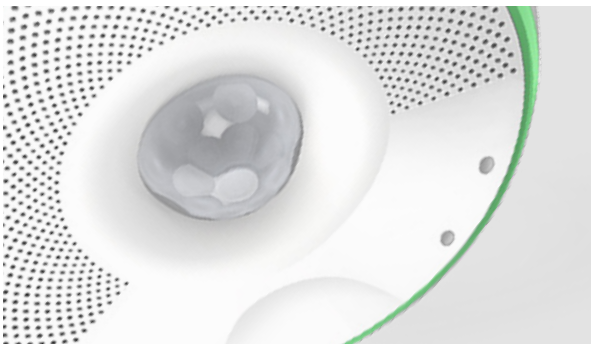
N° 41 2022

SAUTER FACTS

The magazine for SAUTER customers



Dear Customers and Business Partners, Dear Readers,

"The most exciting research today is happening at the interfaces of different disciplines", Arno Schlüter from the Swiss Federal Institute of Technology (ETH) in Zurich revealed to us in an interview. On pages 8 to 13, Professor Schlüter provides further interesting glimpses into his research work on new technologies and methods for constructing and operating buildings sustainably.

There is no avoiding the issue of sustainability in the construction sector either. Extensive EU requirements on environmental, social and governance dimensions – ESG criteria for short – have brought the topic into focus for all players in the building sector. We are following suit: Performance Management allows us to identify relevant data, calculate parameters and present this information in easy-to-understand reports. We track development of the parameters, alerting our customers to changes and suggesting possible action. This is the basis for fulfilling and continuously improving ESG criteria in the property sector.

Besides the important subject of Performance Management, we have news from the SAUTER Group and other product highlights for you in this issue. To mark the launch of our Smart Actuator, we highlight the strengths of this IoT-capable field equipment. The Smart Actuator combines controller, valve/damper actuator and cloud integration in one device, is easy to install and controls heating and cooling circuits autonomously. It sends operating data to the SAUTER Cloud for use in system inspections and maintaining smooth-running installations.

Have you heard about our viaSens multi-sensor? In this magazine we present this innovation, extending SAUTER's portfolio in integrated room and building automation. viaSens features six sensors for measuring air quality (VOCs), humidity, brightness, acoustics, motion and temperature. The article (p. 22 to 25) details its main functions and how it can benefit building operators and users.

A key strength of the SAUTER Group is our long-standing customer relationships and our reference projects are our best business card. This issue showcases notable examples from Germany, Luxembourg, South Korea and Switzerland.

I would like to take this opportunity to thank you for your interest in our customer magazine and wish you an inspiring read!

Yours, Werner Karlen, CEO

INTRODUCING
Emtec Group

The SAUTER Group has acquired a majority stake in Emtec Group Ltd, one of the leading mechanical and electrical contractors and maintenance providers in Scotland and the North of England. This acquisition allows SAUTER to further expand its presence in the UK.

The owners and founders of the Emtec Group have a proven track record of continual growth spanning almost twenty years. Initially launched as a contracting company, today it operates predominantly in the field of M&E (mechanical and electrical systems). The corporation has gradually diversified and moved into various specialities, now encompassing eight business units and featuring a broad portfolio. Clients include principal contractors and developers as well as local authorities and end users. Headquartered in Glasgow, Scotland, the Group has staff of over 550 people in eight branches in total across Scotland and the North of England.

The current management team of the Emtec Group will remain in place. This includes one of the founders, shareholder and Group Managing Director, Scott Stevenson.

By acquiring the Emtec Group, SAUTER, in turn, has notched up another milestone in its growth strategy. SAUTER will now be able to branch out further in the region, having previously focused mainly on the south of the UK. The potential gains to be made, hand in hand with SAUTER's own components and project businesses, are significant.

