dimensions (40 mm x 40 mm x 18 mm), the switch actuator is also geared to high loads with continuous currents of up to 16 A. And it delivers all this with an energy-efficient standby consumption of less than 0.5 W. Innovative hybrid switching technology actively suppresses undesirable side effects when switching all common loads, and the relay also operates in zero crossing mode. The miniSO1 has thermal as well as electrical overload protection, which gives it special robustness and a long lifespan.

Like all Omnio actuators, the miniSO1 offers many functions ranging from simple switching and time functions to occupancy simulation and programmable scenes.

www.omnio.ch

New gateway unlocks smart sensor data

Pressac Communications, a leading manufacturer of smart building technology, has unveiled a new gateway which makes it easier than ever to get sensor data into the cloud.

By Jamie Burbidge, Product Manager, Pressac

The new device means that information on everything from room occupancy to temperature can be easily fed into software or IoT platforms. The gateway works by changing the data gathered by the sensors into JSON, sends it via MQTT and makes it available locally or via the cloud.

The system comes with ready-made connections to leading platforms, such as Microsoft Azure, IBM Watson and AWS platforms, while Google Cloud connections are available if required. It uses EnOcean's internationally approved wireless protocol for transmission, enabling the sensors to communicate data via secure AES 128-bit encryption.

www.pressac.com

Smart access solutions
for smart buildings

With its SAG Smart Line, SAG recently established the first smart mortise lock with EnOcean wireless technology on the market, thereby ensuring wireless and self-powered integration of doors into building automation. SAG Smart Access now provides the next level of intelligent access organization. By Oliver Barnscheidt, Corporate Communications, Schulte-Schlagbaum AG

Digital control in smart properties requires solutions for preventive monitoring, individual room control, keyless access and smart cabinet locks, which ensure a perfect symbiosis between the building and its users. The new SAG Smart Access solution portfolio allows these applications to be configured flexibly at any time.

Keyless access

With SAG Smart Access, electronic lock systems, combined with corresponding apps, ensure that access authorizations can be easily and comfortably organized, for example, via cloud-based systems and platforms while on the go. This solution is open to a wide range of identification technologies, such as Bluetooth, RFID, PIN codes, Time Sensitive Booking Codes and much more.

Smart cabinet locks

SAG Smart Access allows storage space in the form of cabinets, lockers and safe deposit boxes to be flexibly assigned and reserved while on the go, depending on the current requirements. These compartments can also be conveniently locked wirelessly without keys via BLE, RFID or a PIN code.

Preventive Facility Management

To increase building security, SAG Smart Access also makes it possible to easily transmit door movements (actuation of lock striker plates and bolts) as a preventive measure. Combined with EnOcean wireless technology, the state of the locks can be monitored online and the room usage management automated with cloud support.

Individual room control

The use of EnOcean wireless technology and SAG Smart Access makes it possible to organize room control on an access-dependent and thus individual basis. This ensures that selected energy consumers such as lights, heating and air-conditioning systems are not activated until the user enters the room, and they are reliably switched off if the room remains unoccupied for a longer period of time.

www.sag-schlagbaum.com

Smart Access offers solutions for keyless access, smart cabinet locking, preventive facility management and individual room control.

Curl Aberdeen –
lighting fit for champions

Curl Aberdeen is a purpose-built, state-of-the-art, six-lane curling rink located in Aberdeen, North East Scotland. Recently, it held the World Junior Curling championships. This event in March 2018 was streamed live via YouTube and on the BBC Sport website.   By Michael Lehzen, CEO, Deuta Controls

Streaming as challenge for lighting

The challenge for the organizers was that lighting for TV and video has particularly demanding requirements. For example, the illumination levels required for televising curling are 4 - 5 times higher than for normal competition play. The initial plan was to have additional temporary lighting. However, this was judged to be a costly short-term solution for an event lasting just over a week.

LED instead of halogen

Instead, the organizers decided on an alternative solution that was suggested by Holophane and its partner DEUTA Controls, of upgrading the existing lighting. The 36 existing 450W luminaires were to be replaced with 380W LED Haloprism units.

Changing them on a one-for-one basis greatly reduced the cabling and installation costs of the upgrade. There were also large savings in lamp replacement costs because the Haloprism LEDs have a rated life of

100,000 hours compared with 8,000 hours for the previously used metal halide lamps.

The particular luminaires installed at Curl Aberdeen deliver 50,000 lumens with a color rendering index (CRI) of 80 at 4,000 K. Five optical distributions available with the Haloprism and an integrated lighting controller based on EnOcean and DALI allow the new luminaires to exactly fulfil the stringent requirements for TV and competition play. During televising, the Haloprism luminaires are at 100% output and deliver over 1,500 lux onto the ice.

Dimming saves energy

However, this level of illumination is unnecessarily high for day-to-day play. Therefore, the rink decided to install the reliable and easy-to-use Holophane Holos Air Lite system. This is based on EnOcean's energy harvesting technology, which generates the required energy directly from the immediate environment. A simple wall switch that doesn't require any mains power sends a

radio signal to the DALI-connected node on the luminaires. No extra wiring is required to dim the luminaires.

The switch has four positions: On at 100% output, 75% output, 50% output and OFF. Most of the time, the Haloprism luminaires are switched at 50% and energy consumption is reduced from 450W to 190W, a reduction of over 40%. There are further indirect savings in that, since the luminaires produce less heat in the arena, the cooling system for the ice does not have to work so hard.

