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E 2017 1

perpetuum®

THE WORLD OF ENERGY HARVESTING WIRELESS TECHNOLOGY

Connected IoT

IBM: Cognitive buildings

EnOcean: The Internet of Things – from the sensor to the application via the cloud

thermokon®

HOME OF SENSOR TECHNOLOGY

SR06 LCD

EasySens® – Room Operating Unit

THE TECHNICAL DESIGN HIGHLIGHT

Stylish, compact, user-optimized – the Thermokon room operating unit SR06 LCD enables a comfortable control of the room climate. Besides current values the display allows the precise input of desired set points.

The solar-cell powered room operating unit is energy self-powered and maintenance-free. In addition, the SR06 LCD is wireless – no wiring needed. Thereby, a free room positioning is no problem.

- Modern, high-graded optics
- Best possible flexibility thanks to different types
- Bidirectionality by means of SmartAcknowledge SmartACK
- Easy configuration via PC
- Battery-less operation due to Energy Harvesting Technology
- Compatible to all common switch programmes – three colors at option

FURTHER EasySens® ROOM OPERATING UNITS

SR04

thanos

SR07

Dear reader,

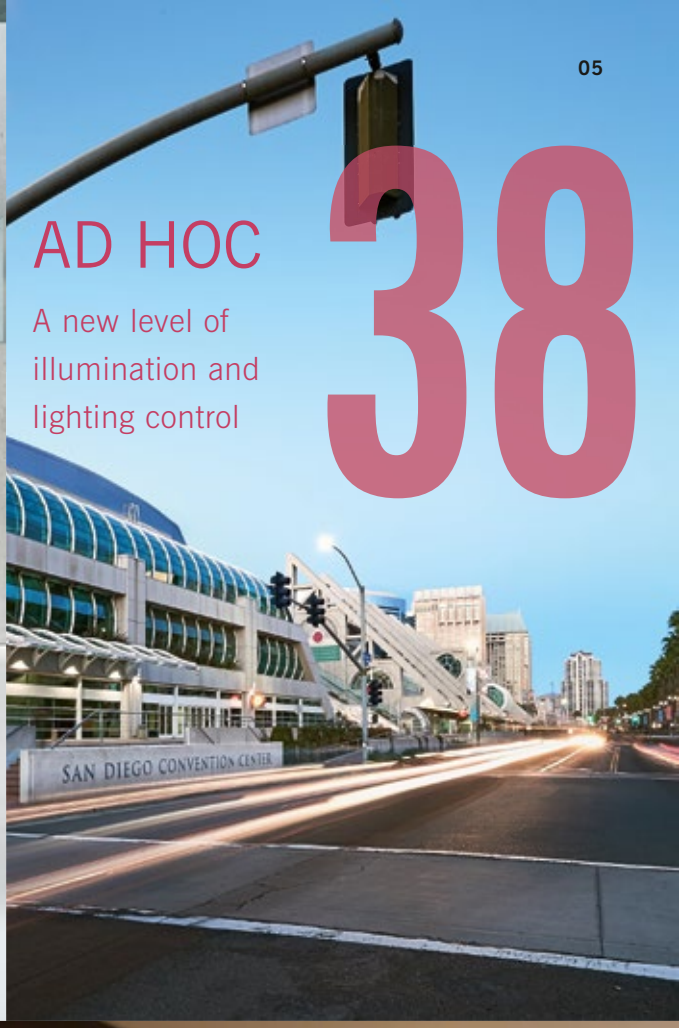
we founded our company 15 years ago, based on a simple idea and with a great deal of enthusiasm. We have remained true to the claim of the EnOcean company name that we came up with at the time. Since then, we've been tapping the "**En**ergy **Ocean**" all around us in order to operate wireless sensors without batteries. The basic idea underlying the technology is and remains fascinating. Every state change, such as pressing a switch or changing a temperature, also results in a change in energy, which makes it possible to collect this information and process it electronically in order to turn it into a wireless signal.

While the focus in the early days was on the simplest of switching applications for controlling lights and heating, the recent trend of the Internet of Things (IoT) offers entirely new application possibilities. The wireless signal no longer merely replaces cables between sensors and actuators, and the light switch also controls far more than the power supply to the lamp. Instead, our sensors generate raw data for the IoT. The desired action no longer results from the rigid connection between the switch and actuator but from the context of all information gathered. For example, pressing a button calls up a scene that turns on the lights and the coffee machine depending on the time of day or opens the blinds when the ambient light has reached a sufficient level. The raw material of sensor information thus forms the basis for creating intelligent systems, from the smart home to highly efficient building complexes to integrated Industry 4.0 applications.

The underlying wireless standard is determined by the particular application. Our energy harvesting solutions today support the interdisciplinary "EnOcean wireless standard", which has been optimized for building technology, as well as 2.4 GHz Bluetooth and ZigBee solutions for use in a room, including long-distance wireless solutions with ranges of several kilometers. The EnOcean Alliance standardizes the EnOcean wireless technology with interfaces of interoperable wireless sensors for the Internet of Things. As a new promoter within the EnOcean Alliance, IBM will contribute its experience in digitalization and cognitive computing to help us introduce entirely new aspects into the EnOcean Alliance, for example to implement innovative solutions for optimizing real estate projects.

As the new CEO of EnOcean GmbH, I am very much looking forward to working with our team and our established and future partnerships to shape the many development and application possibilities for our energy harvesting wireless technology. I hope you enjoy reading this issue of Perpetuum.

Andreas Schneider
CEO, EnOcean GmbH



Figures for the EnOcean ecosystem

The ocean of unused energy - this source reveals the batteryless wireless technology from EnOcean. What advantages do EnOcean switches and sensors offer? This page provides insight into the microcosm of energy harvesting and the future of the Internet of Things. Learn more about the new EnOcean Alliance logo on page 60.

→ The EnOcean Alliance has more than 400 members.

→ Over 1,500 interoperable products based on the EnOcean standard are available.

→ Enocean technology has already been installed in more than 400,000 buildings around the world. This saves approximately 50,000,000 batteries.

Self-powered sensors for the Internet of Things

Trillions of **IoT sensors** will be operated by **2025.**

(soucre: TSensor Summit Oct 2013)

→ The Enocean wireless standard for worldwide usage: 868 MHz for Europe and China, 902 MHz for North America and 928 MHz for Japan.

In 5 years, the number of **users** with over 20 **connected devices** will increase by 44 percent.

(source: IBM Institute for business value. "The Business of Things: Designing business models to win in the cognitive IoT." December 2015)

Analysts project **by 2025,** data from connected devices will yield insights driving potential economic value of as much as USD 11 trillion.

(source: Unlocking the potential of the Internet of Things. McKinsey & Company, June 2015)

DOLPHIN
Self-powered IoT by EnOcean

Dolphin Products

enocean® ZigBee® Bluetooth Low Energy

EnOcean's Dolphin product portfolio includes self-powered wireless modules and white-label end products, enabling product manufacturers to develop reliable and maintenance-free wireless sensor solutions for global use.

Products with 868 MHz – EnOcean for Europe and other countries adopting R&TTE/RED specification
Products with 902 MHz – EnOcean for North America adopting FCC/IC specification
Products with 928 MHz – EnOcean for Japan adopting ARIB specification
Products with 2.4 GHz – for BLE & ZigBee networks (worldwide)

Energy Converter

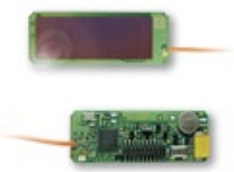
Energy converters collect and save the tiniest amounts of energy from their environment.

Energy Harvesting Wireless Switches

Energy harvesting switches use kinetic energy for switching applications in buildings and the Internet of Things.

For Energy Harvesting Wireless Sensors

Solar-powered energy harvesting sensors monitor and sense the environment to transmit this data to a wireless node.



For Controllers and Actuators

Wireless transceiver modules and products receive sensor data and also transmit values to other devices.

Tools

Starter kits and development tools help OEMs to implement energy harvesting wireless modules and products easily.

EnOcean Products: **www.enocean.com/products**

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

Self-powered Bluetooth Beacons – Signal fires of the modern age

Beacons have been used to guide people for many centuries. Traditionally, they have been implemented as signal fires on top of a hill or a tower that can be seen from far away. This historic concept has more recently been augmented by a new class of radio transmitters called Bluetooth Beacon.

By Matthias Kassner, Product Marketing Director, EnOcean GmbH

The functionality of modern Bluetooth beacons is very similar to their historic predecessors. They also periodically transmit information providing guidance to receivers about location and possibly additional parameters.

Determining location

Location information continues to be one of the most important parameters in our daily life. Bluetooth beacons can provide valuable help in establishing the exact location. They do so by transmitting specific status messages at regular intervals. The receiver of such messages can establish his distance from the transmitter based on the relation between the signal strength at the receiver versus the signal strength at which the signal was transmitted.

The relation between transmitted and received signal strengths is called the path loss. For precise location measurement, it is desirable to have a strong relation between path loss and distance. Small increases in distance should ideally correspond to large decreases in received signal strength to precisely establish the location. Based on standard path loss curves for the selected radio protocol and frequency, it is possible to determine the distance of the receiver from the sender.

Radio systems using 2.4 GHz – such as Bluetooth - are ideal for this type of application since their signals decline much faster

with distance than sub 1 GHz radio signals such as EnOcean radio telegrams.

Flexible and maintenance-free location applications

In general, there are two classes of beacon-based location use cases. First one includes:

➔ **Fixed transmitter, moving receiver**
This is the classic beacon use case where the location of the transmitter (lighthouse) is fixed in a well-known location while the precise location of the receiver is unknown. A typical application would be indoor location information, i.e. the ability to establish ones exact location within an unknown building.

Another typical use case is location-specific content, where for instance visitors to an art gallery receive information about specific paintings in their immediate vicinity.

➔ **Moving transmitter, fixed receiver**
This use case is typical for equipment tracking where the exact location of specific items needs to be determined. For instance, many airports provide wheelchairs for people needing special assistance. The availability (in use or available) and the exact location of available wheelchairs is often unknown requiring the airport to provide significant more wheelchairs than actually required.

Characteristic for both use cases is the need to have transmitting beacon devices that can be easily setup (either at defined locations or attached to certain equipment) and operate reliably without maintenance.

Energy supply

Beacons are required to frequently transmit their signals so that receivers can quickly and reliably establish their location. Transmission cycles of one second or less are common in these applications. The energy required for radio transmissions is of course strongly dependent on the transmission cycle. Short transmission cycles required for location beacons have a direct impact on the lifetime of battery-based solutions and therefore make energy harvesting beacons a better choice for applications where reliable, maintenance-free operation is required.

Thanks to Energy Harvesting technology, energy can be obtained from the surrounding environment. Light, for example, is one of the most popular sources of renewable energy. Using miniaturized solar modules, indoor light can also be used to supply electricity for ultra-low power wireless radio modules. Without need of batteries and cables, these solutions enable flexible and maintenance-free location applications.

Integrated intelligence

Bluetooth beacons can provide valuable additional information such as temperature, humidity or light level. This enables integrated intelligent solutions for energy monitoring and control with little impact on the existing infrastructure. For example, the room climate can be monitored precisely. All end points can transmit their data to a central system, which evaluates the information and makes decisions according to the requirements. These solutions help make buildings more flexible, more energy-efficient and more cost-effective.

www.enocean.com

Monitoring the environment with maintenance-free wireless sensors

Series products of energy harvesting wireless components have been available for more than 15 years – especially for use in building automation, where they help save energy and improve comfort and security at attractive operating costs – a success story that endures. The technology has now conquered a new field of application. By Frank Schmidt, CTO and Marian Hönsch, Product Manager, EnOcean GmbH

A new world at your doorstep

Any infrastructure that we encounter in everyday life can benefit from sensors. For example, sensors can tell us whether the road is icy or where we can find a free parking space. They warn us when bridges need maintenance or high voltage lines are overloaded. In the fields, they collect essential information needed for the optimum cultivation of agricultural crops. The main reason why only a fraction of this potential has been used up to now lies in the cost of cables – or the cost of maintaining battery-powered wireless sensors.

Zero maintenance is crucial

One thing we have learned from building technology is that zero maintenance is important, and it is the crucial reason for the success of energy harvesting technology. Changing batteries is unacceptable due to the effort required for disposal and the cost of replacement.

Nowhere is this more true than in outdoor areas, where replacing batteries is even more complicated: in the fields, on bridges and building facades, on high voltage lines or bodies of water.

New challenges

Compared to building automation, two important new requirements arise for outdoor applications: The first relates to the radio range, which should be several kilometers despite the limited energy reserves. The second concerns the outdoor conditions: moisture, dirt, sunlight and extreme temperatures require solid building technology and suitable structural elements, in particular for the energy stores, in order to protect the electronics.

The long-range wireless system from EnOcean

Over the last three years, EnOcean has developed a proprietary long-range system based on experience and building blocks from earlier developments. This applies, in particular, to the sophisticated charging and energy management system, a flexible and energy-optimized communication strategy and the standardized data interface.

A typical installation uses three main components: sensor transceivers, a gateway transceiver and sensors.

The sensor transceivers are encased in a robust aluminum housing with three M16 interfaces. Two interfaces are used for connecting external sensors, while the third permits the individual configuration and software updates. An integrated solar cell allows for fully maintenance-free operation and facilitates the collection and transmission of data within a defined period of time over several kilometers.

Maintenance-free wireless sensors play a significant role in increasing crop yields and quality in agriculture.

The gateway transceiver uses the same housing but without a solar cell window, since the latter is supplied via its own M16 interface. This interface also makes it possible to transfer the data to the cloud.

All sensors are connected to the sensor transceiver via short cables (up to 2 meters) with M16 plugs. A generic interface was developed for this purpose, which enables new sensors to be added to the system flexibly later on without requiring software updates in the transceiver.

From parking space monitoring to agricultural applications

Until now, sensors have been used for agricultural purposes to measure soil moisture, humidity, temperature and light intensity. We continue to work on sensors for monitoring parking spaces, detecting motion and measuring water level. The objective is to expand our portfolio of available sensors in order to open up more and more new fields of application.

Wireless standards, networks and services

New wireless standards combine low transmission power with long ranges. Examples include LORA, based on chip technology from Semtech, and the narrow-band transmission process developed by Sigfox, which can be implemented on different transceiver platforms. Both processes also rely on increasingly expanding an infrastructure—a network of receiving nodes which transfer the sensor data to the cloud and facilitate new data-focused services.

Self-powered monitoring of the environment based on long-range standards

All components were tested over a period of more than two years in multiple pilot installations in Germany and Japan and have been available in series production for the Japanese market since the end of 2016. The first customer to successfully use this long-range solution for agricultural applications is the Japanese company NTT.

Thanks to EnOcean's extensive expertise in the area of energy harvesting and applications based on various wireless standards, the energy harvesting wireless technology based on open standards increases efficiency, safety and cost savings even beyond building applications.

www.enocean.com

Self-powered Bluetooth Low Energy solutions

Bluetooth – isn't that the standard that I use to connect my smartphone to all possible audio devices and headsets? And what does that have to do with light controllers? Can my energy harvesting switch now control my smartphone directly? And what is the difference between EnOcean and Bluetooth?

By Andreas Schneider, CEO, EnOcean GmbH

These are many questions that are being discussed more and more due to the global success of the two technologies, "EnOcean energy harvesting" and "Bluetooth." The EnOcean wireless solutions on the Sub 1 GHz band are gaining acceptance due to their self-powered function, a wide range, high grade of service (availability) and very short transmission times for direct light control. Bluetooth, in contrast, can be used worldwide, has very low chip costs due to a high volume and – last but not least – is integrated into every modern smartphone. This means that any device can potentially be used as the user interface for Bluetooth devices. The biggest challenge when it comes to Bluetooth is the range.

Self-powered switch applications for BLE systems

Until recently, EnOcean's energy harvesting technology was reserved primarily for the EnOcean wireless standard. Self-powered switch applications are also made possible here by further developing the Bluetooth standard to Bluetooth Low Energy (BLE) and Bluetooth 5.0 as well as by defining so-called "advertising telegrams." The range problem was solved by the system approach: Since all lamps communicate with each other by Bluetooth, the sensor needs to radio only to the first lamp in the room, across a short distance and without any obstacles in the radio link.