Profile

Company founded:	2003
Headquarters:	Glasgow, Scotland
Employees:	Approx. 550 in total, of which 320 are based in Scotland
Revenue 2021:	£ 70 million

Specialisation:
The Emtec Group encompasses 8 separate businesses taking in a wide range of expertise and capabilities, including mechanical and electrical engineering, facility services, renewable energy, to name but a few.

www.emtecgroup.co.uk

This project particularly fills us with pride

Emtec Building Services have been working in partnership with their valued client McLaughlin and Harvey on behalf of The University of Edinburgh to successfully deliver phase 1 of the Nucleus Building which is a new state of the art learning and teaching facility being built in the heart of the Universities King's Buildings Campus.

Emtec provided the full range of mechanical and electrical services to the new four-storey building which comprises of contemporary lecture theatres, teaching laboratories, study spaces, student services, together with shopping and catering outlets. Emtec, utilising their inhouse Off-Site Manufacturing facility, carried out the design, manufacture, and installation of prefabricated multi-service modules and plant modules to service the building.

Following on from the success of this project Emtec and McLaughlin and Harvey have been successful in securing the opportunity to deliver the Usher Institute, a world class research facility where academics and commercial partners work collaboratively to drive innovation within the health science sector. This project will deliver a new build facility at the Edinburgh BioQuarter for up to 914 Usher staff and commercial partners over 4 storeys. The Usher Institute will predominately be an academic workspace and include space for conferences and similar events.

« I believe that the acquisition of Emtec by the SAUTER Group now allows us to enter the next stage of our planned growth and development. It was established very early on during the acquisition process that SAUTER's ethos mirrors closely with our own visions and values and I am confident that we have picked the correct partner to take us into the next chapter of our journey. With all of the current senior management team remaining in place the provision of first-class service delivery to our clients and the development of our entire team at Emtec remains our priority. »

Scott Stevenson

CHANGE IN SR. MANAGEMENT AT THE SAUTER Group

The new Chief Operating Officer of the SAUTER Group is Arno Hohmann, an industrial engineer, who took on his new role in March. An introduction.

Office number 01.03.14 is open. It is bright and inviting. Through the window you can see the green hills of the southern Black Forest. The large desk with lots of storage space has been replaced by a slim standing desk and a large screen for meetings hangs on the wall opposite.

This is the office of Arno Hohmann, COO of the SAUTER Group. He looks back on his first 100 days at the company with satisfaction. He is happy that his gut feeling was right. Especially because the move to SAUTER involved relocating to the region between Basel and Freiburg. As committed as he is to his job, Hohmann's first priority is his family. From the very beginning, his wife and his children – two teenagers – were involved in the decision to change jobs.

The balancing act between Germany and Switzerland, or rather the mixing of mentalities, is nothing new for the native Bavarian. He was an employee of the Swiss company, Kaba, when it merged with the Germany company, Dorma, in 2015. Most recently, Hohmann was Head of Operations at dormakaba Germany.

What is the actual role of a COO?

To ensure profitability and customer satisfaction, companies need effective supply chain management from supplier to customer. The COO's job is to strategically manage and optimise all of the processes related to this: procurement with regard to spending efficiency, monitoring production efficiency, on-schedule and complete delivery. "The gears have to mesh. Particularly in times of crisis, weaknesses become apparent that need to be worked on so that we can improve: for ourselves and thus also for our customers," adds Hohmann.

To balance his working days, Hohmann is passionate about model flying and model making. He has remained faithful to this hobby since he was a schoolboy. One rule of model flying is: "Never lose sight of your

plane in the air and keep an eye on the surroundings!" This applies to the job as well. As COO, it's not enough to be monitoring your own area, because what's happening to the left and right of it also influences the value chain. "I have to assess the current situation, anticipate developments and then derive and initiate long-, medium- and short-term measures. All this without lapsing into micromanagement. Engaging in dialogue with my people and other departments – this is what I really enjoy!"

First impressions and major challenges

Arno Hohmann says that, at SAUTER, he found a well-coordinated team with a pragmatic mindset. What he also likes about SAUTER are the direct communication channels and the open exchange of ideas. Instead of silo thinking, he noticed straight off a relationship of trust between people and across departments. This makes a new start easier, regardless of the position.

