

**T**he rapid developments in building technology offer a win-win for building managers and engineers alike. It's no wonder that investment in building automation is growing quickly, notes Graham Martin, Chair & CEO EnOcean Alliance. Whether it's in factories, offices or homes, today's smart buildings make it possible to work and live in safe, comfortable and efficient environments. And it's becoming easier than ever to bring the technology on board.

Technology trends like big data and artificial intelligence, building information modelling (BIM), power over ethernet (PoE) and wireless and battery-free controls are changing the way we build and operate workplaces and homes. These will not only work as smart buildings but go further and create smart spaces from meeting rooms and conference suites, right down to restrooms and individual living and working spaces. As the technology gathers pace for large buildings – from offices and factories, through to multi-occupancy homes, hotels and hospitals – so individual smart homes will also become fully intelligent agile buildings. Smart applications will be part of our daily lives and routines, with demand-based services that flexibly adapt to changing needs. Artificial intelligence based on resource-saving technologies will significantly help to meet the challenges of climate change, demographic change, rising prices and limited space.

### Sensors optimise building environments

Building the perfect environment requires exact data from every room or area of the building. For example, intelligent lighting control can be used to modulate illumination levels over the course of the day. Controlling the colour temperature offers an additional method to adjust

lighting in tune with body clocks. The data comes primarily from sensors which are the key to building automation and Internet of Things (IoT) applications.

Wireless solutions are essential to ensure that the necessary data is made easily available in existing premises as well as new buildings. The cost, disruption and environmental issues involved in routing new cables and replacing batteries are extremely high. That's why energy harvesting-based, wireless sensors have become the choice for the building and data service community. If such sensors are combined with a building automation (gateway) and moved to the cloud, raw data can be accessed from anywhere.

This sensor-driven, real-time connection between real locations and their digital twin helps to analyse and improve workplace situations. Integration of a wide range of components is simplified by leveraging the interoperability offered by industry organisations, such as EnOcean Alliance. Its energy harvesting, wireless technology for example, is used in around 1,000,000 buildings worldwide, from factories to offices and multi-occupancy buildings as well as smart homes. Most energy harvesting sensors, switches and other self-powered devices communicate over distances of up to 30 metres in buildings, with short encrypted messages. A large variety of sensors and switches are available and allow users to choose functions with style and certified interoperability. This makes it easy to choose a range of home automation options while the modular building is being fabricated; and it is simple to add new functions later.

Efficient and effective use of space is vital given the flexibility required for office buildings and multiple occupancy housing. With digitalisation, a wireless and maintenance-free solution is a very smart approach when it comes to

retrofitting existing buildings. Sensor-based knowledge further helps bring operating processes in line with demand. For example, cleaning and maintenance processes become more flexible, adapting to occupation levels and uses of the space.