We have launched switch modules for BLE solutions on the market under our new "Dolphin" product brand. With Bluetooth, we focus on our core expertise of "energy harvesting," that is, modules that are a combined energy converter, energy management system and wireless device, such as the switch module. Bluetooth is already integrated into the application to be controlled, for example for smartphone control, and only needs to be expanded with our communication profiles of our switches and sensor solutions.

Successful collaboration

The first collaboration partners have already integrated our transmission protocol into their solutions:

Smart Xicato lighting solutions

The combination of our energy harvesting wireless switches with the features of Xicato´s LED lighting modules allows users to create and control simple or complex lighting scenes and effects, and enables simple, flexible installation of lighting applications. These solutions permit radio-based, maintenance-free control without the complications and costs associated with cable- and battery-operated solutions. The self-powered lighting solutions are used in some of the world's most prestigious museums, retail stores, hotels and residences.

Casambi uses BLE switches with NFC for configuration

Our new BLE switches can be linked to a Casambi network and be seamlessly integrated into a wireless light control solution. The switch is configured quickly and easily, thanks to the integrated NFC functionality of the switching module. Our self-powered switches make it possible to control single lamps individually, groups of lamps as well as all lamps within a network, certain light scenes and even animations within the Casambi light control solution.

We are happy to be able to now form partnerships with suppliers of Bluetooth solutions in addition to the highly successful EnOcean Alliance. End customers have the choice to use EnOcean or BLE-based systems to find their optimal solution. With the Internet of Things at the latest, the useful information of the switch and the sensors will again become what they are, regardless of the transmission technology selected: valuable raw data for new services, energy-saving applications and smart solutions.

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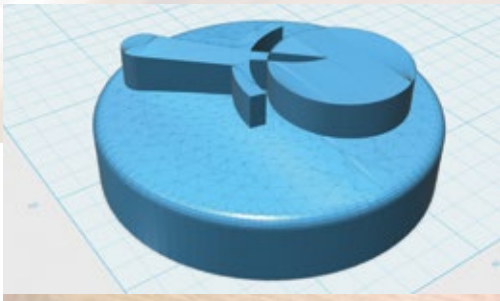
The Merging of IoT and 3D Printing



The Internet of Things is built around a central promise: the objects around us will soon recognize our daily patterns and be customized and responsive to them. EnOcean and 3YOURMIND are working to speed that shift with their partnership to 3D print the open source design files with a click. They envision a nearby future where the final switches and buttons for your IoT devices are custom 3D printed with a design that matches your exact functional needs. By Brian Crotty, Marketing Director, 3YOURMIND GmbH

Pizza at the Click of a Button

In order to kick-start the process, 3YOURMIND has altered the button from the Element14 Sensor Kit into a pizza button. As the IoT device is self-powered using the innovative EnOcean technology, the button can be hung in the location where you most often get your pizza craving. A click of the button can trigger a custom script, similar to the "Zero Click App" from Dominio's, to place an order with your favourite Pizza chain via an API call.

Simple and Professional

Unlike early attempts such as the PiePal device, which required hours of modelling, 3D printing time and the ownership of a 3D printer, EnOcean provides open source design files, so that the only customization required is to the public face of the design. It is a significant time saver and lowers the barrier to entry.

The next step is to upload the design file to 3YOURMIND's online 3D Marketplace. There, you will receive instant results for the best price and delivery time from professional 3D printing services worldwide. Your model will be verified for printability and can be produced in over 100 different materials.

The Merging of IoT and 3D Printing

While this first experiment was designed specifically for the pranksters within the Maker community, this methodology also enables to design beautiful casings for professional IoT devices, both for prototyping and small batch production. EnOcean and 3YOURMIND are providing the first consumer combination of IoT with 3D Printing. The future is nearer than you think!

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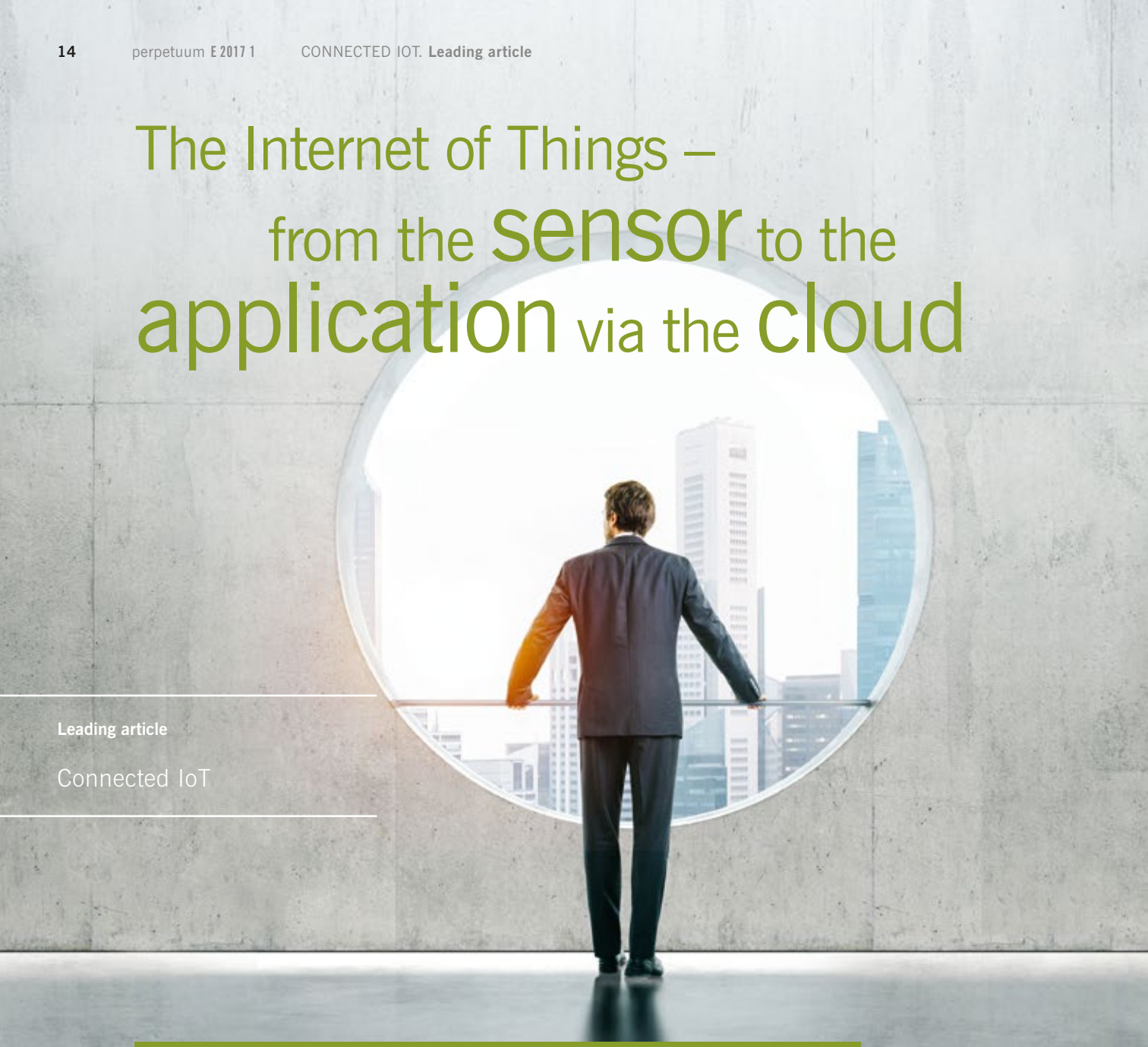
www.3yourmind.com/pizzabutton
www.enocean.com

The Internet of Things – from the sensor to the application via the cloud



Leading article

Connected IoT

More and more, the Internet is being expanded by the ability to connect smart objects, and it thus increasingly helps people to perform their everyday tasks, usually without them being aware of it. Welcome to the Internet of Things! It all began with the use of individual sensors, which are now being networked with a large and growing number of smart devices and which send data to the cloud, thus paving the way for exciting new application possibilities.

By Armin Anders, Vice President Business Development, EnOcean GmbH

Wireless sensors – the sensory organs of the Internet of Things

The Internet of Things is growing exponentially. Studies speak of 20 billion devices being connected to the Internet by 2020 and 30 trillion "things" by 2030. Most of these "things" will be sensors. These devices record the data that is so important for processing information and are thus the sensory organs of the IoT. They are mounted, for example, on windows, doors, walls, landscaped areas and plants. These solutions are interesting primarily for applications that require a large number of sensors, for example, in building automation and to collect data in traffic and usable areas. To meet the different requirements, sensors must be small, unobtrusive and easy to install.

The overwhelming number of IoT sensors will be wireless radio sensors, since connecting them to the Internet with cables is quite impractical. Moreover it is not possible to power these trillions of wireless sensors with batteries, due to the amount of maintenance work involved as well as the cost of battery replacement and disposal. The logical conclusion is to use energy harvesting wireless technology.

Smart homes are only one of countless IoT applications

Innovations such as lawnmowers that continuously keep the grass at an ideal height, and vacuum cleaners that automatically vacuum the home were mocked only a few years ago but are enjoying increasing popularity today. Some of these devices can even be operated by voice control. The question of whether these things are really necessary brings to mind the discussions of power windows in cars many years ago: a suitable hand crank did the job in less time. So why replace it with a power window that also costs more? Easy answer: the power window is more convenient, which is why new cars no longer come with hand cranks. The same thing will happen with building automation. Very few people in the private sphere give priority to this benefit when making a purchasing decision. However, smart homes will be basic equipment in the residential construction market a few years from now. Property owners will also want to add this function as a retrofit.

From asset management to the campus

Use cases, in which comprehensive or even predictive evaluation of extensively collected data in the IoT adds considerable value for users, are currently the ones most interesting and most widely discussed. The quantity of conceivable applications seems to be endless, and yet a number of fundamental fields of application can be identified.

In offices, development laboratories and creative spaces, seat occupancy can be detected with presence detectors, and the use of devices can be determined with power meters. In connection with room climate data (temperature, brightness, CO_2, moisture), room usage profiles and even a correlation with the effectiveness at particular workplaces could thus be determined. This could make it possible to optimize the use of rooms and devices and possibly even the work results.

Early detection and intervention in the event of fires and water leakage is a good sales argument for insurance companies and thus a crucial way to build customer loyalty. Sanitary facilities would be much easier to use if sensors reported the fill level of paper and soap, and if the degree of toilet use were transmitted by the door contact. In hotels and other living and useable spaces, the combination of window contacts and motion sensors is an ideal way to increase protection, security and energy efficiency. A closed window protects the room against bad weather, avoids unnecessary heating and prevents false alarms by the motion sensor caused by the wind. Combining the sensors with available weather data on the Internet is also useful.

To enable seniors to live in their own homes comfortably and safely, motion sensors in mattresses, fall and presence detectors as well as flexibly positioned emergency call and control buttons supply urgently needed information. Motion sensors in indoor markets can be used to determine movement profiles and protect the premises at night. Booth-mounted climate sensors regulate the ventilation depending on the location and use; sensors on elevators, fan motors and pest traps signal a need for maintenance.

Outdoor applications

The IoT has an endless number of potential applications even outside buildings. In addition to detecting and analyzing traffic flows, the importance of parking space management in urban centers will rise sharply in the future. For this purpose, traffic flows and parking space availability must be detected with thousands upon thousands of sensors. To be able to feed the world's ever growing population, and to optimize quality and crop yields, plantations and crop areas must be monitored with millions of sensors. The condition of bridges and rockfall nets can also be monitored with vibration sensors, and natural disasters such as floods can be detected at an earlier stage.

The cloud – the networking command center of the IoT

Increasingly, devices and sensors will be networked via the Internet in the form of web-based services: so-called cloud services. However, the amount of intelligence needed locally and especially which user- and operator-specific data needs to be stored on site for data privacy reasons are still under discussion.

One important aspect is the time availability of a cloud-based solution. Since this availability is not always ensured, basic security-relevant functions, such as turning room and basement lights on and off, must be implemented locally and ensured without access to the Internet.

However, the functionalities, user interfaces and range of web-based services are growing rapidly and offer enormous potential for application. If an appropriate system partitioning is selected, it becomes apparent that value-added services and the interconnection of the individual functionalities should be reproduced on the Internet in the future. The cloud thus becomes the central system intelligence for value-added services.

The gateway – the link between sensors and the cloud

In this regard, the gateway that connects the local sensors to the cloud takes on enormous importance. A suitable cross-standard and open software stack in the gateway forms the basis for integrating the data of the EnOcean wireless sensors into the managed services of the IoT platforms hosted in the cloud. This results in an interoperable network, in which the collected data can be used for the intelligent control of different devices, independently of the equipment manufacturers and the cloud platforms.

The IoT players – from IT giants to industrial corporations to startups

The trend is moving toward the intelligent networking of objects by means of cloud-based services and analyzing data collected with the help of sensors. The well known IT corporate giants who offer these cloud-based services and tools are in a good position here. IBM, Cisco, Apple, Microsoft, Google and Amazon are currently getting ready for an arms race in which each vies for the best position in the networking command center of the IoT.

In addition to the big IT players, classic industrial corporations such as Siemens, Bosch, ABB and General Electric also believe themselves to be well armed to conquer the IoT market with their market access and experience in engineering and product life cycle management. They must urgently establish themselves in this market segment in order to keep pace with the IT corporate giants, since the next stage on the value chain in automation engineering will be reached through digitalization.

The market is also exciting because more and more specialized providers and startups are entering the field. Most of them lack critical mass but instead have the advantage of being able to act disruptively, unburdened by any existing business.
However, all of these IoT players have one thing in common: They need to have the best access to data, specific sensor solutions and therefore close collaboration with sensor providers. For example, IBM and the EnOcean Alliance will work together in their new partnership to promote the use of intelligent building solutions and standardize smart IoT applications.

In summary, let me say that there is an enormous amount of unstructured data that needs to be sifted through, analyzed, weighed, interpreted and learned. The latest data must be used for control purposes but also related to historic information and other data available on the Internet with tools such as the IBM Watson IoT platform in order to thereby discover any unknown correlations that may exist. This will result in new insights and a new understanding of interrelationships.

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Sensors to the cloud – succesful IoT collaborations

There is a rapid development of intelligent buildings and soon these will be able to integrate IoT devices indepentently, generate a large amount of reliable data and use this information for building optimization. The basis for this are EnOcean based sensors and devices, which operate large numbers of IoT devices efficiently and supply reliable data to IoT systems.

By Graham Martin, Chairman & CEO EnOcean Alliance

By providing self-powered sensors, EnOcean and the EnOcean Alliance are supporting IBM, a strong partner with many years of experience in cloud-based services and IoT, to develop cognitive buildings.

EnOcean and IBM: Self-powered sensors for cloud-based IoT-applications

EnOcean is working closely with IBM to further develop maintenance-free wireless solutions for the Internet of Things with the EnOcean Sub 1 GHz radio standard. EnOcean is proud to be one of the first IBM Business Partners to use the mark "Ready for IBM Watson IoT".

Together with IBM´s Watson IoT Platform, a fully managed, cloud-hosted service, self-powered EnOcean-based sensors enable maintenance-free real estate management-solutions to improve the operating, financial and environmental performance of plants and facilities. Standardized sensor profiles ensure the interoperability of more than 1,500 products from the EnOcean ecosystem and enable the development of interoperable system solutions. These solutions can be used in various cases from asset management, ambient assisted living projects, insurance or hotel and campus projects, giving maintenance-free wireless switches and sensors based on EnOcean technology.

EnOcean Alliance and IBM: Development of open standards for maintenance-free wireless solutions for usage in cognitive buildings

The EnOcean Alliance has strengthened its programme in building automation and the Internet of Things with IBM supporting the EnOcean Alliance as a Promoter Member. Together, IBM and the EnOcean Alliance will bring sensors to the cloud and develop self-powered solutions as a standard for the Internet of Things.

The EnOcean Alliance offers the benefit of a broad, proven ecosystem of interoperable energy harvesting wireless sensor solutions, which are available for intelligent buildings worldwide. These solutions help optimize the utilization of buildings, create new service models and make buildings more flexible, more energy-efficient and altogether more cost-effective.

In close collaboration, the EnOcean Alliance and IBM define and expand standards for self-powered solutions for the IoT. Together, both partners standardize the EnOcean to IP interface and simplify the usage of applications in the IoT. This, for example, allows the integration of energy-harvesting wireless technology into the IBM Watson IoT Platform to conduct predictive and real-time analysis of facilities. For further information, please also read the article "Cognitive buildings" by IBM on page 18/19.