At the moment, it is primarily external factors that are posing challenges for Purchasing, Production, Sales Administration and Logistics. Hohmann's main focus is on stabilising the supply chain in order to make the material supply more resilient, prices more stable and ultimately reacting more flexibly to unusual orders. "Bringing calm to the value chain does not mean that we can put our feet up. Calm means that things become predictable again for both us and our customers."

The foundation of trust and dedication that Hohmann has encountered at SAUTER is something he wishes to extend further. He would like everyone to approach him openly and directly address difficult issues. This is how they can implement activities for improvement together. He says that everyone shares responsibility for ensuring that the step-by-step improvement of processes continues. The door with the number 01.03.14 on it will therefore remain open.

The footsteps

Arno Hohmann succeeds Peter zum Wald, who is retiring after 32 years. On handing over the helm or, in model flying terms, the remote control, zum Wald explains: "With his professional experience in companies with similar structures, Arno Hohmann will provide SAUTER with the necessary impetus for the Operations division."

With regard to his exit, zum Wald says: "I'm leaving the company feeling both happy and sad. My thanks go to all my colleagues and employees in the SAUTER Group who were with me during these eventful years. They weren't all easy times but together we laid the foundations for a sustainably profitable business. I'm now looking forward to putting my experience to use in my private life, and to spend time with my family."

Climate-conscious

ARCHITECTURE AND URBAN DEVELOPMENT: A TASK FOR SOCIETY AS A WHOLE

Arno Schlüter is Professor of Architecture and Building Systems at ETH Zurich. His research focuses on new technologies and information-based methods for the sustainable, integrated construction and operation of buildings. We met with Mr Schlüter for an interview.

SAUTER: Society, politics and industry have a responsibility to use energy and resources as sustainably as possible. Mr Schlüter, you conduct research into building planning, construction and operation of the future. Please can you explain climate-conscious planning and architecture to us.

Schlüter: Climate-conscious architecture and planning pays attention primarily to two things. First of all, our buildings have to be constructed and operated with minimum CO_2 emissions. Secondly, they must take climate change into account here and now for example by offering sufficient protection against heat and not causing local environments to warm up even further, i.e. by creating "urban heat islands". People must always be at the heart of decision-making

What aspects need to be considered in ecological construction?

In my opinion, ecological building today coincides strongly with an ethos of climate-aware building. This is the case, for instance, with energy efficiency, local production of electricity through photovoltaics, use of bio-based materials or in the evaluation of emissions. But there are certainly other aspects to assess, such as the pollutant content of materials.

New technologies can support the development towards sustainable construction. Which of these offer the greatest potential, both ecologically and economically?

This is a proven technology, yet we still see great potential in the integration of renewable energy generation. This can be attained, for example, through new materials and construction methods, together with local energy storage or networking with other buildings and electric mobility. In terms of building operation, technological developments in learning systems for building automation are of special interest to us. They promise a solution to a common dilemma – the trade-off between user comfort and minimal energy consumption. In many buildings, the preconditions for learning algorithms are already in place – a building management system with the necessary sensors.

This is precisely what we deal with in our day-to-day business and R&D at SAUTER. Could you perhaps give us a little insight and tell us how you address this in your research?

In research, we use modelling – i.e. mathematical-physical or data-based descriptions of buildings and the technology thereof – so as to compare new practices and algorithms with existing approaches. This also enables us to track how they affect the energy balance and user comfort of a room. We then attempt to validate them on real, small-scale test objects – to investigate whether things really do behave as per the model. When we're satisfied with the conclusions, we try out the new concepts in what we call "living labs".

What are these "living labs", please?

They are rooms and buildings that are used and inhabited normally. This realistic environment allows us to learn how the approaches would pan out in real applications.

User behaviour and, hence, the expectations made of buildings and rooms are forever evolving. To what extent does your research account for this?