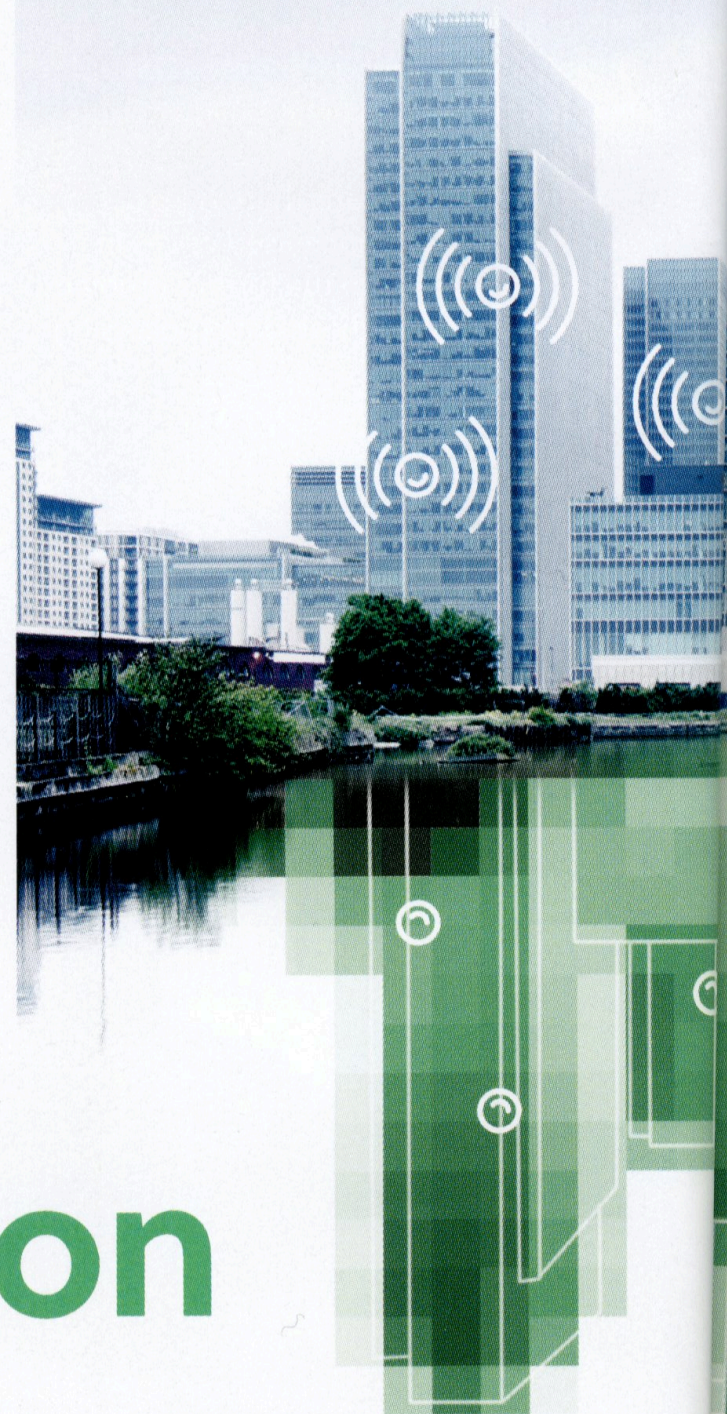
Maintenance-free, self-powered wireless sensors and actuators can be installed with minimal effort and provide their room data to local control systems and/or self-learning, cloud-based AI devices via a smart gateway virtually and in real time. This digitalisation platform provides a central, flexible and hardware-independent control system for smart spaces.

### Live data is key

Intelligent linking of existing or retrofitted building technology with a self-learning control platform in the cloud offers the

# The smart option

Sensor-driven, real-time connections between locations and their digital twin offer a new age of building automation. But will construction and building managers see it as a chance to add value?





greatest potential for operating existing properties, where lighting, temperature and air quality can be automatically adapted to the specific room bookings and on-demand use.

Smart spaces with live data and wireless communications can be applied to a broad range of areas in the commercial and domestic premises.

This includes bathrooms, where sensors on soap dispensers can determine the fill level and send an automatic notification to the maintenance staff as soon as the threshold value is exceeded. This allows the soap to be refilled as needed and increases user satisfaction. Door contact sensor determines how often the restrooms are used and prompts staff to clean the room as needed according to a managed pattern when a threshold

## "This digitalisation platform provides a central, flexible and hardware-independent control system for smart spaces"

value determined by building operators is exceeded.

Sensors in communal rooms, including conference rooms and lounge areas, can help manage energy use as well as cleaning and maintenance depending on how often they are booked and used. Motion sensors with a special algorithm installed in the room supply the necessary data to building management systems.

The networked devices in the conference room can also be controlled via an app on a tablet or a smartphone, based on pre-programmed scenarios providing building operators and users greater flexibility and direct control.

For example, the projector in conference rooms can be set to automatically start up in 'Presentation' mode while the blinds are lowered. The lighting can also be adapted to respond to a range of scenarios, switching the lights on if the room is being used or turning them off and lowering the window blinds for presentations or entertainment. Heating or cooling in unused rooms is minimised and can be reactivated a few minutes before the next room booking.

All raw data supplied by the sensors and actuators can be used locally but can also be combined in the cloud and made usable via a software solution, thus enabling in-depth analysis of ways to further optimise services and increase efficiency. In other application scenarios, sensors can, for example, detect whether proactive maintenance of technical equipment is necessary.

As well as the solutions described, service providers can also manage conference rooms, room bookings or building security via smart services. This also includes optimising the management of parking spaces in car parks based on sensor data.

In addition to technology companies such as Microsoft, NTT Communications, IBM, Tencent and Softbank, many other businesses are also offering IoT solutions for smart buildings based on interoperable standards. Traditional building automation providers have also added data analysis and cloud services to their standard offerings. It isn't just the energy harvesting aspect driving this success. The large, multi-vendor, interoperable product ecosystem and ease of installation and operation are also helping to fuel this growth. The future looks bright for smart buildings based on intelligence gathered by wireless and battery-free sensors and acted on by low-impact controls. Buildings managers may even get chance to put their feet up. 

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