As a thought leader in the field of self-powered applications for the Internet of Things, EnOcean, together with the EnOcean Alliance, will continue the successful cooperation with IBM to enable the development of exciting, future-oriented, maintenance-free applications for the Internet of Things.

www.enocean.com
www.enocean-alliance.org
www.ibm.com/iot

Cognitive buildings

Cognitive buildings are the next generation of sustainable building systems as they automatically integrate, analyse and learn from the vast amount of IoT generated data within a building and its environment. As a result, the building itself becomes an assistant and strives to improve user satisfaction, driving down costs and enabling new innovative collaborative services. The development of cognitive buildings is made possible by the recent advancement and convergence of multiple technologies.

By Joern Ploennigs, PhD, Research Scientist & Manager, Cognitive IoT for Buildings and Environment, IBM Research - Ireland

IBM's Watson IoT HQ in Munich is an example of a cognitive building

EnOcean Alliance – enabling self-powered cognitive buildings

With the success of its wireless technologies and easy to fit battery-free sensors, the EnOcean Alliance is an advocate and large enabler of cognitive buildings. It leads to a new scale of deployments, enabling tens of thousands datapoints in both new and legacy buildings. This new granularity makes it possible to monitor and control the operation and comfort levels of a building environment right down to an individual workplace level.

Real time prediction

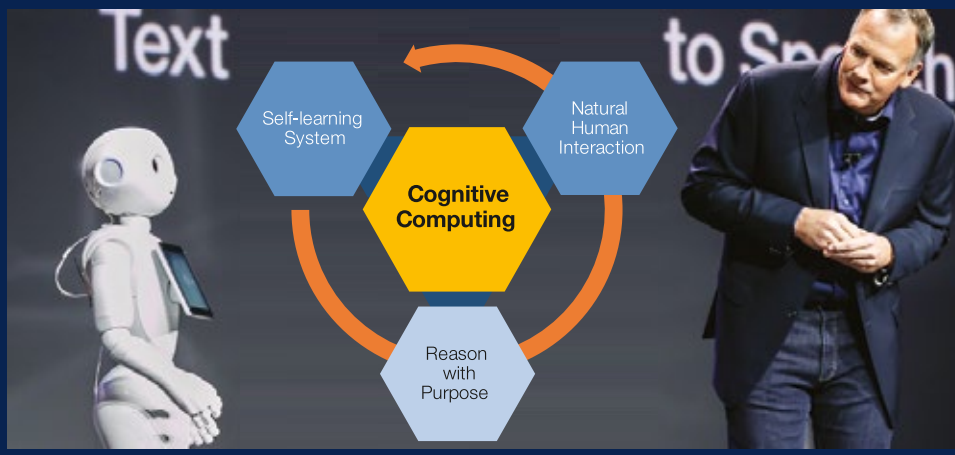
Recent major advances in machine-learning and AI technologies have enabled novel solutions that learn from vast amounts of data. As a result, cognitive buildings can anticipate the occupancy and operational requirements, they understand a building's energetic behavior, and predict facility maintenance and outage needs. This helps facility managers and real estate executives to address the increasingly dynamic requirements from energy efficiency regulations, demand response, workplace sharing and facility management.

Interactive applications

These developments are accompanied by new mobile device interfaces and applications that enable users, from smart home owners to maintenance staff, to interact within the field or remotely from a system. In addition, we are also seeing the inclusion of augmented reality and speech interfaces that are enabling users to communicate with a building's system in a more natural way.

Next generation cognitive building solution

IBM together with its partners have created this next generation cognitive building solution at its new global Watson IoT headquarters in Munich, Germany. The building's AI integrates sensory data from thousands of devices including those of EnOcean via the IBM Watson IoT Platform coupled with a semantic modelling solution that incorporates data from The Weather Company, room booking systems and business operation tools all combining to unlock benefits across the buildings systems.



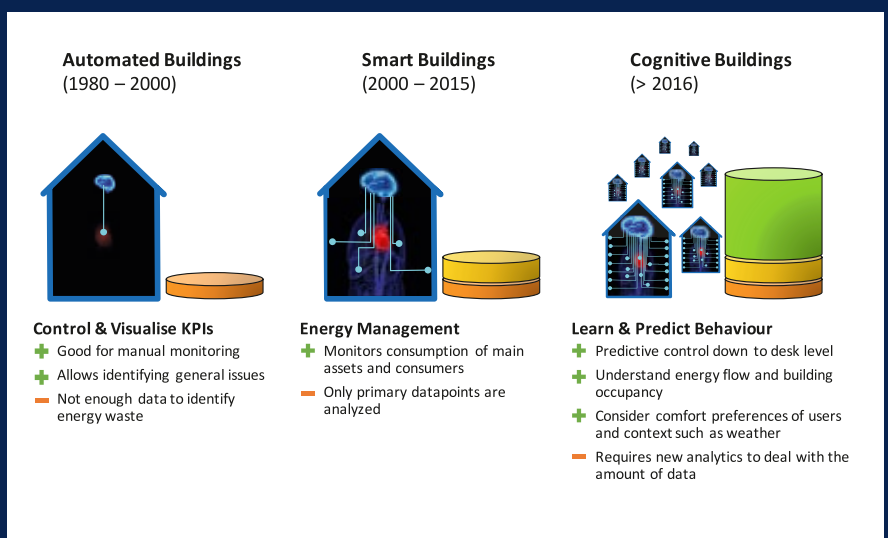
Cognitive buildings autonomously integrate IoT devices and learn system and user behavior to optimize operation and provide assistance via natural user interfaces.

As a result, the solution automatically applies machine learning and reasoning to predict and optimize the energy consumption and maintenance needs of the building. It detects and diagnoses anomalies in real-time that allow for a timely reaction and efficient operation of the building. The system is aware of the building occupancy in meeting rooms and the environmental comfort levels at individual employee workplaces. Acting as the "cognitive assistant" the system can recommend vacant meeting rooms to fit to user expectations, while cognitive whiteboards capture and transcript meeting discussions for later usage. A mobile solution also allows users and operators to engage with the building's AI via speech to be guided to rooms or assets, and they can use augmented reality to visualize insights about their environment and get advice in solving issues immediately.

Enhanced building experience

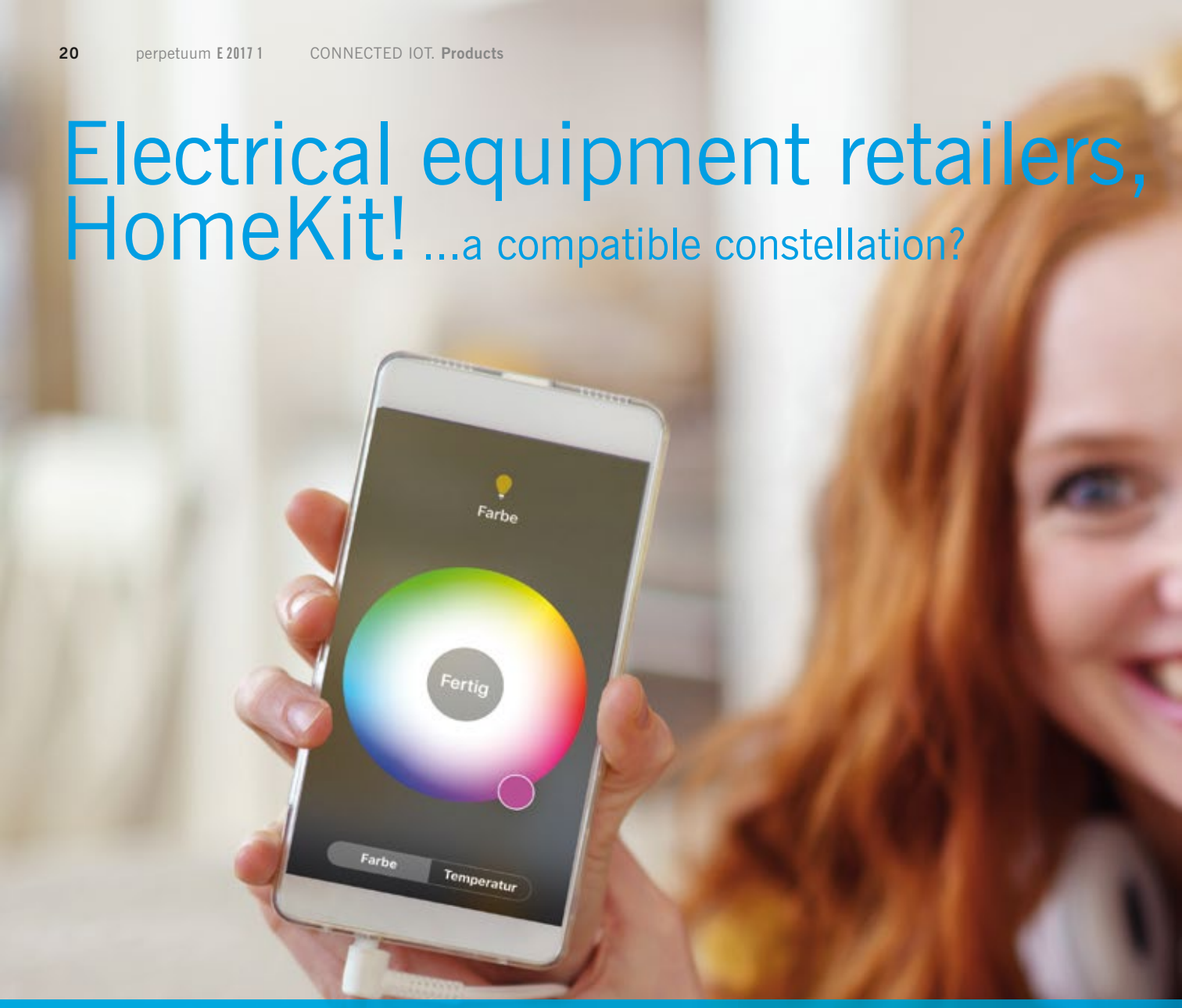
Cognitive buildings like this will radically change the way all businesses operate and how people interact with their physical environments, to make buildings more comfortable, secure, personalised and efficient. This will lead to a transformation in business and an enhanced building experience.

www.ibm.com/iot



Since the 1980s, the penetration of instrumentation and analytics has increased—smarter buildings have become the norm and the era of cognitive buildings is here.

Electrical equipment retailers, HomeKit! ...a compatible constellation?



If the proverb, “cobbler, stick to your trade”, is to be believed, technogeeks should program their HomeKit worlds while electrical equipment retailers should install home equipment. But what if we could combine these two worlds, and everyone focused on what they do best? JÄGER DIREKT took this approach by combining Apple’s new HomeKit with the recently launched OPUS® BRiDGE.

By Ina Fischbach, Marketing Director, JÄGER DIREKT

OPUS, EnOcean and Apple

Electrical equipment retailers install sensors and actuators in the home through renovation-free retrofits based on EnOcean technology, following the JÄGER DIREKT approach. Based on its many years of experience in the area of wireless technology, the manufacturer from southern Hesse, Germany, has developed an easy and straightforward method that enables installers to get their slice of the big "smart home" and "Internet of Things" pie.

"We see the electrical equipment retailers as the key forces driving this development and are indispensable to the 230V level," says Thomas Jäger, Managing Director of JÄGER DIREKT. The deep integration of the retailers is not a matter of course, and it is not exactly easy in today's world of plug & play. And yet more than one battery-operated wireless outlet set from the electronics retail business is required for the real solutions.

From conventional installation to the Internet of Things

Products and systems that are powerful and offer an infinite number of functions are a dime a dozen. Permanently installed touch panels, additional control lines and solutions that cost more than tens of thousands of euros have also long been available. The OPUS® product range is intended to take a different approach.

Equipment retailers install smart, electronic switches that, in principle, offer benefits for users in entirely conventional ways. Preassembled, preconfigured packages make everyday work easier, since a pre-trained wireless switch is readily supplied along with the easily installed electronic switch. This simple installation forms the absolute basis for the Internet of Things. In this constellation, it doesn't matter whether a new house is being built or an old one retrofitted without renovations.

The end customer may wish to have a smart color-changing LED lamp in his home, such as the Philips Hue, or he may want to retrofit a blinds controller some time later. He can add all these solutions in stages and thus make his home "smart."

In times of app stores and smart gadgets such as the Apple Watch and fitness armbands, the resident of a home is accustomed to outfitting his home himself and thus making life easier. If he wants to take the same approach with his home control system, he can very easily do so with help from his installer. A central controller is needed to combine all sensors, actuators and gadgets installed in the house into a smart home or even into the Internet of Things.

Smart networking

Apple's recently launched HomeKit is just such a controller. It enables end customers to combine the functions of many individual apps (such as those for white goods, shading or lighting) into a central app. Products from different manufacturers use technologies that already exist on the market, such as EnOcean, Zigbee and KNX, and they therefore do not talk to HomeKit directly. Apple has defined a special interface in order to introduce these easy-to-use sensors and actuators, and thus their enormous range of application, to HomeKit. This is where the gateway from OPUS® is used. In this way, Apple has created an intelligent link between the electrical installation and the best possible user experience through a favored, manufacturer-independent app.

Efficient collaboration

JÄGER DIREKT makes it easy to get started and provides a connection between conventional, familiar installation methods and smart products. The OPUS Home Kit Gateway translates the actuator and sensor commands and states into the Apple HomeKit world.

Individual, use-optimized smart home solutions based on different technologies can be implemented, thanks to reliable planning. Preassembled packages give the installer fast consulting and uncomplicated installation, because JÄGER DIREKT has already completed the training in at the factory.

The installer mounts products, starts up the gateway, scans existing installed products with a QR code and gives the end customer an user interface that he can easily configure in the usual way common to all Apple products. The end user can easily set up light scenes or an occupancy simulation when on vacation and change them as needed. In this way, we satisfy the end customer's desire for many different options and do not try to offer services through equipment retailers for which the end customer is hardly willing to pay reasonable hourly rates.

The fact that the constellation of electrical equipment retailer, OPUS, EnOcean and HomeKit combines the best of the particular worlds is thus confirmed, and the user gains access to smart and useful smart home solutions. It is now possible to order the OPUS HomeKit gateway, the delivery starts from summer 2017 (3rd quarter).

www.opus-schalter.de

Open Connectivity Foundation – the new standard for the interoperable IoT

Billions of connected devices such as phones, computers, appliances and sensors should be able to communicate with one another regardless of manufacturer, operating system, chipset or physical transport. The Open Connectivity Foundation (OCF) is creating a specification and sponsoring an open source project to make this possible. **By Jörg Hofmann, CEO, BSC Computer GmbH**

OCF will unlock the massive opportunity in the IoT market, accelerate industry innovation and help developers and companies create solutions that map to a single open specification. OCF will help ensure secure interoperability for consumers, business, and industry.

EnOcean Alliance and OCF - Bridging open standards

The EnOcean Alliance has been partnering with the OCF (originally called Open Interconnect Consortium) and the AllSeen Alliance (now merged into the OCF) for the past two years and has been in the forefront of demonstrating the true capabilities of these technologies publically, for example at the Mobile World Congress (MWC) in Barcelona 2015 and Consumer Electronics Show (CES) 2016 in Las Vegas.

BSC Smart Home Gateway: the key to interoperable IoT

The OCF has over 300 member companies, lead by industry leaders such as Microsoft, Intel, Qualcomm, Cisco, Electrolux, LG, Haier and Samsung. EnOcean Alliance promoter member BSC Computer GmbH is a platinum member of the OCF and is spearheading the efforts to create the multi-standard interoperable eco-system for IoT applications such as smart homes.

As early as 2007, BSC pioneered the solution enabling EnOcean sensors and actuators to communicate with the internet and in 2009 released first smart home app, followed by solutions for smart metering and ambient assisted living. The current generation of the BSC gateway solution is based on the latest highest-security Intel platform, enabling the entire EnOcean eco-system to be easily integrated into multiple interoperable IoT solutions.

www.openconnectivity.org
www.embedded-intelligence.de/en

The wireless and battery-free interpreter

The $TRIO_2SYS$ dry-contact transmitter is an intuitive and flexible tool, which significantly expands the number of possibilities for users and planners wishing to integrate existing devices into the EnOcean world.