The idea is that the building's control system also learns through direct and indirect interaction with occupants. This includes how they use the building or what settings, e.g. temperatures, they prefer. Users changing setpoints or operating windows and blinds are direct interactions, for example. Indirect interactions come from changes in the indoor environment due to the presence of people. These could be increases in temperature or CO_2 level, for instance.

We often read and hear that Covid has accelerated the push towards digitalisation. Do you see any effects of this in your research? And what impact will this have on the future planning, construction and operation of buildings?

Yes, definitely. We see the consequences of Covid in the growth of research that looks at air quality, ventilation behaviour and pollutant distribution indoors. At a very direct level, the pandemic has had a lasting impact on education and teaching. It has become the norm to learn content digitally – through learning platforms and videos – and sharing it online. Learning formats have adapted and become more interactive and diverse because traditional formats are not ideally suited to the online realm. This brings with it more flexibility but also requires more responsibility on the part of the student.

Back to climate-conscious architecture and planning. What do you actually expect from industry, from companies like SAUTER, for instance?

We need industry to translate results from research into new products and offers – to allow them to succeed in the marketplace and let new and better ideas take hold. I believe it is particularly important to think outside of the box and use new business models for innovations to foster their breakthrough.

Will society accept the planning measures – from building to urban development?

Attitudes to climate change and sustainability are also altering in society. The increasingly hot summers are bringing home the consequences to us already. Many private and professional builders today want to build sustainably. However, both public discussion and society's participation are still required to put the key changes on a broad footing. In the end, we must not only accept them but also actively develop new ideas and visions for living more sustainably together in the future.

The NEST Unit HiLo (NEST: Next Evolution in Sustainable Building Technologies) in Dübendorf, Switzerland is a "living lab". The research and innovation building functions as an office and uses innovative design elements, materials, construction schemes and control systems that are guided by the principles of sustainable development.

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Among other things, a movable solar façade, also developed by Arno Schlüter and his team at ETH Zurich, provides both energy generation and shading for the building.

> We need industry to translate results from research into new products and offers – to allow them to succeed in the marketplace and let new and better ideas take hold.

Arno Schlüter

During your teaching, have you observed a change in students' understanding of climate issues? And how is this expressed?

Every year in our first Bachelor's lecture, we ask the students a number of questions: about their perception of the topic of climate change, the responsibility of building, and how they perceive the discussion of these topics in their studies at ETH Zurich. In recent years, there has been a sharp rise in the awareness and perception of these issues among students here. What pleases me especially is the growing number of students highlighting these subjects in their work and demonstrating where building might be heading.

What is your assessment of the challenges for the field of teaching?

The challenge is to embed this diverse and multi-faceted topic firmly in teaching. It is my belief that no building professional should graduate without a good knowledge of energy, emissions and sustainability and how, in turn, they interact with design, planning and construction. This is what we are aiming to achieve.

At the Institute for Technology in Architecture (ITA), you represent interdisciplinary approaches to solutions, in the doctoral programme in particular. Which input or collaboration has been the most exciting so far?

The most intriguing research today occurs at the interfaces. In the "Future Cities Lab" in Singapore, we have been working in recent years with urban planners, economists and complexity researchers. We have been examining how the city, its buildings, its infrastructures and, of course, its inhabitants will have to change. In other words, how the city will look and function under future conditions. The wholly different perspectives are extremely exciting and enriching. At the ITA itself, we work to a large extent in joint projects, collaborating with colleagues from structural design and digital fabrication, for example. This gives rise to completely new ideas and components, helping us to solve problems later on. We achieved some of these in our unit at Empa's NEST research building in Dübendorf where they were met with a great response.

A personal question to finish with. Are you optimistic about the quest for greener, more economical and healthier buildings?

Absolutely. Today we know how to construct buildings with low emissions, and operate them with no emissions. They don't actually cost much more than ordinary buildings either. It will take a good mix of incentives and pressure for such buildings to become mainstream. This is especially so when it comes to refurbishing existing buildings. The challenge will be ensuring that there are enough skilled workers available to make this happen. You need only look as far as the current boom in solar installations and wood construction to see the problems. All this is a task that belongs to society as a whole.