The result delivered by the two companies Holophane and DEUTA Controls is a vastly improved lighting scheme that consumes much less energy than before. It is also completely ready for televising events that will hopefully produce future champions.

www.deuta-controls.net
www.holophane.co.uk

Lighting control as

The Quadram Institute, located at Norwich Research Park, opened in May 2018. Among its facilities, it boasts one of Europe's largest gastrointestinal endoscopy units and clinical research facilities. The building showcases the flexibility of Prolojik's lighting control system, demonstrating DALI lighting, Central Battery Integration, BACnet and IP integration, along with EnOcean energy harvesting user control. By Asela Rodrigo, Managing Director, Prolojik

Lighting control

The project integrates 3,000+ DALI luminaires into Prolojik's DALI controllers. Over 100 DALI networks are connected to an Ethernet network using TCP/IP area controllers. Control for occupancy and daylight is achieved by over 600 conduit box-mounted DALI multi-sensors, which are designed to fit directly into BESA enclosures, making them ideal for exposed ceilings.

Central battery integration

As with many mission-critical facilities, Quadram Institute is supported by a Central Battery System (CBS). When a CBS is integrated into a DALI lighting system, it is crucial that lighting not be "held off" under

DALI control when the power fails. To prevent this effect, Prolojik developed DALI phase failure monitoring units, which override the lighting to full output in the event of a lighting circuit failure.

AV integration

Prolojik's AV gateways are installed in 9 locations to provide integration between the audio/video system and lighting control. The AV gateways support scene recall, override and bi-directional control of associated services.

HVAC integration

One of the key benefits of Prolojik's open systems approach is the ability to directly

a building's backbone

integrate the lighting data in third-party systems such as HVAC solutions. The ability to utilize the occupancy data to achieve both lighting energy savings as well as share the data over BACnet/IP is one such benefit. This optimization halves the number of installed sensors and reduces construction costs without compromising building functionality.

EnOcean user control

EnOcean has developed a range of wireless and battery-free peripherals that are embedded into a variety of manufacturers' devices. One example is the MK Electric Echo range of switch interfaces. EnOcean provides a number of unique benefits, including service-free operation and cable-free installation.

To take full advantage of the flexibility of EnOcean, Prolojik deployed 17 EnOcean gateways to interface with over 120 EnOcean-controlled rooms to support both switching and dimming control and data sharing with DALI multi-sensors – for seamless control integration.

IP supervisor

A building of this sophistication demanded an equally robust approach to supervision. Prolojik achieved this by implementing a TCP/IP infrastructure and virtualizing the Perspective Supervisor on a rack-mounted server located within the Quadram Institute data racks.

The Perspective Supervisor provides an extensive set of features including real-time monitoring, status reporting, system reconfiguration, time scheduling, DALI, BACnet/IP and EnOcean device management.
The Quadram Institute is a prime example of how the Prolojik open standards-based lighting control system can support the numerous demands of a sophisticated client.

www.prolojik.com

EnOcean and Casambi –
the perfect pairing

Casambi's revolutionary Bluetooth lighting control system unlocks the potential of EnOcean wireless switches. **By Saara Guastella, Product Marketing Manager, Casambi**

The new Diageo headquarters in Edinburgh, the £21 million Prince & Princess of Wales Hospice in Glasgow and the 30,000 m² new building at the Ulster Hospital in Northern Ireland – these are just a few of the locations where EnOcean energy harvesting wireless switches are being used with Casambi to provide professional, reliable lighting control.

New ways to control light
Casambi is the revolutionary wireless system that's changing the way buildings control light. The Casambi Ready ecosystem of interoperable luminaires, sensors and control devices is growing – and EnOcean's products occupy a special place in it.

Casambi enables compatible products, including EnOcean switches, to create a wireless mesh network based on Bluetooth. It has no central hub or gateway – every node holds all the intelligence needed to keep the network running. If a luminaire or other device fails, or is removed, replaced or reconfigured, the rest of the network adapts. It's a self-healing, flexible system.

Casambi is also the only lighting control system in which wireless switches from EnOcean can be paired with the whole network, rather than just the nearest individual node.

This ability to pair with an entire Casambi network means that EnOcean devices benefit fully from the robustness of Casambi's mesh architecture. This makes operation even more reliable, and means the initial pairing process of EnOcean switches with Casambi couldn't be easier. Mobile EnOcean switches can also be used as remote controllers across the whole network area.

Many ways for integration
Integration with Casambi opens up a world of opportunities for EnOcean products. All you need are Casambi Ready luminaires and the free Casambi app – no complex commissioning or setup, and no new wiring.

The Casambi app also lets you control lights using any mobile device. Powered by Bluetooth, Casambi works with every smartphone, tablet and smart watch. Lights can also be controlled using sensors, timers and wired switches and dimmers equipped with a Casambi Bluetooth module.

Interoperability ensured
The Casambi Ready Ecosystem is the biggest of its kind. There are thousands of compatible luminaires, drivers and control components. The technology is incorporated into luminaires from the likes of ERCO, Fagerhult and Zumtobel, and drivers from Tridonic, Meanwell, TCI and many more. All are interoperable with EnOcean switches on a Casambi network.

It's a tried-and-tested system that is being used to manage thousands of lights right now at global locations including commercial offices, museums, universities and retail stores.

Users all over the world are learning that Casambi is the ideal way to unlock the full potential of EnOcean.

www.casambi.com

Wireless

There are many factors that go into the utilization of wireless controls in any building, particularly when it comes to medical facilities. There is, however, a significant use case for controls and there are wireless strategies that provide benefits without creating issues with interference and security. One of the identified protocols for medical facilities is EnOcean technology.