By François Pillet, Export Department, $TRIO_2SYS$

Thanks to its potential-free dry-contact output, the transmitter is designed to detect any change of status within equipment connected to it. Therefore, the transmitter allows the integration of any device with an on/off status report into the EnOcean protocol.

Optimization of intelligent buildings

Combined with an existing infrared (IF) barrier, the dry-contact transmitter sends a signal each time someone crosses the sensor. This configuration offers the supervisor the possibility to count traffic within an area, corridor or room in intelligent buildings while keeping already installed devices. Such information can then be processed to analyze people flux in offices, stores and public areas and helps optimize the configuration of these facilities.

Flexible integration into existing systems

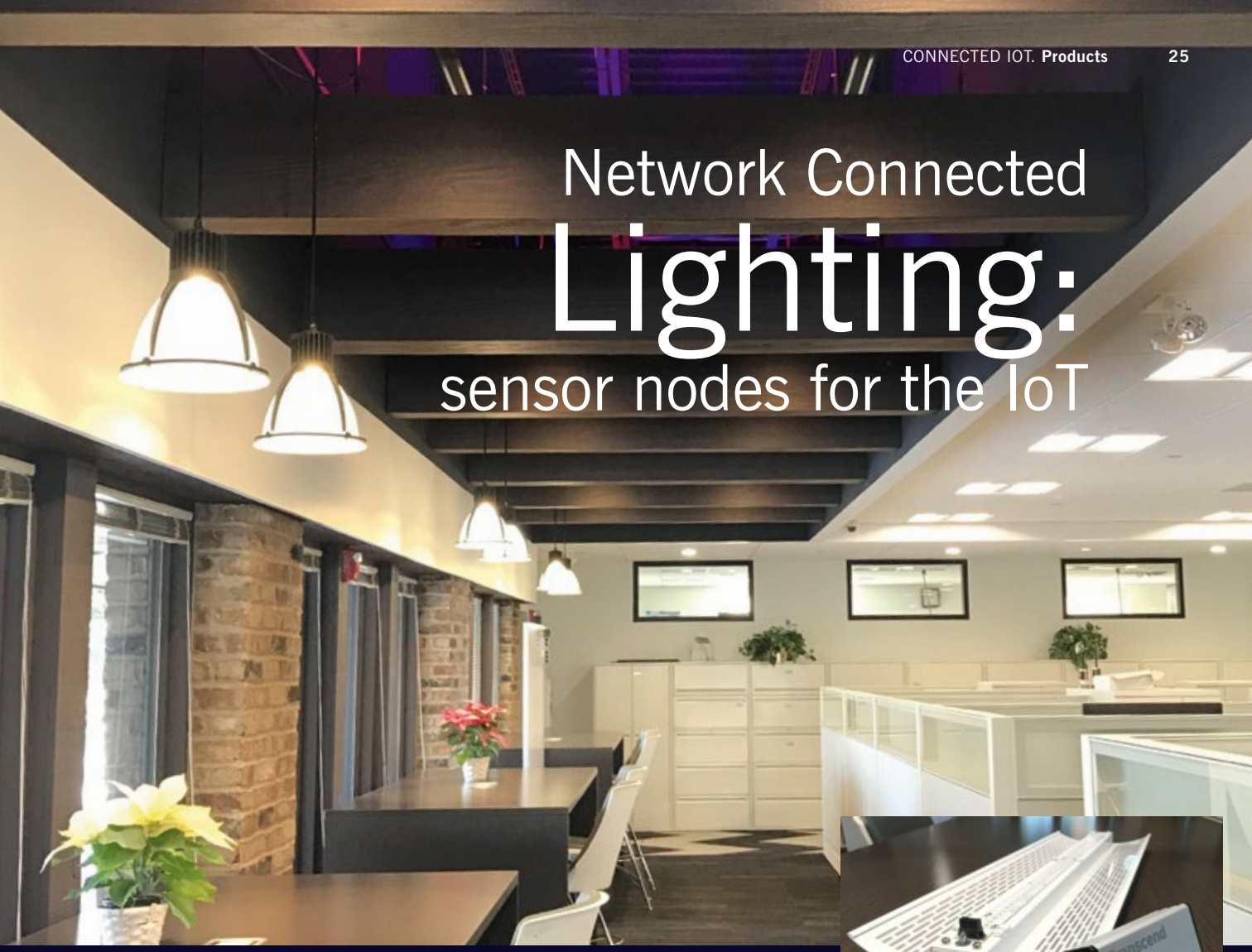
The dry-contact transmitter can also be combined with other devices with a dry-contact on/off output such as conventional smoke and water leakage detectors to report the user any change of status. The planner has therefore the possibility to keep the already installed devices and integrate them into an EnOcean-based smart system while saving additional time and money.

Connected with limit switches, the dry-contact transmitter can report additional status from automated gates, automatons and valves which provide valuable information for industrial applications. The user can also configure this device with a pushbutton as an EnOcean manual override.

Connectivity is flexible and easy as the transmitter is available with a crimp connector or with a connection wire.

www.trio2sys.fr

Network Connected Lighting: sensor nodes for the IoT



The ability to migrate lighting controls to IP-based infrastructure makes lighting a service and an Internet of Things (IoT) building asset for Internet of Things (IoT) that can be controlled synergistically along with other building functions.

By Giovanni Frezza,

Director - Network Connected Solutions, Molex

More integration means not only better control leading to drastic energy saving, increased occupant comfort and productivity performance, but also more meaningful data being collected by distributed sensor system as part of lighting network infrastructure.

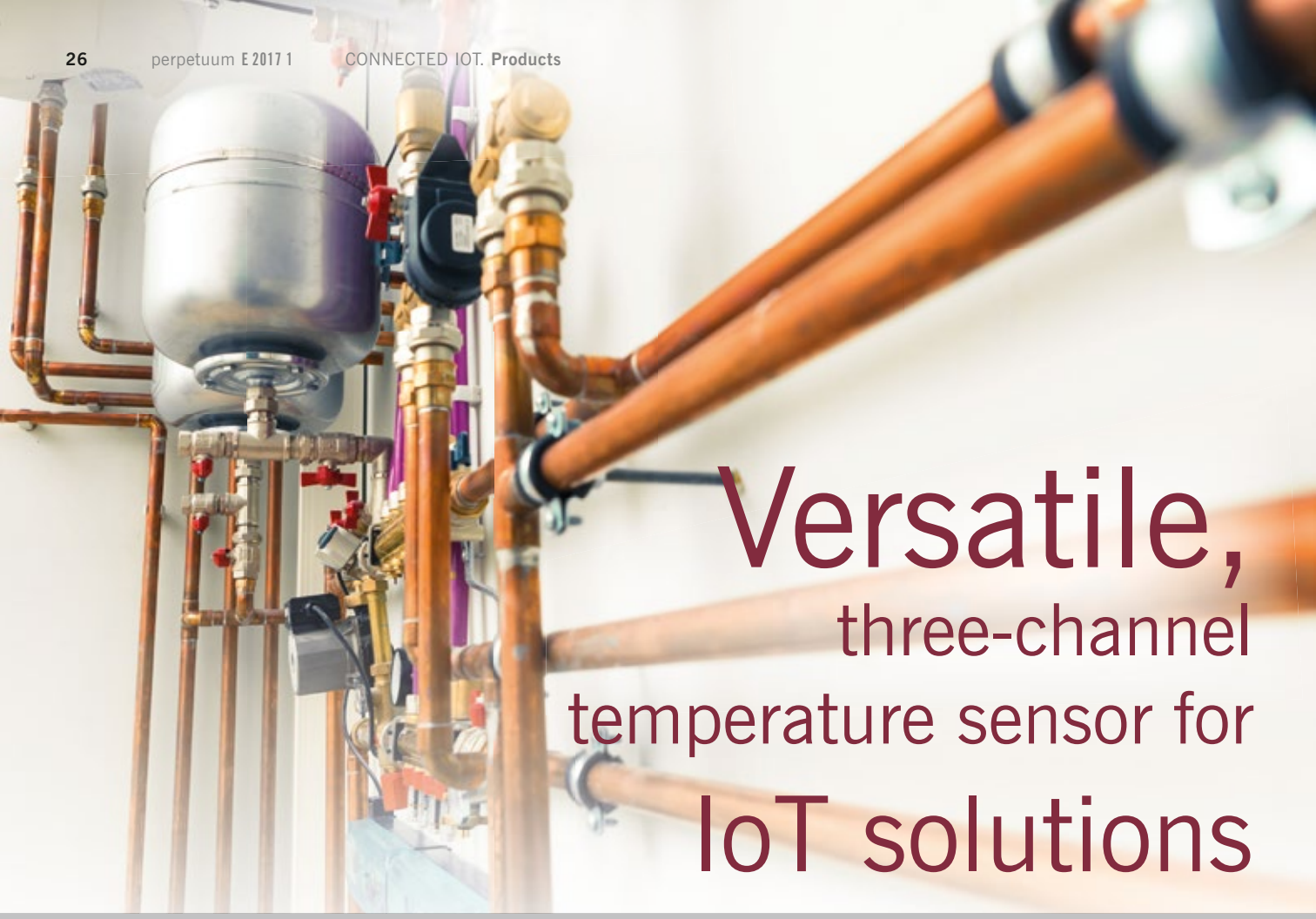
Bridging the IoT

Molex Transcend Network Connected Lighting System represent a unique advanced infrastructure able to bridge the IT (Information Techology) world and the OT (Operational Technology) world in a cost effective IOT architecture. The integration of EnOcean field-proven wireless technology combined with the sustainable principle of energy harvesting into Transcend Ethernet-based POE network-connected infrastructure offers new possibilities for efficient smart building implementations in a variety of applications.

Connected sensors for intelligent buildings

The ability to add EnOcean standard-based devices aligns well with the intelligent, low-voltage Transcend system, accelerating the smart building application convergence over IP. With its granularly distributed sensor system, Transcend lighting network can produce data that drives real-time energy usage reporting, sensor-based occupancy reporting, light status and environmental monitoring.

www.molex.com



Versatile, three-channel temperature sensor for IoT solutions

The new EnOcean multi-channel temperature sensor from Pressac Sensing is designed for applications that require multiple points of temperature measurement for IoT solutions used in internal or external environments.

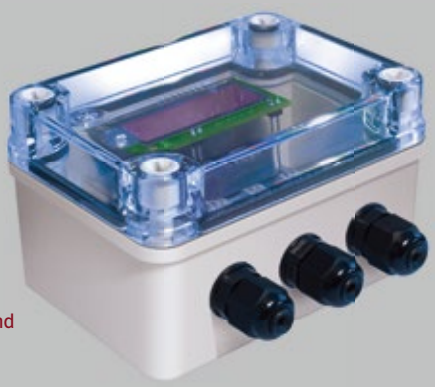
By Jasper Spencer, Head of Business Development, Pressac Communications

Legionella control – made simple

One of the key applications in intelligent buildings is the monitoring of water systems for the prevention of Legionella bacteria growth, for compliance with legislation. The IoT enabled temperature sensor is intended for use with industry standard PT1000 probes that connect to hot, cold and mixed water pipes.

IoT technology with 24/7 monitoring

The multi-channel temperature sensor sends temperature measurements wirelessly in real time to a receiver. On-site and instantaneous data collation reduces the number of site visits and therefore associated costs, making this the preferred choice for temperature monitoring.



Thanks to its reliable data collection, the energy-efficient sensor allows for optimum and cost-efficient monitoring of water systems.

The sensor is self-powered via a solar panel and includes a backup battery. Available in long-life battery and solar powered variants, this sensor is entirely non-invasive and easily retrofittable. It can function as a standalone device or within a Building Management System.

www.pressac.com

„Alexa, please switch off the lights!“

“Alexa”, Amazon’s artificial intelligence, is finding its way into German homes. “Amazon Echo” not only lets you listen to music or have Alexa tell more or less funny jokes but can also be used for voice control of EnOcean actuators. Welcome to the Internet of Things!

By Katja Maja Krödel, student at the Ostbayrischen Technischen Hochschule Regensburg

A connector was added to the Smart EnOcean Gateway that establishes a connection between the gateway interface and the “Smart Home Skills API” from Amazon. It is a cloud-based solution, which means that part of the code runs in the Amazon cloud, known as “Amazon Web Services” (AWS).

Alexa, the first woman to understand you

“Smart Home Skills API” lets you use voice control to turn actuators on and off, regulate temperatures and forward percentage values to devices, for example in order to dim lights or move blinds to the appropriate height. The API provided by Amazon will be further expanded in the future. It will implement any type of sensor inquiry, such as “Is the window closed?” or “How warm is it in the living room?” Users will also be able to control actuators manually from an app, without direct voice control. Moreover, the complete specification of actuators and sensors as well as their functionality in the smart home will follow.

Smart networking

Companies such as Apple, Amazon and Google are showing the way to the future and rely on their voice assistants, which are based on the respective artificial intelligence. The Smart EnOcean Gateway establishes the connection between these applications and the devices, which are based on the EnOcean wireless technology. This connection is already in place for “Apple HomeKit” and “Amazon Echo”.

www.enocean-gateway.eu

EnOcean Alliance Certification – quality seal for reliable interoperability

Interoperable devices with EnOcean technology have been enabling the composition of building management systems for quite some time now and will secure investments for many years. Interoperability, as defined, will result in fluent communication between EnOcean-based devices made by different manufacturers over a certain distance and, thus, enable implementation of distributed functionality – provided that the existing system specifications of the EnOcean Alliance are consistently applied. By Armin Pelka, Certification Manager, EnOcean Alliance

In technical wording, interoperability requires devices which perform as specified and in a repeatable manner at all layers. In detail:

- at the physical layer, the air interface has to be compliant with the EnOcean standards ISO/IEC 14543-3-10 and ISO/IEC 14543-3-11, and a defined minimum transmission range has to be achieved,
- at the communication layer, the scheduling and the logical compliance with defined communication flows,
- at the application layer, the correct coding and decoding of communication content, the compliance to defined schedules and a conformal processing of transmitted data.

Interoperability – enabler of versatile solutions

System planners, system integrators and customers demand reliable devices and procedures which facilitate the implementation of versatile solutions with an increasing variety of use cases of EnOcean technology. The EnOcean Alliance Certification Program – linked with a corresponding marking on devices – will secure interoperability of EnOcean-based devices without major additional effort. The Certification Program will cover all elements of the communication adequately defined and will be designed for self-certification by the device manufacturer – similar to the European CE declaration. In addition, an extension for a supplementary verification by an independent and accredited test laboratory is also possible.

Standard testing procedure

The EnOcean Alliance declaration of conformity consists of several steps, which the device manufacturer can carry out during

the course of his development verification process without going to a great deal of additional expense. In preparing for the certification, the certification tests that apply to the device are defined on the individual levels, and the device-specific documents are compiled. The individual certification tests are carried out according to the EnOcean Alliance test specifications. This ensures that all devices undergo an identical test procedure, and the test coverage as well as the result are comparable and can be repeated independently of the individual device manufacturer.

Interoperability on the physical level

An important first step toward EnOcean Alliance certification was reached with the release of the "Radio Performance" specification. Manufacturers can thus immediately verify that their devices achieve the necessary radio range in terms of interoperability. Tests and methods relating to the conformity of the individual signals and their chronological behavior are established with the release of the air interface certification specification based on the EnOcean standards ISO/IEC 14543-3-10 and ISO/IEC 14543-3-11.

Interoperability on the communication level

The Technical Working Group of the EnOcean Alliance (TWG) has continued to develop the specification for certifying the communication profiles. The implementation can thus be checked on the basis of the selected protocols – EEP or Generic Profile. This is based on the EnOcean Alliance system specifications – the EEP specification (currently Release 2.6.6) and the Generic Profile specification. Defined "test steps" are used to check the protocols, which are thus simultaneously documented, and to ensure that the tests can be tracked.

Certification level

In principle, a distinction is made between certifying a platform, for example a module, and certifying an end product. A certified platform is checked only for its air interface but is a prerequisite for a certified end product, which must demonstrate a specification-compliant and trackable behavior on all three specification levels (air interface, minimum radio range and communication profiles). Certification levels 2.0 and 3.0 have been in place since January 1, 2017.

Certification 2.0

Certification version 2.0 applies to existing end products that were in development or on the market before the certification program went into effect. Certification 2.0 covers the specification-compliant behavior of a product with regard to the two specification levels, air interface and communication profiles, and thus ensures a certain interoperability between 2.0-certified products.