Thank you very much for giving us an exciting look into your work and what it has discovered!

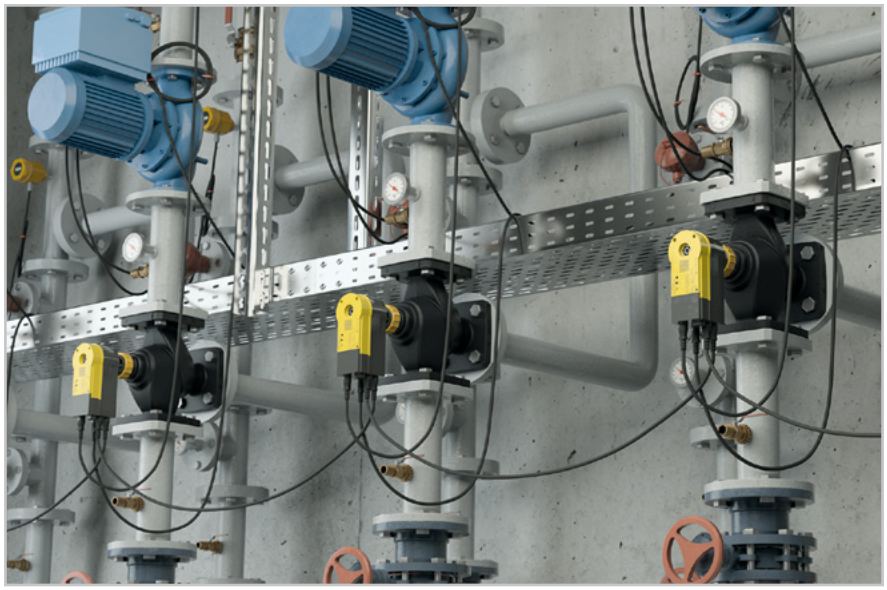
Curriculum Vitae

Arno Schlüter has been Assistant Professor since 2010 and, since 2014, Professor of Architecture and Building Systems at the Institute of Technology in Architecture (ITA) at the Swiss Federal Institute of Technology (ETH) in Zurich. He studied architecture at Karlsruhe Technical University and received his PhD in information and building technology from ETH Zurich. His research focuses on developing new methods for integrating current and future building technology into architecture and urban design. Since 2013, he has also been Head of a module at the Future Cities Lab in Singapore.

Institute of Technology in Architecture (ITA)

The ITA's main role is training the next generation of architects, civil engineers and consultants in various disciplines. These include structural design, digital fabrication, energy and building systems, construction processes and computation. The ITA has an experimental research infrastructure that is unique worldwide. It is also involved in research projects all over the globe. Students work on real design problems of various magnitudes – from components to cities and from construction details to digitally formed landscapes. This is often performed in "living labs" (labs in a real context outside the ETH campus with a user-centred approach). The PhD programme in Architecture & Technology is interdisciplinary by nature. This degree enables the programme's graduates to take up academic positions at leading research institutions around the world.

Take a virtual tour of the NEST!



THE Smart Actuator: AUTONOMOUS CONTROL FOR DISTRIBUTED INTELLIGENCE

Valve and damper actuators are essential for energy distribution in buildings. They are deployed in heating and ventilation systems and take over individual room control. SAUTER has launched a Smart Actuator geared to decentralised systems. In response to the usual challenges encountered during planning, installation and operation, practical solutions to four questions are provided by the new Smart Actuator.

What if...

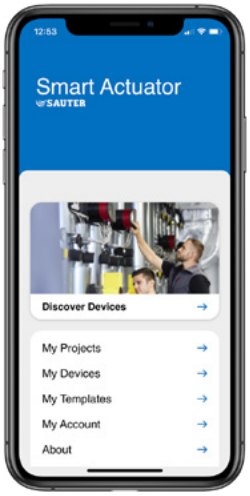
1 ...the actuator was also a controller?