By Cory Vanderpool, Director of Business Development, Magnum Innovations

Certified secure lighting solution

Security, system reliability, interference concerns and impact on patient comfort are the primary drivers for the consideration of wireless controls, particularly as they relate to lighting. Due to the inherent security advantages native in the EnOcean radio module and the way that the radio is utilized from a low power perspective, Magnum Innovations was able to receive independent certification of its gateway and sensors by MIT Lincoln Labs.
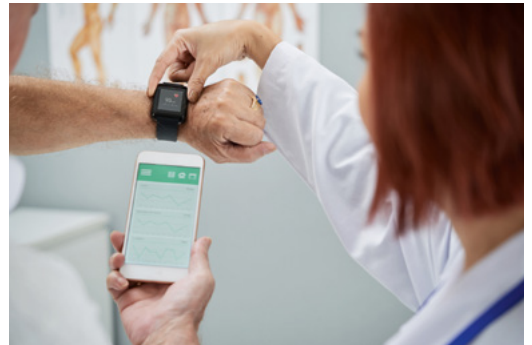
lighting controls
for medical buildings

EnOcean as safe choice

With EnOcean residing at 902 MHZ in the U.S., it is a more suitable wireless technology for medical facilities than Zigbee, Bluetooth or WiFi. Much of the equipment already in place at a medical facility utilizes wireless. The unrestricted use of wireless devices in health care settings is therefore not considered to be a safe practice. EnOcean is a sub one gigahertz radio frequency solution that does not pose a risk to equipment and devices that already utilize WiFi. Additionally, when it is required to cover longer radio ranges in buildings using EnOcean, Magnum's solution is able to increase typical distances by two or three times.

Tridium-based management platform

Magnum has been supporting a large, campus-wide renovation project at Memorial Sloan Kettering in NYC. This multi-year project is unique in that the LED fixtures supplied for the project are all low voltage fed and include no traditional LED drivers. Magnum's 0-10 V pulse width modulation node intercepts the incoming 24 V DC power and then powers up to 100 watts of fixtures downstream while also controlling the fixtures.

Occupancy/LUX sensors provide daylight harvesting and occupancy-based on and off commands, and switches are located throughout for manual overrides. This entire lighting system is tied into a Tridium-based building management platform. The benefits to the customer were the ability to utilize less expensive low-voltage labor, as well as lower-risk power throughout the facilities, which can reduce insurance costs.

Magnum's use of EnOcean-based technology makes it an ideal fit for medical facilities. The future of wireless lighting controls for medical buildings will include tunable white and more data-driven capabilities for patient satisfaction and safety.

www.magnum-innovations.com

Wireless Echoflex Solutions sensors and power controls using the EnOcean protocol make it easy for 275 Battery to change office layouts and compete for tenants.

Echoflex Solutions' commitment to service – and the EnOcean wireless protocol – makes change easy for Envise. By Jacob Coakley, Marketing and Communications Specialist for ETC, Echoflex Solutions

Smart use of office spaces

Today's corporate landscape requires more from lighting than ever before. In San Francisco's super-hot corporate office environment, competition is fierce, energy codes are tight, and clients are demanding. Envise manages several buildings in downtown San Francisco and relies on Echoflex Solutions to create lighting control designs that please the tenants, meet all the codes, and even make the contractors happy.

Cool wireless helps 275 Battery to remain a hot property

A perfect example is Envise's property at 275 Battery. The building has space for more than 30 tenants, and every time a new one enters, Envise knows it can rely on Echoflex to create a control system capable of handling whatever the tenant wants. Echoflex's helpful staff is on the ball to help create a lighting control system that properly illuminates a space and follows all applicable energy codes (Title 24 in California).

And, of course, all the data from Echoflex – including occupancy state, light levels, dimmer levels and demand response state – feeds back into the BMS used by Envise. The reporting helps Envise stay on top of energy usage and keeps the company ready for whatever changes are coming in the future. The sensors give Envise all this information, and can respond to whatever commands it sends out as well. The capability is even there for more data and interaction, too.

Redesign rooms flexibly

After the design phase, the Echoflex team submits the paperwork to electrical contractors and end users to make sure the system meets their needs, as well as to engineers to get the stamp. Once the designs are approved, Echoflex works with contractors and the engineering staff at Envise in order to make the transition to a new space trouble-free. Thanks to Echoflex's wireless capabilities with the EnOcean protocol, it's easy for contractors to change the location of sensors and switches to adapt to any configuration, without needing new gear or having to rewire everything.

Contractors like wireless because it means they don't have to open walls and dig around for wiring. They can completely gut a space, redesign it to change offices into conference rooms, or remodel open office spaces into private offices. Echoflex devices can simply be moved around as needed with little reprogramming required.

Businesses today need to be agile, with the ability to gather and act on information seamlessly. With Echoflex, Envise and 275 Battery respond quickly and easily to constantly changing conditions – whether that's just tracking the amount of daylight in a space and dimming accordingly, or building out space to a new client's specifications.

www.echoflexsolutions.com

Smart
lights with a switch

Philips Hue works with partners to enhance smart lighting with easy controls. By Marijn de Jong, Global Product Manager Friends of Hue, Signify

With over a century of experience in lighting, technology and design, Philips Hue is the most advanced brand in smart lighting. It offers an easy, customizable and comprehensive portfolio of smart lights and accessories that complement any home – and any moment.

The Friends of Hue program
Friends of Hue allows manufacturers of smart lamps, fixtures and lighting controls to develop products that integrate seamlessly into the Philips Hue system.

With this program, Philips Hue is supported by a growing number of innovative smart lighting brands to give consumers more options in personalizing their smart lighting system – whether they control their lights using the Hue app, voice via smart home assistants, motion sensors or switches.

Smart switches for a smarter home

Many Friends of Hue partners design smart light switches that can be used with Philips Hue, working directly with the Philips Hue Bridge and the Hue app to ensure a seamless smart light experience. These products are immediately identifiable to smart lighting shoppers: The products' packaging and other in-store and online communications prominently display the Friends of Hue logo.

Thanks to the wireless, battery-free design of the switches based on EnOcean technology, these controls can be placed anywhere in the home. Users – whether DIY or professional installers – appreciate not just the ability to add a light switch without rewiring or cutting into the wall but the environmentally friendly aspects of a battery-free accessory.