Certification 3.0

Certification version 3.0 applies to new products that are being developed in 2017 as well as to older products that already demonstrate a specification-compliant behavior with regard to the three specifications. Certification is carried out with regard to the three specification levels of air interface, minimum radio range and communication profiles, and thus guarantees a high degree of interoperability between 3.0-certified products of different manufacturers.

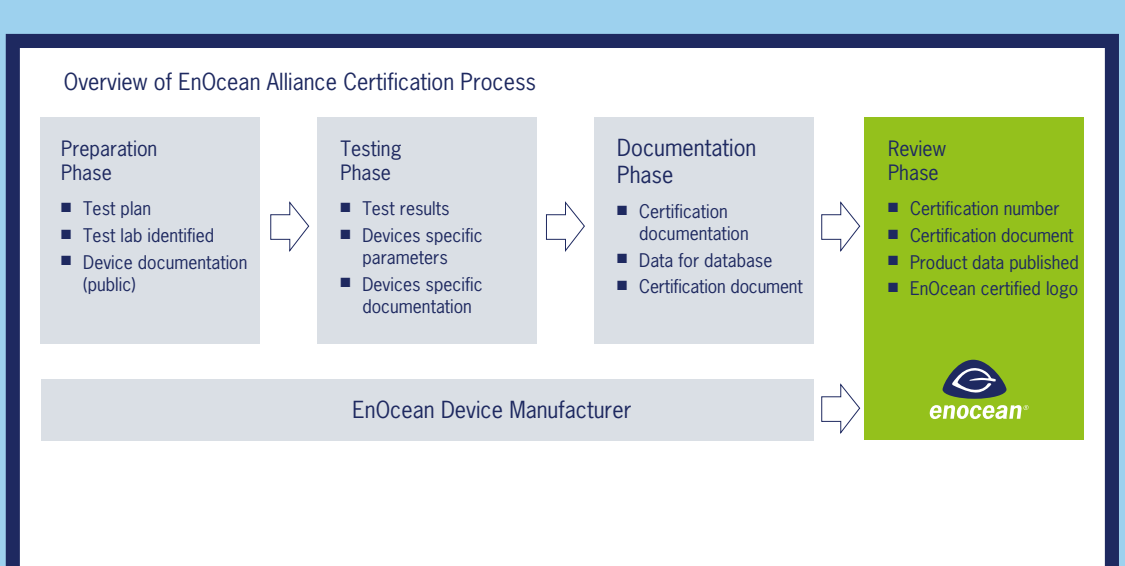
Guideline and documentation

The "EnOcean Alliance Certification Handbook" ensures a smooth certification process. It supports the standardization and thus the trackability of the certification documentation. In addition, the TWG selects suitable test labs as independent EnOcean Alliance certification authorities, which may be used as an alternative or in addition to self-certification. A so-called Certification Manager will check the certification documents submitted by the product manufacturer in the name of the EnOcean Alliance to ensure they are complete and correct and issue a certificate if all conditions have been met.

The EnOcean Alliance Certification Program is the important tool for guaranteeing and further developing the interoperability of EnOcean-based devices, and it can be carried out without going to any additional expense. It also entitles product manufacturers to use the EnOcean Alliance technology logo for marking their products and to list their certified products in the product database on the EnOcean Alliance website.

Please find more information about the new EnOcean Alliance logo at page 60.

www.enocean-alliance.org



The Certification of EnOcean-based products can be carried out without going to any additional effort.

A fortress for France's banknotes

The "Centre Fiduciaire du Nord de France" specializes in managing banknotes. Throughout the building, SAUTER building automation ensures optimum climate conditions while minimizing energy consumption. Productivity is therefore high and occupants work in comfortable surroundings. By Grégory Pohier, Directeur Régional Nord Normandie, SAUTER France, SAUTER Régulation S.A.S

The Centre Fiduciaire du Nord de France demonstrates, quite clearly, how security, comfort and energy efficiency can all be fulfilled without compromise.

The new premises of the Banque de France in Sainghin-en-Mélan-tois, near Lille, has robots which handle, sort and check banknotes. As you would expect, considerable demands are placed on security. The enormous building with stringent security measures has no windows in the outer façade. Instead, daylight enters through a courtyard at the building's center, ensuring lighting is evenly distributed.

The site is the first fully automatic money management center in the Eurosystem. It has a floor space of approximately 6,000 m2, making it roughly the same size as a football pitch. Despite its spaciousness, most rooms in the building are controlled completely by artificial intelligence. Robots take delivery of incoming banknotes, bring them to sorting machines and storage areas and then finally place them onto security vans – the process is fully automated from start to finish.

Smart remote control

The Banque de France required a building automation system that was simple to operate. Not only did it need to provide optimum temperature, air and lighting conditions for employees, energy consumption also had to be kept as efficient as possible. With SAUTER offering its EY-modulo 5 range – an entirely BACnet/IP-capable system – and its extensive know-how in the field, the SAUTER solution was given the green light by planners.

Due to restricted access to the rooms, the Banque de France also sought a facility for remote monitoring and control of the whole installation – a central system for technical management on location, situated outside of the secure areas. The answer was SAUTER Vision Center. This is a web-based building management system which shows, at a glance, all the HVAC installations in a building. This means that on-site service technicians, no matter where they are, can use their smartphones, tablets or PCs to keep room conditions under control.

Rooms individually regulated for comfortable working

To provide an environment to suit each of the building's users, SAUTER room automation stations – ecos500 and ecos504 – were installed. These control the temperature and lighting in a room. ecoUnit 1 room operating units, featuring EnOcean wireless technology, are also fitted. They display an overview of current room conditions and allow the heating or cooling to be easily adjusted.

Automation for high energy efficiency

An energy module is installed, allowing the on-site facility manager to check freely the energy consumption of each system. The EMM directly integrated in SAUTER Vision Center relays consumption values in real time and records them. The user-friendly energy dashboard – showing the various key performance indicators – enables corrections to be made as required.

The intelligent, all-round solution from SAUTER not only creates ideal climate conditions for employees in this high-security building, it also maintains low energy demand.

www.sauter-controls.com

The room operation units ecoUnit 1 allow an uncomplicated and appropriate control of the room conditions.

Symbiosis
of Design and Functionality

As a specialist for sensors in the building automation and HVAC industry, Thermokon creates an additional benefit for customers all over the world with Engineering, Innovation and Quality "Made in Germany". The room operating units from Thermokon meet the strictest technical and customer requirements. The "thanos" room panel is a perfect all-rounder, with focus on design and functionality. The touch room operating unit with TFT display is designed to detect temperature and optionally relative humidity, enabling an integrated operation of HVAC, lighting and blinds. Daniel Blaich, Managing Director of Blaich Automation GmbH, is very satisfied with the Thermokon products installed in the Le Méridien hotel, Stuttgart.

By Thorsten Kresin, Head of Marketing, Thermokon Sensortechnik GmbH

Mr. Blaich, why did you choose the thanos when planning the retrofit of all hotel rooms?

Le Méridien is a luxury hotel in which innovative art and superior design are of paramount importance even with regards to operating panels for room automation. Besides the aesthetical point of view, the operating units have to fulfill various technical requirements such as high reliability, flexibility with on-site customization and no maintenance. The EnOcean-based RF technology provides a maintenance-free operation by means of the additional solar-powered window contacts, which do not require any batteries. Because of an increased fire load in the hotel rooms, the operator also specified the use of wireless window contacts in the tender. Taking this fact into consideration and in recognition of the compatibility to the existing BACnet bus system, numerous arguments were in favor of utilizing the multifunctional and state-of-the-art "thanos" room unit with its integrated EnOcean communication.

Did you experience any problems during installation?

In particular, the fast and efficient communication with the Thermokon support team while using the field strength measuring tool "airScan" enabled sound procedures and results. By means of "airScan", the intended mounting position of the devices could be verified and subsequently an optimal performance was guaranteed. In total, 77 hotel rooms were equipped with the "thanos SR S" room operating unit in white in white, together with the wireless and batteryless window contacts. Both are based on the wireless EasySens® system from Thermokon. An outstanding benefit was further found in the high interoperability of the EasySens® system with the networks of other manufacturers. For this project we connected the "thanos" room panels and wireless window contacts to Beckhoff room controllers and experienced perfect interoperability.

Mr. Blaich (left), Managing Director of Blaich Automation GmbH and Mr. Lo Iacono (right) from Thermokon.

Which features of thanos are used in the hotel Le Méridien?

Hotel guests can change the setpoint for room temperature, adjust fan stages and status of the windows displayed in their thanos. The settings for room temperature can be adapted via touch button on the operating unit. Thanks to the bi-directionality of the "thanos," the front desk managers of Le Méridien have comprehensive room control options as well. They are able to receive and read out measured sensor values directly at their workplace and can change the temperature setpoint if required. Therefore, a tailor-made user interface was programmed, which visualizes the room temperature in all hotel rooms via a GUI/HMI. If the room temperature is too high or too low, e.g. because a window remained open over night, front-desk managers can easily and flexibly intervene and save energy, hence lowering heating expenses.

Are you satisfied with thanos?

Yes, our experience with the thanos is highly satisfying! Installation and learn-in procedures of the products on-site were very smooth. Minor startup difficulties were resolved very quickly and efficiently. The scheduled modernization of the remaining 170 rooms of the Le Méridien will be implemented with thanos and its EasySens® technology as well. Moreover, we have already been working very successfully with the Thermokon EasySens system in the Gerling Quartier," a residential and office building in Cologne/Germany. In this project, cooling ceilings are controlled by means of Thermokon room operating panels.

Mr. Blaich many thanks for the interview.

www.thermokon.com

Smart and poetic life for Mansion Wenrode

System Integration

As one of China's most exclusive real estate developments, Mansion Wenrode undoubtedly has the highest standards regarding location sophisticated building techniques. To fit these requirements, ENNO's Panno S controller and Panno-X switch have been selected as the smart home solution for all of Mansion Wenrode's villa projects. The two-side control system is based on energy harvesting technology from EnOcean, so that it ensures smooth and rapid communication and enables complete and comfortable living experience for the residents.

The maintenance-free switches can be flexibly implemented and therefore enable unlimited applications to control the living environment - individually as required by residents.

Chengdu, known as the Land of Abundance, has always enticed people to come to this major city in Western China. Mansion Wenrode is located in the financial and hi-tech center of Chengdu, next to the Jincheng Lake, and is one of the top luxury residences in China, inheriting Orient's spirits in its elaborate buildings. Combined with traditional culture and smart lifestyle, the residents can embrace leading technology together with the poetic life. **By Marketing Department, Enno Electronics Co., Ltd.**

The Panno S controller integrates numerous functions, providing users with an intelligent and customized smart home experience. Together with Enno's App, the controller allows users to set and switch between 20 custom scenes such as playing with children, getting together with family or immersing yourself in reading. Furthermore, the controller helps create an elegant lighting atmosphere to complement the Chinese-style interior design. At the same time, Panno S lets users interact with Apple Siri® to control the home in different languages, so that residents have a smarter way to set their level of comfort.

No Wires, No Batteries, More Flexibility

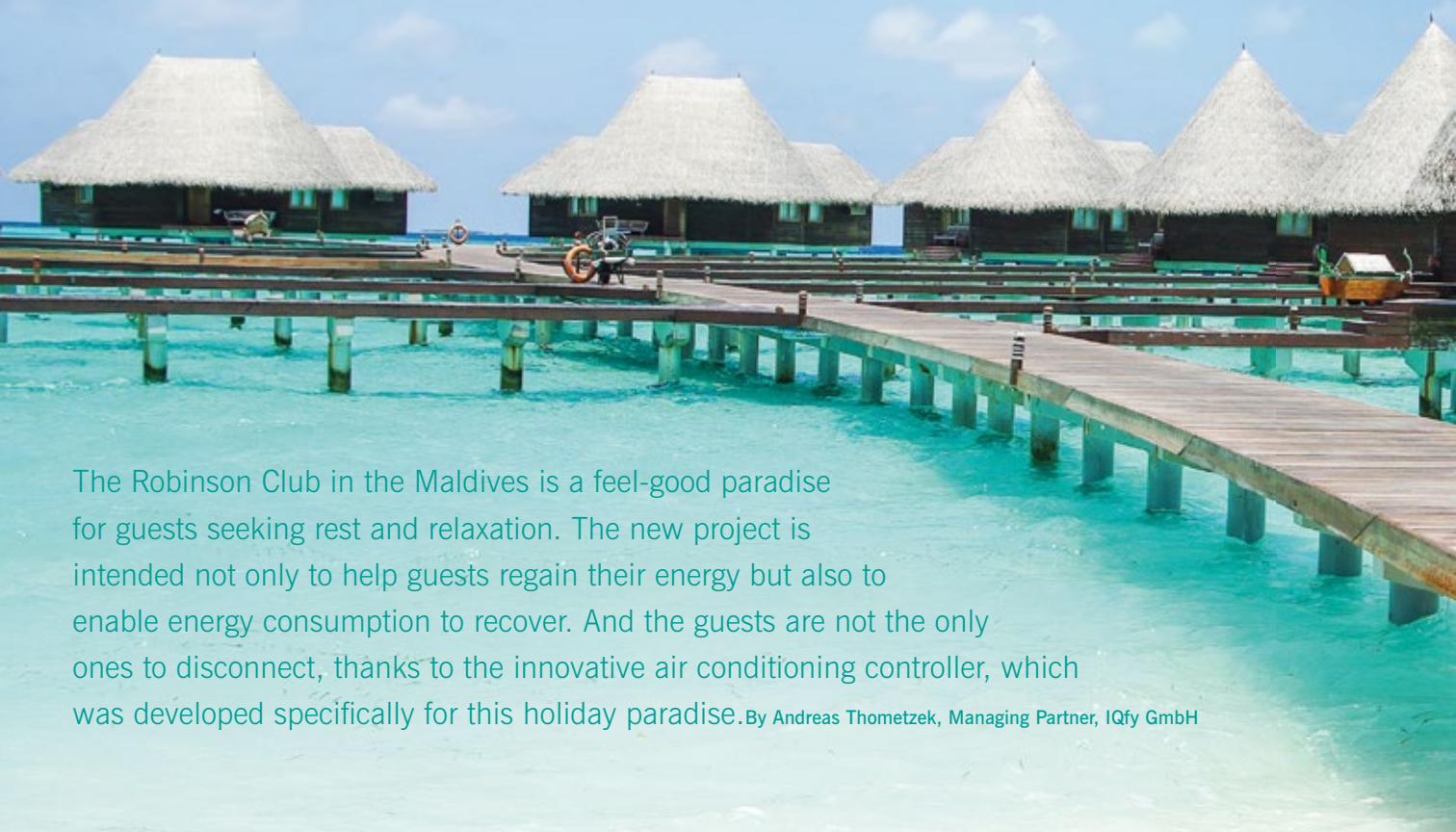
In the villa projects of Mansion Wenrode, the designers make the best use of the space. The wireless and battery-less EnOcean technology sets the Panno-X apart from traditional switches, as it eliminates installation complexity. Panno-X compatibly and conveniently removes use limitations and provided more ways to change your living environment. It can also be mounted anywhere.

Both products, the flexible switch and the controller, are prefectly matched to each other. Moreover, the switch can be paired with several Panno S controllers at the same time via Bluetooth or WiFi. Furthermore, users can add more Panno-X switches, according to room size and the area to be controlled. Each Panno-X has 4 buttons, users can customize each button for preferred function. This miniature intelligent control panel no longer works in isolation but interacts more precisely with multiple functions for greater enjoyment.

www.enno.com

(Siri is a trademark of Apple Inc., registered in the United States and other countries.)

Robinson Club Maldives – Disconnect = Recover



The Robinson Club in the Maldives is a feel-good paradise for guests seeking rest and relaxation. The new project is intended not only to help guests regain their energy but also to enable energy consumption to recover. And the guests are not the only ones to disconnect, thanks to the innovative air conditioning controller, which was developed specifically for this holiday paradise. **By Andreas Thometzek, Managing Partner, IQfy GmbH**

Welcome to savings paradise. "Savings make for a good income" remarks Marcus Tullius Cicero, and the savings potential for this project is considerable. Power and CO_2 consumption as well as monetary spending enjoy a respite due to the fact that the air conditioning is automatically turned off when a window is opened.

Efficient performance

The best time to vacation in the Maldives is between November and April. The hot tropical climate, in which temperatures rarely drop below 25 °C even at night, makes air conditioning unavoidable.