The Smart Actuator from SAUTER is an actuator, controller and cloud integration all in one. This is a novelty in HVAC technology and demands a rethink when planning systems. This is a rethink, however, that brings advantages. Firstly, the cabinet and other control components disappear from the primary system completely. Secondly, there is no need for further single room controllers, traditionally required for heated and chilled ceilings. Through smart planning and this IoT-capable actuator, you get a lean and flexible system.

2 ...the installation was a piece of cake?

A device – no matter how smart – may prove impractical if certain knowledge or experience is needed to use it. The Smart Actuator has a connector system with pre-assembled cables. The cost and difficulty of installation and commissioning are thus reduced to a minimum. Coloured and mechanical coding ensure error-free connection. I/O modules enable the addition of further sensors and actuators. A large cabinet can also be dispensed with.

Applications are configured with a smartphone. An app can directly load tested and ready-programmed applications on the Smart Actuator. The only tasks remaining during commissioning are setting important parameters and fine-tuning. No further software or knowledge is necessary.

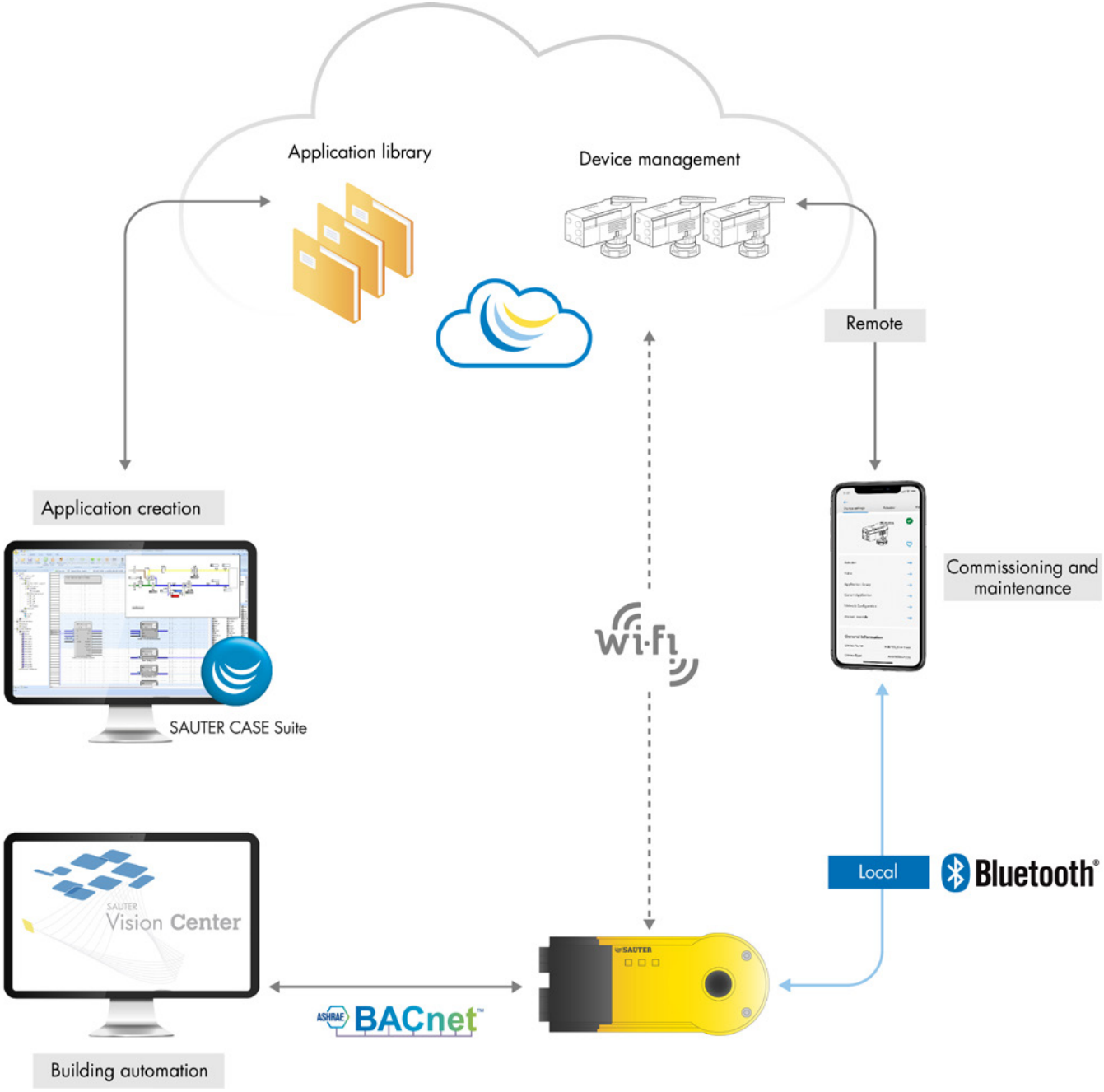


The benefits of the smartphone app are not limited to the configuration process. It also allows access to the operating data, settings and the regulation itself. Installed in a decentralised manner, the Smart Actuator performs control tasks on its own. It does not require additional automation stations and integration in the building automation system is performed through the open BACnet interface.

3 ...heating and ventilation systems could be operated remotely?

'Cloud' is the keyword here and the advantages of cloud services are obvious. Computing and storage power can be scaled almost infinitely and server availability is unparalleled. The Smart Actuator's potential to evaluate data in the cloud was clear from the outset. SAUTER Cloud Services assume the function of a traditional management and operating level. The Smart Actuator allows operators and service staff to solve most application cases remotely, i.e. via the SAUTER Cloud. They do not need to be on site which therefore saves time and money.