Friends of Hue partnerships are open to companies that would like to join the Philips Hue platform. Philips Hue provides integration guidelines, design support and a certification program for all potential Friends of Hue partners.

www.meethue.com/integrate

Friends of Hue partners at a glance:

Friends of
hue
personal wireless lighting

ABB	Niko
Busch-Jaeger	NodOn
Eltako	RunLessWire
Feller	Senic & Gira
Jäger Direkt	TCS
JumiTech	Vimar
JUNG	Voltus

For self-powered smart switches:

"Battery-free by EnOcean" seal

The "Battery-free by EnOcean" logo marks self-powered wireless switch solutions based on EnOcean technology. It allows private users to readily identify the associated benefits: operation without batteries or cables, maintenance-free design, flexibility and comfort.

Manufacturers can use the logo to advertise their self-powered wireless switches that integrate the EnOcean energy harvesting technology for wireless standards, such as EnOcean, Bluetooth® and Zigbee.

www.enocean.com

Battery–free
by EnOcean

U.S. retail chain reduced energy costs significantly

A U.S. retail chain with over one hundred locations was seeking cost-effective solutions to replace outdated lighting and multiple EMS systems. The customer sought to reduce energy costs by upgrading to LED lights and new thermostats, coupled with various rebate programs through an advanced cloud-based control platform.

By Ara Bederjikian, President, Titanium Intelligent Solutions

The retail chain had a broad mix of different store buildings ranging in size from 15,000 to 60,000 square feet with a variety of lighting fixtures and diverse configurations of HVAC systems. It was in the market for three years, searching for a comprehensive remote control/monitoring platform that could provide enterprise oversight solutions to drive savings, operational efficiencies and asset digitalization with future automation capabilities.

Multi-vendor interoperability

Titanium Intelligent Solutions won over the U.S. retail chain with an advanced solution platform that included hardware products from various EnOcean Alliance members for enterprise monitoring, control and analytics. As proven in this project, Titanium is the ideal platform to incorporate sensors and other control devices offered by any EnOcean Alliance members.

Titanium works in synergistic partnerships with EnOcean and EnOcean Alliance members to offer the right solutions for solving customers' problems. These partnerships resulted in the customer using EnOcean products for lighting control, thermostat control, power measurement, heat map for occupancy activity and environmental monitoring.

Benefits and savings

Using the Titanium platform, the U.S. retail chain now has a greater ability to cost-effectively manage the lighting and HVAC in its stores from the corporate office. In figures, this means that Titanium monitors over 20,000 network wireless devices that cover many distant locations for an aggregate of 10 million square feet of space, indoors and outdoors. Additionally, Titanium remote automated commissioning gave the customer savings of approximately 90% during project implementation. Moreover, advanced intelligent capabilities may result in ongoing approximate energy savings of over 30%.

www.titaniumintelligentsolutions.com

Cloud-based platform for enterprise management

- Titanium's brain is a robust cloud-based platform for enterprise management that connects to hardware devices to make them intelligent. It is expandable and scalable as well as interoperable and easy to use with its universal user interface. The platform provides corporate visibility for global remote control and monitoring.

- The platform enables customers to take advantage of many environmental monitoring opportunities. Titanium offers a wide variety of tools such as sophisticated control rules, intelligent and structured alerts, easy access to live sensor data and an astronomical clock.

- The Titanium network provides real-time data, live network status and network optimization and alerts for many buildings in multiple locations and multiple regions.

Every smart city starts with the smallest unit – the smart home

Efficient, green, networked and technologically up to date – this is what characterizes concepts like the smart city. While the focus has been primarily on technology in recent years – for example, to create applications for single persons, families or senior citizens – these solutions are now merging into a holistic construct. By Celina Schuricht, Assistant of the CEO - Strategic Market Development, JF Group

Higher-level software, cloud services and temporary services are becoming more and more important. The growing number of smart homes is driving the need for smart building and smart quarter solutions. Together, these developments pave the way for a holistic smart infrastructure for cities – the smart city.

New ways of living and working

People´s demands on their living and working environments are changing. Digital building and the designing of everyday life in a smart way are easier than ever before with the current state of development of sensors and actuators based on EnOcean technol-

ogy. Smart home (private) or smart building (commercial) radio solutions – which can be implemented in new buildings with no additional costs compared to the standard installation and can be retrofitted in existing buildings without renovation – create a smart infrastructure that increases comfort, minimizes costs and protects the environment.

From smart home to smart quarter

In the smart home, intelligent functions begin with lighting, heating and roller shutter control – for example, via an app or voice assistant using a mobile device. In smart apartments, digital rental processes solve annoying issues such as scheduling the meter reading, maintenance or energy cost billing. In the commercial context of the smart building, attractive functions include conference room and appointment management, cleaning on demand and the visual-

ization and evaluation of sensor data for process optimization. High energy-saving potential is also generated in this area, so that the technology pays off thanks to lower operating costs.

The next stage, the smart quarter, already enables the cross-divisional networking of the most diverse smart apartments and commercial premises and supplements smart technology with further functions, such as the administration of shared areas via an app (for example, parking lot occupancy).

The smart city is more than the sum of intelligent buildings

For the emergence of a smart city, the use of these developments means numerous possibilities, ranging from the optimization of mobility and infrastructure, to protection of the environment and resources, all the way

to citizen-friendly processes in city hall and administrative offices that can significantly improve every person's quality of life.

JÄGER DIREKT, manufacturer of the intelligent building system solution OPUS green-Net, experiences the new requirements coming from the areas of politics, the economy and population as an additional driver for the electrical engineering industry. Increasing interaction with system house builders, the real estate industry and the "big players" from the software and electronics industry is creating new networking opportunities almost every day. The biggest challenge: comprehensive system integration and access to the people who use or invest in the technology.

www.myOPUS.eu

Connected
handle for sliding doors and windows

La Croisée DS is one of the leading suppliers of accessories for doors and windows made of wood, aluminum and PVC. The French company is well-known for its very stylish and contemporary product designs while also meeting all relevant technical requirements and standards. **By La Croisée DS**

As part of the further development of its products, La Croisée DS places great emphasis on connectivity and is constantly adding new features. The eSarena window handle fits seamlessly into this strategy.