The air conditioner is now controlled automatically, thanks to the new technology used. A window sensor signals when a window is opened, and a wireless sensor gives the system a rest.

Two products turned out to be perfect movement and relaxation coaches: the FCC-230-1/25 fan coil control and the FKFB-Solar-FS wireless magnetic contact. The Robinson Club's happy technical service team express their satisfaction with the hardworking and successful little "energy animators" in a reference letter from November 2016: "IQfy controls the lights and air conditioning continuously every day, 24 hours a day, all year round – we enjoy efficient power 365 days a year."

Savings

The measurement results also ensured a refreshing budget recovery. IQfy helped save nearly $70,000 in energy costs per year. The efficient use of the air conditioning system also has a positive effect on the condition of the equipment in that it reduces the cost of maintenance and repair and shortens the overhaul intervals. Instead of performing a "health check" every four years, the interval can be extended by approxi-

mately one year, due to reduced stress. The total savings achieved with this project have a positive effect on finances, since the return on investment is a maximum of eight months.

Energy from the surroundings

Environmental health also benefits from this project. The reduced diesel consumption cuts CO_2 emissions by approximately 280 metric tons per year. Moreover, in the comprehensive recovery project in the Maldivian sunshine, only the environment recharges the batteries – the EnOcean-based window sensor operates only with solar energy and is thus maintenance-free.

The energy harvesting wireless receivers also manifest a discreet style through elegant reticence. They elude the guests' attention and in no way limit comfort. Finances, the environment and guests of the Robinson Club in the Maldives have thus found a comfortable, inspiring source of new energy and efficiency. The IQfy controller for the air conditioning system prevents the risk of an energy collapse because this project vividly confirms one thing: disconnect and recover.

www.IQfy.de

above:
The 2-channel radio receiver was especially developed for the control of air conditioning systems and is characterized by its extremely small dimensions, enabling the usage in tight spaces.

right:
The maintenance-free wireless sensors can be flexibly positioned and reliably increase efficiency.

A new level of illumination and lighting control

The San Diego Convention Center management team maintains and promotes an iconic facility that attracts events, bringing tens of thousands of visitors and tremendous economic benefits to the city. An important consideration for the exhibit hall is the quality of the lighting and the flexibility of the lighting controls in the facility. After an extensive evaluation and bidding process, the convention center selected StarLite LED fixtures working with an ILLUMRA lighting control system to provide the best quality lighting and maximum flexibility and reliability as needed in a facility whose primary purpose is to showcase products and events.

By Matthew Eisenberg, Director Business Development, Ad Hoc Electronics

Extensive requirements

The San Diego Convention Center main hall offers an exhibit floor that is up to 300 feet wide by 2,000 feet long which may be subdivided into smaller areas using 8 removable partitions depending on the needs of an event. In total there are approximately 1,200 fixtures which needed control and customizable scenes for the various configurations of the building that accommodates different events. The control system needed to offer simple access to Night, Work and Show Scenes. They also needed to include customizable light levels on a per fixture basis for maximum show flexibility. In addition, the system installation and commissioning needed to have the highest level of reliability and be cost competitive. The facility selected an ILLUMRA control system enhanced with 3 levels of fault-tolerance to ensure the show will go on, even in the unlikely event that a system issue arises, such as the loss of network connectivity.

Additionally, the installation needed to occur in a very tight time frame between previously scheduled events and it was critical that the system be fully operational by a

specific date. To accelerate the installation process, all fixtures were pre-configured and labeled for a specific location ID and worked with the system immediately upon connection in their final location. Fixture controllers shipped pre-configured for integration into the fixtures prior to installation. Within a few weeks, a custom user interface was created to allow for individual control of each of the fixtures and scene settings in the facility.

Scan and link mobile commissioning application

The ILLUMRA "Scan and Link" application, built on the EnOcean standard for Remote Commissioning, was a key part of the success of this project as it facilitated quick commissioning of each fixture control device with the specific location configuration at the factory prior to shipping to the convention center. The mobile application, which works with Apps on both iPhone (iOS) and Android devices to completely create links and adjust device configuration, was helpful at the facility to make changes as needed from the ground without the necessity of physically touching the controllers which are mounted on the ceiling fixtures.

Additional feature provided

Because the ILLUMRA Primary Area Controller has the unique feature of being able to accept a 0 -10 V input, it allows the end user to use a standard (over the counter) dimming slider switch. This technology was used to implement manual backup control by providing standalone devices that are only plugged in to utility power when they are used. They have a dimming capability in each of the convention halls to provide wireless control from other lighting control panels or provide backup control if the primary system is offline for any reason. This feature gives the convention center the ability to offer its clients control of the "house" lighting zones by having the clients provide a 0 - 10 V output (or a DMX to 0 - 10 V interface) from their lighting control systems.

Flexibility of control

There are 3 options for controlling the lighting in the convention center.

- **Option A:** A computer- or tablet-based accessible user interface can be taken into the hall to configure and activate show scenes.
- **Option B:** Wireless self powered EnOcean switches that allow activation of any of 4 preset scenes. These switches can be used by show organizers to control the entire hall at once with one switch or any subsection as configured in the user interface.
- **Option C:** 0-10V sliders for manual control or integration with lighting control panels.

Successful implementation

The project was completed within the required time constraints and is currently providing beautiful lighting using StarLite LED technology and ILLUMRA controls for the events being hosted in the facility. The Commissioning and Convention Center Control Applications provided by ILLUMRA, along with the unique features of the EnOcean protocol, resulted in an innovative solution that provides a new level of flexibility, efficiency and reliability.

www.illumra.com
www.starlite-led.com

Inconspicuously staged

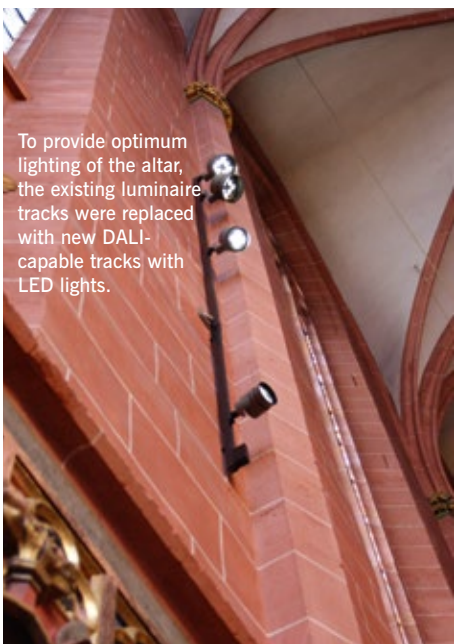
Shining in new splendor, thanks to a modern lighting solution

The lighting system of the Imperial Cathedral in Frankfurt am Main has gotten along in years. The goal was to re-stage the many details in the area of the chancel in the former collegiate church, which is also the biggest ecclesiastical building in the city on the Main River, by using modern lighting technology, thereby bringing out their full beauty. The bright red of the walls as well as paintings and gold-studded ornaments provide an ideal basis for planners and light experts to show of the strengths of the LED technology. By Michael Lehzen, Managing Director, DEUTA Controls GmbH

To illuminate the impressive high altar and the so-called St. Bartholomew frieze, classic luminaire tracks with corresponding lights were mounted on the longitudinal walls behind the three columns at the beginning of the project. Barely visible to the viewer, these lamps used to provide sufficient lighting of the individual objects but without being able to set any true light accents. In addition, a chandelier and pendulum lamps above the choir stalls were used to illuminate the room. It was no longer possible to economically operate the existing track lights, due to their advanced age. It is not possible to procure adequate lamps, because of changes in the laws covering incandescent lamps and requirements relating to energy savings.

Project objective: an innovative lighting concept

Numerous valuable coats-of-arms and gravestones decorate the longitudinal walls in the area of the chancel and need to be illuminated with the aid of modern track lights. At the same time, adequate lighting still needs to be ensured in the practice and sermon area of the chancel hall. One requirement of the building owner was also the ability to switch the lighting of the individual objects separately and to dim the brightness steplessly. This task was not easy to accomplish, since the some of the lights for illuminating an individual object are distributed among all six tracks. A control solution therefore had to be found, which allowed the individual lights in each track to be controlled in groups without the unavailable cable connection between the individual luminaire tracks.



To provide optimum lighting of the altar, the existing luminaire tracks were replaced with new DALI-capable tracks with LED lights.

The implementation: successful teamwork

Due to the historic preservation requirements, the only option was to work with the six existing single-phase supply lines of the old luminaire tracks. There was no way to install additional control lines or bus lines for activating individual lamps separately. First, the existing luminaire tracks were removed and replaced by new DALI-capable tracks. The existing incandescent track lights were replaced by LED lamps with a DALI interface as well as a different fitting from the manufacturer ERCO. A lighting test with the total of 37 LED lights showed that it was possible to implement the building owner's different requirements as planned.

The solution: Easy plug-in

The light control was implemented on the basis of plug-in modules for DALI luminaire tracks from DEUTA Controls in the BL-201 "FLEX" series. Every controller has an EnOcean-based wireless receiver. Placed at the lower end of each of the total of six luminaire tracks, the receiver can receive both the wireless signals of the permanently installed light switches as well as those of the desired remote control units. With the

integrated DALI master and the DALI power supply, which is also preinstalled, the modules form a complete solution for this project. Up to 17 DALI lights in each track segment can communicate directly with the controller. The wireless configuration of the controllers via EnOcean using the PC made it possible to set up light scenes with the planner and client right on site and to configure the switching functions.

Different functions were configured for daily operation. It is thus possible to switch each group of lights separately and to dim them in a range from 0 to 100 percent. One group of lights, for example, is turned on only when the altar doors are opened on special occasions. When the doors are closed, the lighting otherwise tends to be distracting. The maximum brightness of the individual lights was intentionally limited to a maximum value of 90 percent, which substantially extends the life of the lamps. Likewise, the light scenes for church services, guided tours or lectures, for example, can be made accessible at the press of a button by easily configuring them on the PC without any programming. Due to the use of the EnOcean wireless technology, light switches can be added at any time without any batteries or maintenance.

Exemplary solution in historic preservation

Unlike other solutions, this plug-in variant does not require any additional installation or mounting space outside the luminaire track, as is necessary, for example, for a WLAN router. Thus, the installation of the control system incurs almost no direct costs, and the system can be configured at any time wirelessly without having to establish a wired connection to the controllers with the PC.

www.deuta-controls.net

Historic preservation, thanks to upgradable technology: Optimum staging of the detailed objects in the Imperial Cathedral, due to the new and innovative lighting concept.

Complete wireless coverage delivers EnOcean messages

Reliably. Without

Some critics of modern wireless systems for building management or the Internet of Things believe that wireless is not as secure as cable. Wireless is more reliable than cable, as can be determined when EnOcean is used in combination with intelligent routing. Then there are alternative transmission routes, which an ordinary wired installation cannot carry out, of course!

By Thomas Rieder, CEO, ViCOS GmbH

In order to make EnOcean wireless more adaptable and thus more reliable than cable, the following problem must be solved: The EnOcean signals must be transported to the place where they're needed, and this must be done in more than one way.

Reliable transmission

Let's consider the situation in which all blinds on a floor or throughout an entire building are opened or closed by pressing a single button. All blind actuators have to receive the command with absolute reliability. Not a single one can fail to "hear" it. Or consider the situation in which the lights are turned on – possibly in combination with raising shutters – as an automatic response to the activation of a smoke detector. Especially in this case, all actuators have to be reliably supplied with the switching command of the smoke detector, even if individual devices in an installation may no longer be working due to a fire.

The continuous supply of all sensor signals to the heating or air conditioning controller is less critical yet equally essential for the daily operation of a building. That is, reliable wireless transmission in large residential buildings, for example from the second or third floor to the basement. These scenarios can be continued, and they all share the fact that a direct wireless connection between the transmitter – the central switch, smoke detector or climate sensor – and the receivers is not always possible for physical reasons. At this point, repeaters can be readily used, although they only permit two additional hops, that is, two additional wireless routes. Simple repeaters repeat all EnOcean messages and thus unnecessarily load the radio channel. Selective repeaters offer advantages here, although they are still limited to two hops and are extremely complex to configure. This complexity prevents them from being used on the mass market.

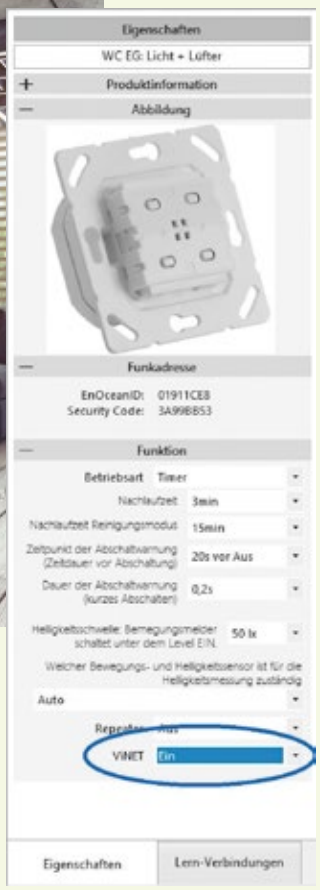
Complete wireless coverage

Targeted routing of individual EnOcean signals from the transmitter to the receiver remedies this situation. Without limiting the hops and without using repeaters. Instead, it employs a configuration for which the installer does not require any special wireless knowledge.

With its ViACT product family, ViCOS demonstrates that EnOcean routing is reliable and that the tool-based configuration of complete wireless coverage is not a compli-

safely to their destinations.

complications. Cost-effectively.



Left (picture 2):
The installer uses routing by switching on ViNET, a further configuration is not required.

Right (picture 1):
Routing a central switch "Z" for light control

cated undertaking. ViNET names the routing functionality for EnOcean messages that can be activated on the ViACT actuators using the ViCOS ConfigTool.

ViNET ensures that EnOcean messages arrive where they are supposed to. It works without any central routing elements and is therefore resistant to the feared single point of failure, that is, the failure of a single device. Regardless of the structural conditions, ViNet Routing always works whenever at least two EnOcean devices equipped with this tool are within their radio range. If three or more ViNET devices "hear" each other, alternative routes are activated. Of course, sensors and wireless switches continue to work as usual. Their signals are reliably passed on to their destinations via ViNET.

Figure 1 shows a scenario for a central switch "Z," which turns off all the lights when leaving the house. All actuators for lights and blinds support ViNET Routing, and the sketched routes are established through automatic configuration. If an actuator fails, this does not cause ViNET to stop operating, since blind actuators, of course, also route the switching signal for the lighting actuators. Actuators for lights and blinds are placed in every room, and the best possible EnOcean wireless coverage is present throughout the entire house.

Reliable. Uncomplicated. Cost-effective.

The ViCOS ConfigTool, which the installer already uses for commissioning a wide variety of EnOcean devices, configures ViNET without complications. If ViNET is activated for devices (see Figure 2), these devices handle routing functions. The ConfigTool takes into account all EnOcean devices of an installation when defining the routes, even if they themselves do not participate in the ViNET routing. The tool uses the Product Label, Product ID, Device Description File and Remote Commissioning processes standardized by the EnOcean Alliance to communicate with the ViNET devices.

ViNET is an integral part of the VIACT product family but is not limited to ViCOS devices. ViNET can be implemented for devices of other manufacturers. The only requirement is that they are supplied continuously and fully support the EnOcean Alliance standardization.

www.vicos.at

Smart model house

Left: The new model house meets the strict “KfW Efficiency Home 40 Plus” standard.
Center:
Clever combination: White upper cabinets and wood-colored lower cabinets turn the kitchen into the highlight of the home.

Less is more: the bedroom is kept simple. Splashes of color, such as the bed linens, lend the room a cozy atmosphere.

in the Swabian alpine upland

Schwabenhaus has opened a new model house in Günzburg. Along with environmentally safe construction materials and healthy fit-out materials, the home uses innovative building and heating systems.

By Schwabenhaus GmbH & Co. KG

The prefabricated home, a modest variant of the Da Capo 85 N house type, thus has a basic smart home package. Combined with an additional router (wibutler), lamps or blinds can be programmed and operated with mobile devices. The manufacturer of prefabricated homes has chosen to use the energy harvesting wireless technology from EnOcean in its smart home concept. This technology has only a low energy demand at a great range, since the wireless modules obtain their energy from their surroundings.