While smaller, commercially used properties like schools or businesses might jump at the chance of having remote installation monitoring, this is very often at odds with the economic reality. Systems designed for large projects may well have all bases covered but they are also likely to exceed the budget. The answer therefore is autonomous systems providing remote access for monitoring and maintenance through cloud services. The SAUTER Smart Actuator fills this gap. Once commissioned, the Smart Actuator can be assigned to a project, followed by connection to the SAUTER Cloud. This in turn is performed wirelessly, courtesy of the integrated WiFi interface. The Smart Actuator is then accessible through the smartphone app, with its operating status available at any time.



The Smart Actuator system:
autonomous control – intelligent integration.

What if...

4 ...every task became part of the Smart Actuator?

Like an automation station, the Smart Actuator can be programmed freely. It is thus extendable by two more I/O modules, making it a flexible system adaptable to different applications. Applications created for individual room or primary system control can be loaded directly onto the Smart Actuator with the app. The greater the number of tasks, the more applications the installer or technician will find in the application library. This shortens the project time immensely.

Protection against “heating hackers”

There are concerns about security, especially in the case of networked, remote-controlled systems. To safeguard the Smart Actuator against manipulation, protective mechanisms have been installed at both device and operating level.

Potential vulnerabilities arise from the possible number of users and convenient, web-based control with a smartphone. Access to the Smart Actuator is therefore password-protected. The SAUTER Cloud is used for logging in, with the security status of the cloud applications in fact often superior to that of locally hosted applications. For this purpose, the system works with signed certificates, verified during the login. What is more, the firmware is also signed and the integrated memory protected by a cryptographic encryption algorithm (AES). Data is transferred through the cloud using encrypted TLS connections.

This setup, combined with careful use, lays the best possible foundations in terms of system security.

Distributed intelligence

The system architecture in smart buildings is currently undergoing a change towards “distributed intelligence”. Here, all devices in the system have the same rights and inter-communicate in real time. The distributed intelligence approach is a further development of today’s central concept in control technology. In this concept, the actuator and controller are separated from one another. Numerous cables run from the cabinet to the system’s periphery. The cross-system programming must also be extended with each device.