Compatible with smart home systems
eSarena is based on the PTM 535 radio transmitter module from EnOcean. It is able to transmit a telegram – using very little energy – to indicate the position of the handle on any door or window. eSarena is compatible with the majority of smart home hubs available on the market.

The new sensor in the handle allows it to automatically switch off air conditioning when a window is opened, thus saving energy. Additionally, it can warn a resident that a door or window has been opened even though no one's home.

Due to its design and patent mechanism, installation is very user-friendly and the handle blends in perfectly with its surroundings. Of course, it easily connects to any smart home system.

www.lacroiseeds.fr

Eimsig offers first HomeKit-compatible alarm system in Europe

The Eimsig alarm system, which has patented* window and glass breakage sensors with EnOcean wireless technology, is compatible with Apple HomeKit™. It can be conveniently coupled with all of HomeKit's smart home functions and offers additional benefits as well… By Florian Schmidt, Managing Director, EiMSIG

In a blackout, the power supply is maintained by a backup battery, and the alarm system operates autonomously even without the Internet. Users have a comfortable overview of all windows and exits and can see whether the alarm system has been activated or deactivated.

Where security meets comfort

A secure home should not mean sacrificing comfort. Users have the option of saving different scenarios and deciding, for example, when lights and blinds are active, what music is played when they enter the house and what temperature should prevail in the individual rooms.

Compatibility & connectivity

All Eimsig security systems can be coupled with many others via interfaces, including KNX bus systems. The EnOcean window sensors are compatible with many smart home systems. The HomeKit-capable security system can be upgraded wirelessly and by radio at any time.

Window sensors signal break-in attempts

Windows should not just be pleasing to look at, they should also be secure. Eimsig therefore develops window sensors that protect the home's outer skin and raise the alarm as soon as someone tries to break in. Their special feature is that they also protect tilted windows. Eimsig's new window sensor with the EnOcean wireless standard breaks new ground. Its combination of jimmy and glass breakage protection is innovative and makes the medium-sized company a pioneer in protecting windows against intruders.

www.eimsig.de

Smart home
for comfortable living

With its new series 64 wireless actuators, Eltako Professional Smart Home has reached the next stage of evolution. Controlling the actuators for teach-in and switching/dimming is now possible with not only EnOcean wireless switches as well as wired switches but also directly via the WiFi home network using a smartphone.

By Ulrich Ziegler, Chief Business Development Officer, Eltako

Since the devices are real latest-generation IoT products with a dedicated IP address, users can also remotely access them via the Internet. All smartphone connections are highly encrypted and therefore extremely secure. WiFi, Bluetooth and EnOcean can be completely deactivated for offline-only operation.

Ready for future developments

The new series 64 actuators can be updated right from the start. Enhanced firmware – the software needed to operate the devices – can be loaded from a smartphone as well as from the Internet via WiFi. As a result, the actuators are absolutely future-viable and open to market developments down the road. All settings can be downloaded and also transferred to other actuators as needed.

The series 64 actuators are Apple-certified and can therefore already be easily integrated into Apple HomeKit™ – including voice control. Google Assistant, Amazon Alexa and other systems are also provided for integration following a firmware update.

Overview of the new actuators

Four new series 64 flush-mounted actuators are available immediately: a wireless universal dimmer switch, non-floating and with an N-type connector, FUD64NPN/110-240V; a wireless pulse switching relay, 16A, non-floating, FSR64NP/110-240V; a wireless pulse switching relay, 16A, non-floating, FSR64PF/110-240V as well as a wireless shading actuator for a venetian or roller blinds motor up to 4 A/250V, non-floating, FSB64NP/110-240V. The FSR64NP and FSB64NP types are additionally equipped with a measuring IC for measuring power.

When it comes to the control functions with EnOcean wireless switches and wired switches, series 64 is fully compatible with series 61 and series 62 as well as the Eltako tap-radio system and the series 14. They

use the perfected tap functions for conventional teach-in with a switch and without an app, which means that they don't require any manual settings on the actuators. Plug-in terminals up to 2.5 mm² in size make the devices easy to connect. The installation depth in flush-mounting boxes is only 23 to 25 mm.

New Eltako app for remote control in smart homes

Eltako has developed a new app to accompany all everyday processes in the smart home. It can be used to set, trigger and control all functions of the smart home easily via smartphone. The new Eltako app is thus a universal remote control that allows all systems in the house to be connected and operated centrally via a user interface. Lighting, shading, security and air conditioning can thus be adapted to personal needs without much effort and controlled individually at any time.

www.eltako.com

The new series 64 actuators with the new Eltako app: a professional jack-of-all-trades that perfects smart living.

The
switchless
house –
a success story in theory and practice

Up to five percent of the total cost of a new building generally goes to electrical installations. However, this figure can easily be higher, depending on individual wishes and requirements. Smart homes, in particular, are said to let the construction costs go through the roof. They are expensive playthings, or so the theory goes.

The project titled "The switchless house" demonstrates that the very opposite can be true in practice. In the collaborative project between STREIF GmbH, Eltako and wibutler, wireless actuators replace conventional electrical wiring.

Instead of the usual pushbuttons, the wibutler home automation system wirelessly connects the devices to each other via the EnOcean wireless standard. The equipment can easily be automated with the aid of self-defined timer and if/then rules. The connected devices then operate independently, interact with each other or follow an individual schedule. If desired, wibutler Alexa Skill can be used for everyday device operation beyond the automation function. Users can then turn up the heat and switch on the lights with voice commands.

However, "The switchless house" would not be a home running on user-defined rules if the residents were forced to live without light switches, etc. Radio-controlled pushbuttons can be mounted according to spe-

The switchless house collaborative project shows how modern wireless technologies can lower construction costs and living barriers and how residents can also benefit from the greatest possible flexibility and above-average comfort. **By Felix Redepenning, Marketing & PR, wibutler**

cific preferences. These switches can also be flexibly repositioned later on.