Sustainable and efficient

The ecological home also features a controlled ventilation system with at least 90 percent heat recovery as well as a floor heating system (including a cooling effect in the summer). An intelligent power control system ensures that the electricity produced by photovoltaics is provided for in-house use or stored in batteries for later consumption. A geothermal heating system heats the room and process water to optimum temperatures. The house also meets the strict “KfW Efficiency Home 40 Plus” standard and thus produces more energy than it needs to manage the heating and hot water systems.

Bottom left side: The understated color scheme in cream and light gray extends through all living areas.

www.schwabenhaus.de

Efficiency is becoming more and more important in the areas of energy consumption and monitoring these days.
The “emon” portable plug & play solution is ready for use in just a few seconds and delivers reliable results. The uncomplicated connection of the EnOcean antenna to the gateway supplies the latter with electricity directly and connects it to the Internet – and monitoring can begin. By Olivier Wagener, Software Engineer, rms.lu

Plug & Play
for easy monitoring

Consumption, room climate and environmental influences
emon’s specialty is recording energy and environmental data, such as that transmitted, for example, by EnOcean smart plugs. To this are added temperature sensors for indoor and outdoor areas as well as CO_2, 3-phase power metering, occupancy and much more.

Flexibility with EnOcean
Since the gateway does not evaluate the wireless telegrams, new protocols or updates can be implemented on the server side. Thus, the latest measurements are not interrupted, and the EnOcean technology can continue to be used.

User-defined equipment
The emon cases are available in various as well as personalized variants. The contents of the cases can be assembled as needed, and additional smart plugs or room sensors, for example, can be added. There is no maximum number of sensors per gateway.

Cloud-supported monitoring
The data collected by sensors is encrypted and transferred to the Microsoft Azure cloud, where the user can access it in real time. The emon platform gives users an overview of the sensor data last measured and allows for comparison of any sensors over freely selectable periods of time. Independent downloads of all data make it possible to visualize the measurements. The potential for saving energy and lowering costs can be pointed out to customers without any added effort.

RMS.lu S.A.

Optimal Production Hall Lighting at Lower Costs

Using a combination of predefined hardware and user- friendly software, WAGO Lighting Management facilitates the design and commissioning of new lighting systems, and also offers numerous advantages for their operation.

By Dirk Röscher, WAGO Kontakttechnik GmbH & Co. KG

Solid Hardware

On the hardware side, the new WAGO PFC200 Controller and the DALI Bus Module from the WAGO-I/O-SYSTEM 750 form the foundation. Every module can integrate up to 64 DALI lights, up to 16 DALI sensors, and up to 16 DALI transmitters into the system. Since the number of bus modules is variable, WAGO Lighting Management can be used for small production halls, and also in large logistics centers. Furthermore, additional I/O modules can be linked to the controller, for example, 3-Phase Power Measurement Modules for power measurement or wireless receivers for EnOcean wireless controls.

Modern Software

However, WAGO Lighting Management becomes a powerful and user-friendly lighting solution due to the software applications implemented at the controller. All settings, for commissioning and during operation, can be carried out at the controller with the click of a mouse. No programming is required. Since the graphic user interface can be accessed by any standard browser, there is no need for local software installation. The Web visualization, based on HTML5, configures the work with particular ease. Parameter values are stored on the SD card or a backup server via SFTP. The values can be forwarded to a higherlevel building control or to a production control center using Modbus TCP/IP.

Innovative Operating Concept

WAGO Lighting Management is oriented toward the different light requirements of warehouses and production halls. The foundation: the hall is divided into virtual rooms corresponding to the different functions and activities there – for example, assembly lines, traffic paths, or offices. Each virtual room receives signals from the sensors and actuators in order to automatically generate the optimal lighting ratios for the respective tasks, depending on the functions that have been set.

www.wago.com/lighting-management

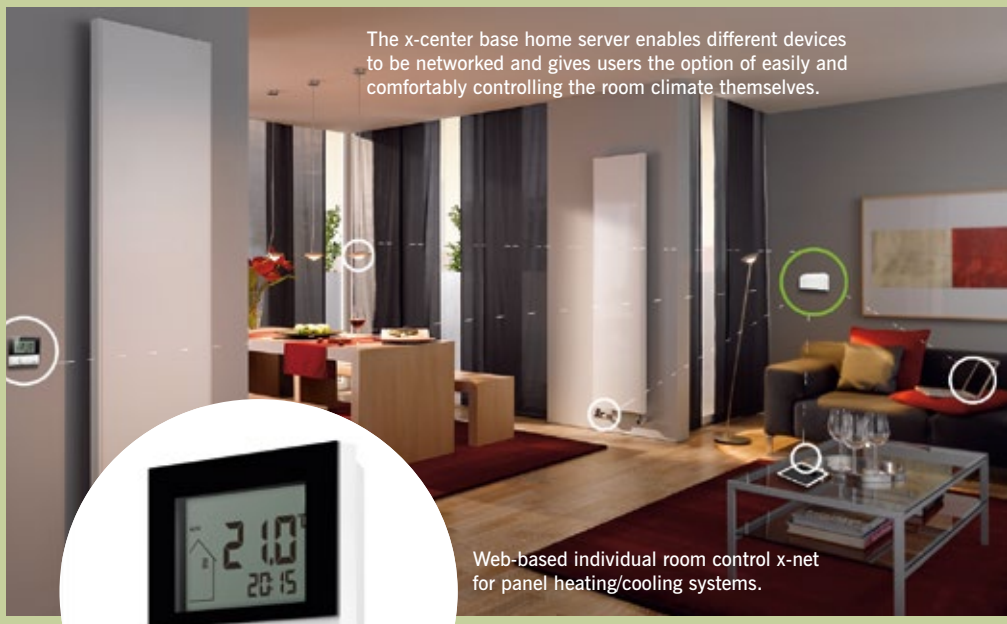
x-optimised – an easy-to-use thermal comfort system

Control the heat in your own home whenever and wherever you want – made possible by Kermi Smart Home with new control elements within the Kermi x-optimised thermal comfort system.

By Franz Stecher, Product Manager for Heating Technology,, Kermi GmbH

At the heart of the system is the new x-center base energy and comfort manager, which allows all components of the heating system to be controlled and programmed – Kermi Smart Home for heating and cooling.

In addition to x-center base, the room climate specialist also presents new intelligent controllers for its radiators, panel heating/cooling systems as well as the x-change dynamic and x-change compact heat pumps.



The x-center base home server enables different devices to be networked and gives users the option of easily and comfortably controlling the room climate themselves.

Web-based individual room control x-net for panel heating/cooling systems.

x-center base – digital control from anywhere

The x-center base home server lets users easily and comfortably access the components of the Kermi x-optimised thermal comfort system with a web browser – no special software required. They can then manage the user interface, temperature settings or heating times for their home from a programmed interface. Users can thus change preset times at any time from anywhere in case they will arrive home earlier or later than expected. A login option with advanced maintenance functions is also available to installers and Kermi service technicians. Data privacy is, of course, guaranteed – the system ensures that data can be accessed only by its owner. A true demand-based inlet temperature control is made possible by evaluating and preparing all room-specific data in the x-center base, combined with other Kermi x-optimised components. The heat is provided precisely where it is needed in each room at the desired point in time, which makes for a much more comfortable temperature and optimizes energy efficiency.

EnOcean radiator controllers – top performance at the radiator

In the Kermi x-optimised thermal comfort system, the x-center base home server communicates with the new radio-based thermostat controllers via the EnOcean wireless standard, ensuring the efficient and user-friendly control of the individual radiators. These thermostat controllers can be easily mounted on the therm-x2 panel radiators and many designer radiators from Kermi in just a few steps. The thermostat controller is then connected to the home server at the press of a button.

Open EnOcean wireless interface

Other devices, such as window contacts, can also be integrated into the network via the EnOcean standard of x-center base. Moreover, EnOcean-based switch actuators are available for electrical solutions on bathroom or designer radiators. The EnOcean wireless-based radiator controller not only shows the setpoint temperature on its large display, it also provides information on the inlet temperature and valve lift position, providing an efficient, demand-based hydraulic function at any time of the year.

x-center control – web-based control of the heat pump

The new x-center x40 controller for Kermi x-change dynamic heat pumps and the x-center x20 controller for all x-change compact models are connected to the x-center base home server, making them also suitable for web-based operation from a smartphone, tablet or PC. This permits remote maintenance as well as online monitoring and online checks as needed so that the heat pumps can operate efficiently and without wasting resources – entirely within the Kermi x-optimised thermal comfort system.

x-net web-based individual room control – for x-net panel heating and cooling

The web-based individual room controller for all x-net panel heating/cooling systems from Kermi, which was introduced at ISH 2015, is also connected to the x-center base home server and can thus be conveniently controlled on the go. It consists of various room control units and associated switch actuators, offering high functionality for operating the x-net panel heating/cooling system comfortably and energy-efficiently.

Heating system of the future

All components of the Kermi x-optimised thermal comfort system are available from a single
source for new construction, renovation and remodeling projects – from heat generation with a heat pump to heat transmission with radiators or panel heating/cooling systems. The new Kermi Smart Home solutions are an intelligent, future-viable and user-friendly addition to the system.

www.kermi.de

x-center x40 controller for heat pumps

EnOcean radiator controller

All-around security: smart security for Smart Homes

With its tried-and-tested series of EnOcean warning devices, AFRISO has made it possible to minimize risks in home and building systems for many years. In keeping with the motto, "Comfort through security," AFRISO is further expanding its smart portfolio and thus offers an aggressive all-around security for the areas of intrusion, danger and leakage detection. By Max Hampapa, AFRISO-EURO-INDEX GmbH

AIS 10 indoor siren:
Usable as a stand-alone solution with EnOcean-based products or integrated into Smart Home Systems as an alarm siren.

It's really loud now!

If the noise level in the house is getting really high, there is a good reason for this. The new and attractive AIS 10 indoor siren from AFRISO has a whole lot of power under the hood and alerts residents and intruders by emitting a loud 85 dB alarm. Once plugged in, the indoor siren performs a wide range of functions. In the simplest scenario, it operates as a standalone device connected directly to a wide range of EnOcean-based products, such as the AFRISO con and eco water sensors, smoke detectors, pushbuttons, door/window contacts, the Hoppe SecuSignal® window handle and other sirens for forwarding alarms. The siren goes off as soon as one of the connected devices sends an alarm. The siren demonstrates its full scope of performance. In addition to the unmistakable warning sound, the siren repeats the alarm of the corresponding sensor every few seconds and thus ensures that it is reliably transmitted to higher-level networked systems. "Lost" signals are thus things of the past. The siren also has a built-in repeater and can be integrated into smart home systems.

Danger detected – danger averted!

Every year, approximately 400 people in Germany die as a result of home fires. Most of these people are taken by surprise at night while they are asleep. In launching the ADS 10, AFRISO has made a VDS-tested smoke detector with a built-in EnOcean wireless module available on the market. The advantage of the ASD 10 over conventional smoke detectors lies in its ability to be integrated into smart home systems. Not only does the device reliably wake up the inhabitants, it can also activate emergency route lighting or open blinds that block escape routes.

www.afrisohome.de

Integrated room automation
for more comfort and efficiency

The SAUTER ecos504 room controller enables both seamless integration into the building management system and the automation of the primary installations. SAUTER therefore combines energy consumption and generation thereby allowing demand-controlled regulation of the supply media. By Roland Hofstetter, Product Management Room Automation, SAUTER Head Office

SAUTER ecos504 is a freely programmable BACnet building controller (B-BC) and part of the SAUTER EY-modulo 5 system range. The modularity of SAUTER's integrated room automation provides maximum flexibility. Therefore, the room automation solution can be tailored to the specific requirements of each building to achieve maximum comfort for the room users with the minimum use of energy.

High energy savings with DALI

Integration of the lighting using DALI is a must if you want to achieve maximum energy efficiency. The DALI interface incorporated in SAUTER ecos504 enables lamps to be integrated with DALI electronic ballasts, presence detectors and light sensors for presence-controlled lighting or constant-light control.

Flexible thanks to wireless technology

Using the EnOcean interface, EnOcean room operating units and sensors can be connected wirelessly. In combination with SAUTER ecoUnit 1 wireless operating units with bi-directional EnOcean technology and LCD, SAUTER ecos504 is also ideally suited to controlling open and flexible room concepts. Window contacts, switches and other EnOcean devices from third-party manufacturers can also be integrated. Programming of the controller with the well-known SAUTER CASE Suite engineering platform thus ensures the optimum flexibility of BACnet/IP, DALI and EnOcean.

www.sauter-controls.com

The world's smallest EnOcean smart plug

If you are starting to make your home smarter, a smart plug would be a wise beginning. Combining elegant in appearance with functionality, the NodOn® Micro Smart Plug, one of the smallest EnOcean smart plugs on the market, is a customizable and flexible solution for your smart home.

By Vivienne Li,
Sales and Marketing Assistant, NodOn

Plug & Play

The NodOn® Micro Smart Plug requires no additional hub. With its plug-and-play setup users can start to use it within minutes. It not only works directly through all EnOcean devices, such as remote control units, but can also be paired with any EnOcean gateway to make your home smart.

Connectivity

Simply plugged into any wall socket and electrical appliance, this versatile receiver would make daily life much easier for the user. Through a Smartphone and tablet, users are able to control their devices from anywhere.

Power consumption meters

Connected to a Home Automation gateway, the NodOn® Micro Smart Plug shares metering information and monitors the energy usage. It can act and trigger scenarios according to measured consumption levels.

Beautiful & reliable

With its innovative design, the NodOn® Micro Smart Plug is able to change exterior color when desired, so users can adapt the appearance to the look of their home or their mood. Thanks to smart plugs, almost all traditional electrical appliances could become smart devices and easily enable home security benefits.

www.nodon.fr

IQfy pressure sensor – Smart sensing in every direction

"Sensing, thinking, action" – sensing always comes first – as can be clearly seen with the new IQfy seat sensor. The world's only patented highly sensitive 360° pressure sensor senses pressure from every direction and takes action. It increases safety and comfort and helps save energy.

By Andreas Thometzek, Managing Partner, IQfy GmbH

The patented design of the sensitive helper "senses," for example, the occupancy of seating and reclining furniture and ensures that energy consumers are turned on or off as needed, or simply reports occupancy or non-occupancy. This approach lowers energy consumption costs and safety risks, depending on the application.

Many different applications

Following its feelings, the IQfy seat sensor thinks of lighting, printers and other "energy guzzlers" in office buildings and turns them off in unused rooms.

Its instinct for sensibly shutting down devices transfers to smart home systems, such as home entertainment equipment. Detecting occupancy is also helpful in public transportation, trains, airplanes, movie theaters and university lecture halls. Even TV shows have been tuned with this sensor.

The sensor has proven itself to be equally sensitive in its role as a health care assistant in applications, such as a hospital mattress specially developed by IQfy or combined with receivers for mobile use.

Safe and reliable

Pressure sensors from IQfy with similar functions and energy harvesting wireless technology based on the EnOcean standard have long assisted in numerous areas and are therefore reliable helpers with many years of experience. These special, new co-workers operate with an extraordinary all-around sensitivity. The 360° sensor reacts to pressure from any direction with the same release force, which makes for particularly reliable and safe detection.

www.IQfy.de

The further development of the IQfy pressure sensor focused on safe actuation with the same release force.

Efficient, safe, comfortable

As a leading manufacturer of EnOcean-based sensors in China, SECO has developed several new products for its intelligent building and smart home solution.

By Marketing Department, Beijing SECO Information Technology Co., Ltd.

Indoor air quality sensor

SECO's multi-function air quality sensor can detect indoor temperature, humidity, VOC (Volatile Organic Compounds, such as benzene, formaldehyde, carbon monoxide, hydrogen, ammonia, etc.), and fine particulate matter (i.e. with aerodynamic diameters not larger than 2.5μm, or PM2.5).

An external signal lamp changes colors accordingly to the level of PM2.5, so that elders and children can easily identify the indoor air quality. With a standard 16A plug design, the installation is simple without any wiring.

The sensor can also be connected with air-purifier or air-conditioner via infrared, and can be integrated with intelligent control system using EnOcean radio: when the indoor air quality changes, the sensor immediately sends an alarm message to the end user and automatically turns on the air purifier or air conditioner to create a cleaner and more comfortable environment.