Flexible, comfortable and economical: "The switchless house" shows that sometimes theory and practice are, in fact, worlds apart.

www.wibutler.com

The heart of a future-proof smart home: wibutler pro interconnects more than 200 devices from different manufacturers.
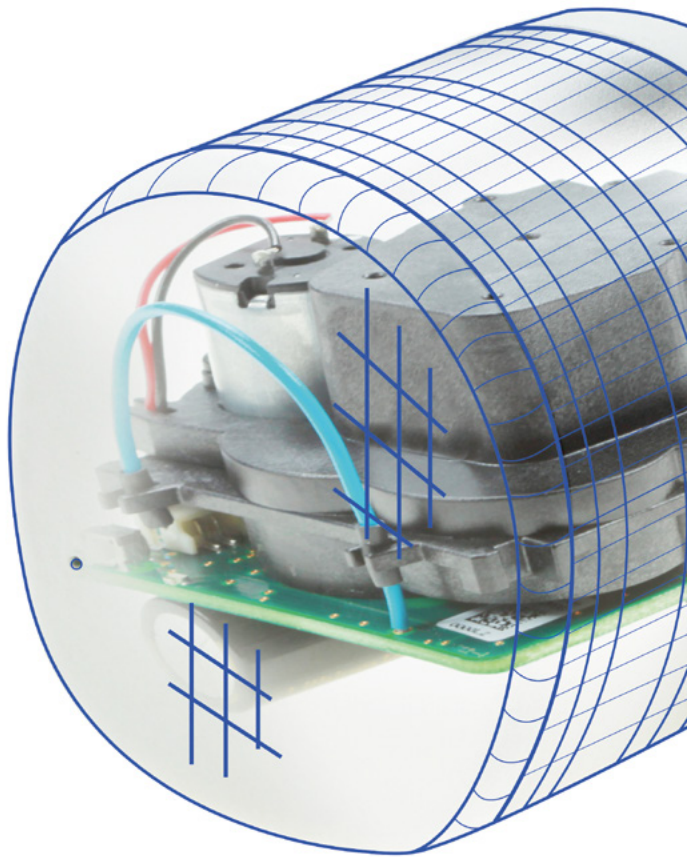
Energy harvesting technology in the radiator valve

By Michael Wigant, Head of Technical Sales,
MinebeaMitsumi Technology Center Europe

Environmentally neutral power generation and interoperability are two important cornerstones of any smart home. The SmartValve radiator valve from MinebeaMitsumi operates without a connection to a battery or power supply and can easily be integrated into any existing smart home system. Electrical voltage is generated from the temperature difference between the heating system and room air, using a thermoelectric generator. The valve communicates by default via EnOcean.

www.minebeamitsumi.eu/en

Thinking
smart
from the very start

The sensor family from Mayer & Co welcomes a new addition: the MACO eTRONIC wireless sensor. Once again, it has reliable EnOcean technology on board. By Stefan Wajand, Product Management, MACO Group

A question that occasionally arises when building houses is this: "What do we want to have – a smart home or a chic designer kitchen?" Smart home solutions still frequently get the short end of the stick. But what if homeowners could leave all their options open from the very beginning? eTRONIC makes this possible. The window manufacturer installs only the concealed plastic housing – which is smart home-ready. The wireless sensor is compatible with every fitting system, meaning that customers can add the sensor electronics at any later date. They then enjoy protection through the eTRONIC "lock monitor," which communicates with a signal transmitter or gateway via EnOcean. It was developed in cooperation with Eltako – so it is perfectly matched to the smart home system of the electronics specialist.

www.maco.eu/en-INT
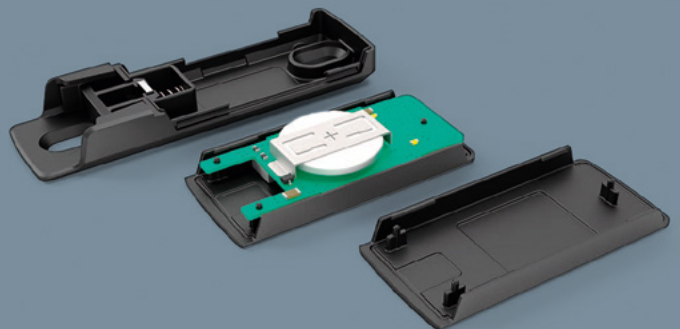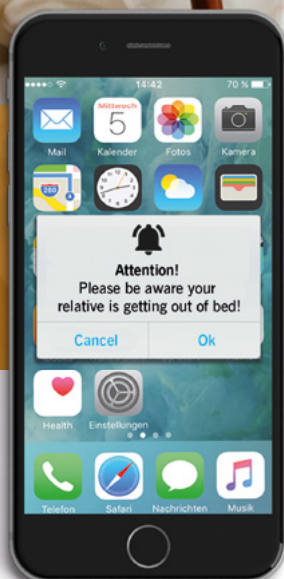
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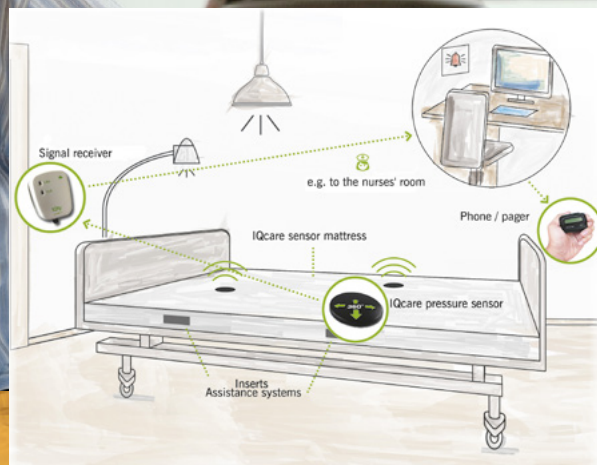
Center of competence for the care sector and private care.

By Andreas Thometzek, Managing Director, IQfy

IQfy, which manufactures safety and assistance systems for the care sector, built a comprehensive center of competence in Bückeburg, Germany. Together with the lighting manufacturer EMB Leuchten GmbH, the company outfitted three living environments for seniors with lighting control, sensor, heating and safety systems. All components are networked with each other via EnOcean wireless technology.

Care with EnOcean inside

In collaboration with lighting manufacturers and other vendors, IQfy develops individual solutions for a wide range of applications in the care sector. With the transmitters and receivers in its IQcare portfolio, the company demonstrates that EnOcean wireless technology is an excellent choice for senior and patient care.

An important reason for this suitability is that the wireless radio technology can be easily integrated into existing structures and is also extremely economical. System handling can be learned very

quickly and the maintenance work is minimal. This also makes the solutions suitable for private, in-home care.

Complete control and assistance system

Slide-in sensor elements for the IQcare assistance system were added to the medical mattresses used in the showrooms. An extensive and demand-based control and assistance system was created on this basis by integrating additional EnOcean components. Via the call system or a cell phone, for example, the system signals that the person being cared for has gotten out of bed.

The sensors in the mattress also use the same radio signal to activate the room lighting and door sensors. The general lighting or an orientation light goes on and the door – to the bathroom, for example – opens. The sensitive sensor system on the doors detects obstacles and stops the doors automatically, providing another safety aspect.

Additional mobile light switches supplement the switch system in the showrooms in important locations, such as directly at the bed. All these measures mean that people who are bedridden or suffer from dementia are far less likely to have an accident.

www.iqfy.de/en

A drive for blinds with EnOcean wireless technology

Less effort, more precise control

EnOcean technology has become the established standard, especially in the prefabricated home segment. Up to now, classic drives have often been used to control roller and venetian blinds without batteries. These drives each required a supply cable for the roller/venetian blind actuator – for example in the switch box. This resulted in an enormous amount of installation work and farsighted advance planning, especially when it came to prefabricated construction.

By Frank Haubach, Head of Sales and Marketing, Becker-Antriebe

BECKER-Antriebe, which specializes in drives and controllers for blinds and shades, is the first supplier to incorporate the EnOcean radio module directly into a tubular drive and thereby make it even easier to use. A separate actuator placed on the DIN rail is no longer necessary and complex cabling is avoided. The result is maximum flexibility and considerably less time and money.

Apple HomeKit-capable

The new Becker EnOcean drive is the first tubular drive that can be integrated into the Apple HomeKit™ via the OPUS SmartHome gateway from JÄGER DIREKT. Apple users can thus very easily automate and control the functions of their blinds.

Smart functionality

Combined with other EnOcean products, the new addition to the Becker drive portfolio also offers other functions that go beyond the standard, such as a ventilation function that interacts with a window contact. The drive can also be easily combined with a smoke detector so that, for example, the blinds are automatically raised when an alarm is given and the escape route is reliably kept open.

www.becker-antriebe.com

Fashionable all-rounder

New addition to the EasySens family: The new NOVOS series of room sensors and room units has been added to Thermokon's self-powered, intelligent wireless system based on EnOcean technology. By Maximilian Lück, Marketing, Thermokon Sensortechnik

From elegant design to a high level of functionality and time-saving installation, the new NOVOS series of room sensors and operating units offers bundled advantages. The flat enclosure and the slightly eroded surface also underline the fact that NOVOS meets the highest architectural requirements.

In addition to the hard-wired NOVOS 3 family, the room sensors and operating units are now also available with an EnOcean radio interface called NOVOS 3 SR.

The NOVOS 3 SR versions are as diverse as they are suited for all kinds of applications, ranging from a pure room sensor without operating elements to a room control unit with push-button and/or setpoint adjuster for convenient temperature control and an RGB LED for status feedback.

A further highlight of the NOVOS 3 SR is the integrated sensor technology, which provides the current room temperature and relative humidity of a room. In order to completely live up to its reputation as an "all-rounder," types that additionally measure CO2 and mixed gas content (VOC) are also part of the wireless family (to follow in the second half of 2020).

The large solar cell used in all NOVOS 3 SR types ensures an excellent energy balance. For rooms with unfavorable ambient light conditions, there is an option of using a standard AA battery for energy supply.

novos.thermokon.com

EnOcean products

EnOcean offers maintenance-free wireless sensor solutions for self-powered applications in the Internet of Things that are used for building and industrial automation, smart homes and LED lighting control.

868 MHz products:
EnOcean for Europe and other countries adopting R&TTE/RED specification

902 MHz products:
EnOcean for North America adopting FCC/IC specification

928 MHz products:
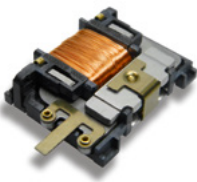EnOcean for Japan adopting ARIB specification
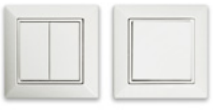
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Energy converter	For battery-free wireless switches	For energy harvesting wireless sensors	For controllers and actuators	Tools

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EnOcean Products: www.enocean.com/products/
                    www.easyfit-controls.com

Product Finder: www.enocean.com/en/product-finder/

The classic with new features

Battery-free PTM switch module with NFC and security

By Marian Hönsch, Product Manager, EnOcean

With the PTM 210 switch module, EnOcean has created an industry standard at the heart of every battery-free switch module. With its standardized interfaces and uniform Original PTM form factor, the PTM can be integrated into all common switch frames.

EnOcean presents the next generation of its PTM switch module for the EnOcean radio standard in 868 MHz, which additionally integrates an NFC interface. The successful Original PTM form factor and functional backwards compatibility of the PTM module remain unchanged. It still fits into numerous switch designs for a battery-free control of lights and shutters in building automation and the smart home.