Smart lock

SECO's connected smart lock gives you the freedom to secure your home. You can choose how to open your door. Fingerprint, PIN code, key card, traditional key, and even APP from your Smartphone when connected to SECO's EnOcean smart home system.

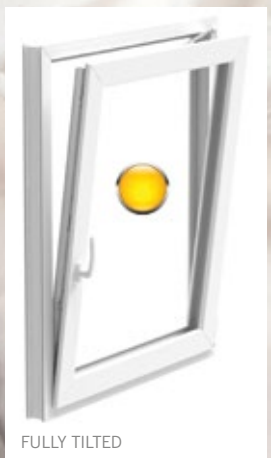
Remote control

SECO's new remote control has 13 buttons (12 on the front, one on the back) and can be easily set and programmed to control the lighting, air conditioning, curtains and scenes. Thanks to ultra-low-power EnOcean radio, the wireless communication is very stable and interoperable with other EnOcean-based devices.

www.secotech.com.cn

mTRONIC, the wireless sensor that is always keeping watch

When it comes to monitoring buildings, a reliable status display for windows and doors is indispensable in order to ensure basic building security. The mTRONIC multisensor from Maco facilitates the omnipresent status monitoring of windows, doors or sliding units. By Petra Janßen-Wahl, PR/Communication, MAYER & CO BESCHLÄGE GmbH



FULLY TILTED

OPEN

CLOSED

The wireless sensor that talks to everyone

How well a wireless sensor works depends on the language that it speaks. mTRONIC communicates via the tried-and-tested EnOcean wireless protocol and can therefore be combined with all common electronic device and smart home systems.

mTRONIC is always keeping watch and working

The model dimensions correspond to a groove width of only 18 mm, making the mTRONIC ideally suitable for placement in each window and door frame. It establishes the connection to the fittings and transmits information to the house system for any movement on structural elements. It permanently monitors the status of windows or doors and not only detects the states of “open” and “closed” but also the three positions of “open,” “tilted” and “closed.” mTRONIC is therefore not just a closure monitor but the intelligent status display for all-around monitoring – 24/7.

www.maco.at

From your office to the cloud –

Self-powered sensors for the Internet of Things

With its new series of Wall Switch Sensors, Echoflex introduces new products for distributed control and Internet of Things solutions. By Shawn Pedersen, President, Echoflex Solutions, Inc.

OWS Series
Occupancy Wall Switch Sensor

The Echoflex OWS Series provides control for your lighting and receptacles in one unit, combining a wireless wall switch with a wireless occupancy sensor. Used with Echoflex controllers, the OWS is ideal for installation in small offices and boardrooms. The OWS provides on/off switching, manual dimming, occupancy/vacancy sensing and occupancy-based plug load or HVAC control. The occupancy wall switch sensor is available in Dual Tech and PIR models.

MOS Series
Dual Tech Ceiling Mount Sensor

In the continuing evolution of the former occupancy sensor platform, the company introduces the MOS-DT solar-powered, wireless, Dual Tech sensor. The improvements in solar energy harvesting and power management enable the development of battery-free, wireless, dual technology ceiling sensors. The MOS-DT uses PIR and acoustic sensing technologies to provide 360 degrees of large-area occupancy detection up to 2,000 square feet. False trips are minimized through advanced signal filtering resulting in a positive occupant experience.

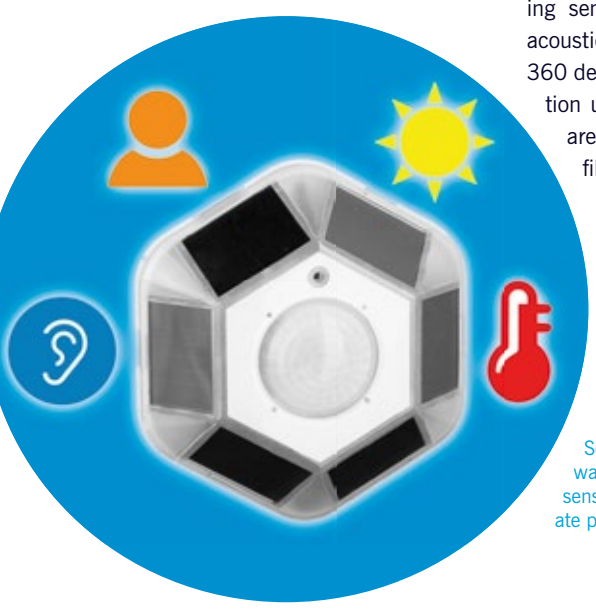


Image left: Through the use of various sensors the MOS-MT radio sensor enables a 360-degree presence detection.

Image above: The Occupancy Wall Switch Sensor combines the function of a radio wall switch with that of a wireless presence sensor and thus enables flexible and appropriate positioning.

MOS – MT Indoor Environment Sensor

Responding to the demands of the IoT sector, Echoflex has leveraged its energy harvesting, wireless and battery-free designs to address diverse facility environment sensing. The MOS-MT combines detection of occupancy/vacancy, temperature, light level and audible noise values into a single, wireless sensor. The MOS-MT provides real-time data of several environmental parameters that are used to improve operational and facility efficiencies.

www.echoflexsolutions.com

The latest generation of smart actuators

The new Omnio REG actuators are based on EnOcean wireless technology for buildings and have many different applications as a cost-effective alternative to wired bus systems in the areas of lighting, shading and heating. They can be configured manually or wirelessly and have the same extensive range of functions as the Omnio UP actuators, but in four- and eight-channel designs.

By Beat Zbinden, Product Manager Omnio, AWAG Elektrotechnik AG

Weather sensor

The hardware and firmware of the new Omnio REG actuators were redeveloped from the ground up and adapted to the extensive range of functions of the tried-and-tested UP actuators. The switch actuators have more than twenty different functions, from simple switching on and off to timing to occupancy simulation. The 8-channel Omnio REG thermostat actuator is used to regulate the temperature in individual rooms.

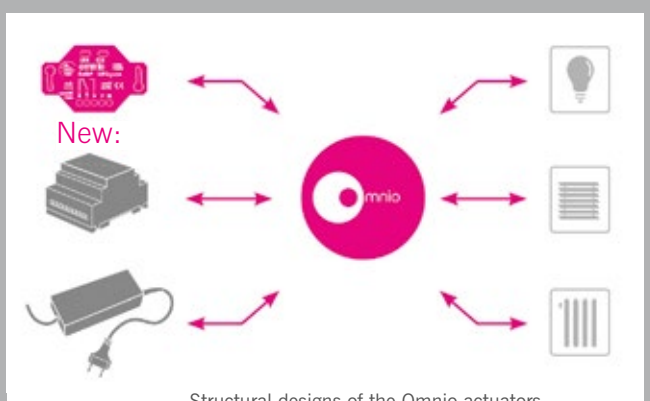
It is employed in interaction with a room temperature sensor, in which the desired room temperature can be set. Additional functions are setpoint shifting, switching over to a second setpoint and window monitoring.

Omnio weather station

The successful Omnio UP blind actuator also comes in a version with four channels for the control cabinet. Millimeter-precise positioning of blinds and louvers, window monitoring and various automatic functions are part of the basic equipment. The weather station developed specifically for Omnio blind actuators protects the blinds against strong wind and rain, while smart shading functions can thus also be easily implemented..

Wide range of applications

Entire buildings can be intelligently automated with Omnio, and the self-powered sensors and actuators are based on the tried-and-tested EnOcean wireless technology for buildings. Due to their wide range of functions, the Omnio REG actuators cover an enormous application spectrum.



Structural designs of the Omnio actuators

Omnio 4-channel blind actuator

They are used as a cost-effective alternative to wired bus systems, such as KNX, wherever all loads in the control cabinet are wired, for example in commercial buildings, single family homes/apartment buildings as well as condominiums and rented apartments. In the event of reduced radio reception in the control cabinet, the radio range can be expanded bidirectionally via wired outstations, even over many floors.

Thanks to the innovative ARCO technology (Awag Remote Commissioning for Omnio), users can configure the actuators manually or wirelessly with ease, using the “E-Tool” software, or they can purchase a preconfigured solution.

www.omnio.ch

The benefits of technological convergence – Niagara and EnOcean

The evolution of any technology often results in technological convergence – the natural progression of a device or software to be able to perform additional tasks in the place of another product. Presenting a multitude of benefits, technological convergence has the potential to disrupt markets, influence society interaction as well as reduce energy consumption and bills. By Mike Welch, Managing Director, Control Network Solutions Ltd

Utilizing technology convergence, the time and energy saving benefits of EnOcean energy harvesting controls can now be incorporated within a Niagara building management system (BMS).

Seamless integration

Enabling networks of EnOcean self-powered wireless switches, sensors and Ethernet wireless transceivers to be commissioned and managed within the Niagara platform, cns-enocean™ removes the need for third party tools and processes. Furthermore, through the use of cns-enocean the need for data IO mapping and labeling is eliminated, significantly reducing the risks and time associated with commissioning a system. Finally it provides for real-time seamless access to device value data for dashboards, analytics both local and remote.

Based on open and interoperable standards, energy harvesting wireless switches and sensors of any product manufacturer that conforms to EnOcean Electronic Profiles can be added to the Niagara based platform.

Successful convergence

Combining the energy saving benefits and flexibility that EnOcean technology provides, with a smart Internet of Things-compatible building management system, such as Niagara, significantly enhances the end user experience. Through the integration of the leading technologies, installed hardware is dramatically reduced, disruption within the building is limited and a single comprehensive building control system is achieved.

www.cns-enocean.com

Simply more security – EnOcean and KNX

Security becomes a crucial factor in a networked world. Encryption is absolutely necessary, particularly in wireless transmissions. The EnOcean Alliance has therefore defined appropriate security algorithms. As the first KNX gateway on the market, the new KNX ENO 636 secure from Weinzierl supports encrypted wireless communication with EnOcean devices.

By Florian Kreutz, Head of Sales and Marketing, Weinzierl Engineering GmbH

Weinzierl KNX ENO 636 secure

The latest model 636 in the KNX ENO 63X gateway family provides the best possible connection between the reliability and configurability of the KNX bus system as well as the flexibility of the EnOcean wireless standard with self-powered wireless sensors.

The gateway starts up quickly and easily: the encryption can be activated individually on all 32 channels. EnOcean-based sensor and actuators that support security can then be taught in as usual. This approach gives users more security without sacrificing comfort.

More functions

Another new feature is the greatly expanded scope of supported EnOcean equipment profiles (EEP). The KNX ENO 636 secure now supports more than 100 profiles and thus allows an even broader range of EnOcean-based sensors and actuators to be securely and easily connected to KNX installations. The illuminated display allows for convenient configuration on site. Power is supplied from the KNX bus.

www.weinzierl.de

New EnOcean Alliance Logo

The EnOcean Alliance keeps evolving and strengthening its position in building automation and the Internet of Things (IoT). The solutions of the extensive, established ecosystem help to enable sustainable and connected buildings. The EnOcean radio standard has successfully established itself as a leading standard for use in intelligent buildings.

Interoperability is essential for the use of integrated building control. For this reason, the EnOcean Alliance is continually working to improve user convenience and the interoperability and performance of EnOcean-based products from different manufacturers. On this occasion, the organization will present the EnOcean certification program. This measure is supported by the new brand launch of the EnOcean Alliance.

The new EnOcean Alliance logo, with the "leaf" as the graphical element, will better underscore our mission to promote and enable intelligent green buildings through the creation of a broad range of interoperable products. Furthermore, the new EnOcean Alliance logo will better support our goal of building a better, safer, cost & energy-efficient, environmentally friendlier world through intelligent self-powered wireless sensor solutions.

www.enocean-alliance.org

EnOcean at CES 2017

This year's CES, the world's largest electrics fair, gave its visitors a glimpse of the key IT trends of the year. Numerous members of the EnOcean Alliance also presented their innovative solutions based on EnOcean technology.

EasyIO wins ControlTrends Award for Wireless Product Solution of the Year

EasyIO is the winner of the ControlTrends Award for best Wireless Product Solution of the Year with the Enocean Gateway. EasyIO's Johan Schakenraad received the award during the 2016 AHR expo in Orlando.

The EnOcean to RS485 Gateway is a device for surface mounting. It serves as bidirectional gateway between EnOcean products and EasyIO FG-controllers. The gateway receives telegrams from all EnOcean devices, such as sensors, actuators, controllers and control systems, with no need of additional software. The gateway comes with the Free EasyIO FG EnOcean driver. EasyIO enables the industry to open new markets for energy saving with the free CPT engineering tool. It's a tool that does logic, metering, HTML5 graphics, logging and EnOcean

www.easyio.eu

MASTHEAD

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Overview of the EnOcean Alliance members

www.enocean-alliance.org/products

enocean alliance
No Wires. No Batteries. No Limits.

PROMOTERS

Embedded Intelligence | EnOcean Self-powered IoT | Honeywell | IBM
Pressac | ROHM Semiconductor | thermokon | Vertuoz by ENGIE

PARTICIPANTS

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ALPS | ALTECON | ART | ASi Controls | Autani | avidsen | AWAG | BAB TECHNOLOGIE | BAPI | BECKHOFF | BILTON
BootUp | Bouygues | Bouygues Immobilier | BRUCK | BURG | CABA | CALEFFI | CONNECTED LIVING | CONTEMPORARY CONTROLS | DEBFLEX | Decelect
Delta Controls | DEUTA Controls | DIEHL Controls | DIGITAL CONCEPTS | DISTECH CONTROLS | DOMADOO | DRSG | EasyIO | EIMSIG | EKE | enno
EMerge ALLIANCE | echoflex | Eltako ELECTRONICS | EMERSON | ESYLUX | ETC | EUROtronic Technology GmbH | Ex-Or | FLEXtron | 方正集团 FOUNDER | Functional Devices, Inc. RIB
Funk Technik | futurehome | GPA | Haier | HELLA | Helvar | HIDEKI | HOPPE | HORA | HOWDENS | htng
HUBBELL | ID-RF | ILLUMRA | Intesis | INVENTRONICS | IQfy | ITEC | itho daalderop | Jäger DIREKT | KESSEL | KERMI
kieback&peter | KMC CONTROLS | LA LIGHTING | LEVITON | LinmoreLED | LIXIL | LONMARK INTERNATIONAL | LOYTEC | LSYSTEMS | mdt | MAGNUM
MAICO | MARUBUN CORPORATION | MechoSystems | menred | micropelt | Midea | 工信智创 | MITSUMI | mivune | MK by Honeywell | molex
muRata | myfox | NEC | NIESHA | NODON | NTTEAST | Cobx | OGGA | OMRON | ON Semiconductor | one
OPEN CONNECTIVITY FOUNDATION | OPTEX | OSRAM | OSRAM SYLVANIA | oventrop | overkiz | PEHA | PERFACTORY | permundo | PM DM | RAUH SR GmbH
Redring Xpelair Group | Reliable controls | RENESAS EASTON | RESOL | RIEDEL | RUSKIN | S+S REGELTECHNIK | SAUTER | Schneider Electric | SECO | sensortec
SIEGENIA brings spaces to life | SIEMENS | SIMICS | SINOBEL | sirlan | Shenzhen Xiao Long Intelligent Technology | SMARTHOME | SODA | somfy | spartan | spega DELTA DORE
ST life.augmented | starkx | TAIYO YUDEN | TERRALUX | Thomas | Titus | TRIO2SYS | ubiant | UCHIDA | USHIO | USNAP ALLIANCE
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Winshine Network Technologies | WIT | Wurmitzer | ZUMTOBEL

...and more than 230 associate members

SMART ENOCEAN GATEWAY

CONNECTING WORLDS

Product information

- IP-Gateway
- translates EnOcean-Radio Communication into different IP-worlds
- Web interface to view, control or manage EnOcean devices
- Multiple parallel client connections possible
- Supports standard EnOcean profiles as well as manufacture specific profiles
- Update capability for future EnOcean products
- No limits regarding the amount of sensors and actuators which can be used
- Simple API (String, TCP) and REST-API (JSON, HTTP)
- Flexible and energy efficient hardware
- Secure with TLS-Encryption

Features

- IoT development kit for Intelligent Buildings
- Fully open bidirectional REST/JSON API with device administration for a seamless integration in any existing ecosystem
- Monitor or publish your data to the cloud easily by using the provided tool Node-Red (Azure, PubNub and more)
- Out of the box integration with the IBM Watson IoT Platform Bluemix and TRIRIGA

DIGITAL CONCEPTS

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