Data security

The fact that the device keys are not readable via NFC, but only transferable, also contributes to increased data security. In addition, a desynchronization of sender and receiver is impossible, as the rolling code – a continuously incrementing counter for obfuscation and authentication – is sent with each transmission.

"EnOcean Tool" for configuration and commissioning of EnOcean NFC devices

EnOcean introduces its own app called "EnOcean Tool" for an easy configuration and commissioning of EnOcean NFC devices such as the new multisensor or the next-generation PTM. EnOcean will equip all new products with an NFC interface from now on.

The app serves as a configuration interface between NFC devices and NFC readers such as NFC-enabled smartphones or tablets. It can be used to determine all essential product parameters.

EnOcean launches the app with a basic version mainly aimed at OEMs and installers. They can also use the application to integrate NFC devices into existing systems. "EnOcean Tool" can be used to optimize the energy consumption of the respective device, monitor the performance of the integrated solar cell and read out all product information such as product ID or device recognition. Access to the NFC interface is protected by a user-defined PIN code. The "EnOcean Tool" app is available free of charge for the operating systems iOS and Android.

www.enocean.com
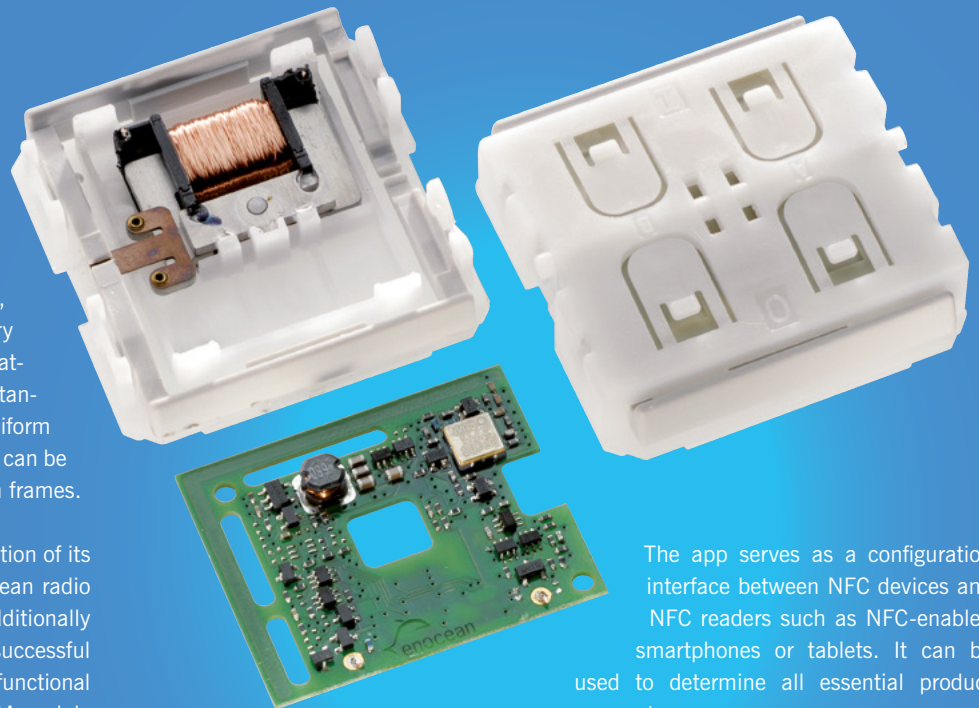
The new multisensor as
key to intelligent IoT systems

EnOcean is presenting its latest innovation: the solar-powered multi-sensor family STM 550, which integrates temperature, humidity, light, acceleration and magnetic contact sensors in a small form factor. The sensor all-rounder thus supplies data via Bluetooth and the EnOcean radio standard for a wide range of applications in digitalized buildings and the IoT.

By Matthias Kassner, Vice President Product Marketing, EnOcean

The integrated solar cell generates all the energy required for measurement and data communication from available ambient light. This energy is stored internally to ensure that the device can function for several days without light.

The multisensor has an NFC interface, which makes it easy to configure using an NFC reader, smartphone or tablet. The sensor module has been integrated into the proven PTM 21x form factor. This is the first time EnOcean has extended its established Original PTM form factor to sensors. Manufacturers can now integrate the multisensor conveniently into a variety of switch ranges without the need to develop new housings.

Due to the small form factor and its wireless and maintenance-free operation, the multisensor can be used very flexibly wherever data is required.

A few use cases:

Prolojik extends space management solution
Proxima networks sense, collate and interpret sensory data to support intelligent space management. The incorporation of the EnOcean multisensor for Bluetooth adds relative humidity, lux and asset movement to Proxima's capabilities in a self-powered zero-maintenance package.

Kopp simplifies home automation
The self-powered multisensor supports Kopp's idea for a comprehensive home automation concept. Due to its flexible application, Kopp can detect a wide range of situations and allow for corresponding scenarios and reactions by the automation. The simple integration via Bluetooth fits perfectly into the company strategy of intuitive installation.

www.enocean.com

Overview of the
EnOcean Alliance Members
www.enocean-alliance.org/products

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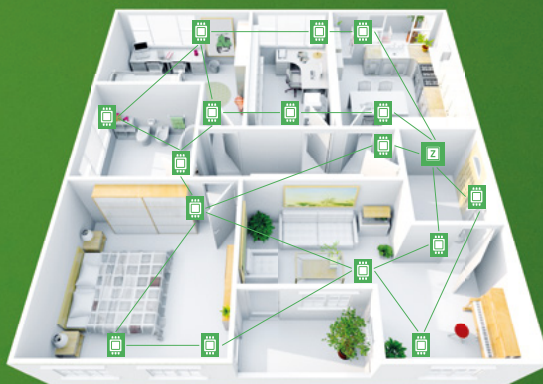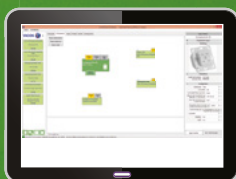
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