By contrast, decentralised control technology shifts the application logic from cabinet to actuator. This renders thick wiring harnesses obsolete while producing clearer programming and increased system modularity. Decentralising the functions merges the field and automation levels into one system. Applications assigned to devices within the network can be processed by these units independently.

The benefits are easy to see:

- More robust systems due to malfunctions not causing an immediate total breakdown in operation – no single point of failure
- Thick cable harnesses and high wiring costs are a thing of the past, fire loads are also reduced
- More compact systems through smaller cabinets
- Better system modularity
- Simplified software and hardware structure, independent of architecture

The product innovation was launched as three types for ball valves, globe valves and ventilation dampers. So, there is only one question remaining: Which individual application can SAUTER’s Smart Actuator use to make your system more intelligent?

Find out more in our video!


Performance Management
SAUTER Cloud
Statistical Temperature Distribution
Ambient Temperature
Heating Distribution
District heating
Boiler
Structure heating
Electric Energy Consumption
135 kWh daily
949 kWh weekly
4256 kWh monthly
Energy Efficiency
A B C D E F G
B
55 kWh / m² a
Heating Energy

NO MORE FLYING BLIND – WITH SAUTER Performance Management

The new opportunities offered by IoT and cloud technologies are transforming buildings into fountains of data. SAUTER Performance Management condenses this vast data volume into concise key indicators. Inefficient systems, impending downtimes or wear and tear on resources and materials are detected and remedied at an early stage. This is an important step towards the self-optimising building.

Until recently, investors and facility managers were content with simply measuring and monitoring energy consumption and indoor comfort – i.e. the temperature and humidity in their buildings. However, an ideal room climate does not provide conclusive information about the efficiency of the energy preparation, energy transport and the internal building energy distribution required for achieving it, nor does it tell whether the systems used (ventilation with pumps, fans, valves, heat recovery, etc.) are working at their optimum level and whether this optimum level matches the volume of fresh air or hot water needed. If the drift between a heating circuit's supply and return temperatures is too wide, this is a typical case of an installation using energy inefficiently.

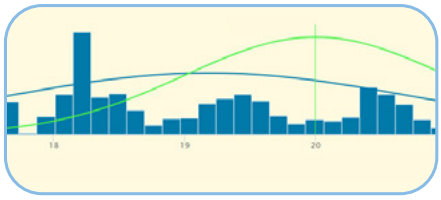
Poor commissioning of a cooling unit can cause it to constantly switch on and off, shortening the life of such expensive equipment. Furthermore, when cooling and heating sequences overlap, systems are not only damaged, but energy is also wasted unnecessarily. All instances of inefficient operation have one thing in common: they often go unnoticed for years! This situation can also be described as "flying blind" in terms of energy and operation.

SAUTER analytical tools for clearer operating data

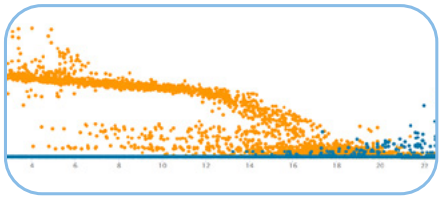
Instead of navigating blindly, SAUTER Performance Management delivers a controlled flight with instruments. Bespoke analytical tools specific to building operation crunch the data from the building automation system and automatically calculate its performance.

Real-time analytics condenses the amount of information and presents it in a generally understandable way.

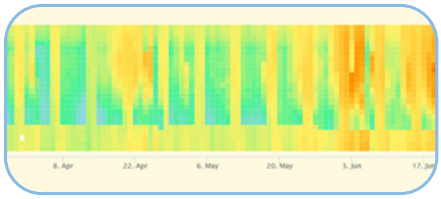
The data-summarising process occurs mainly at the following levels:



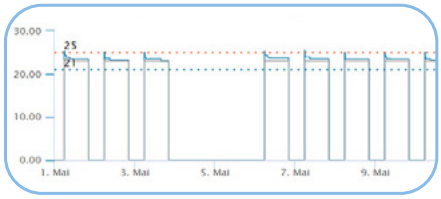
Time series data is condensed into frequency distributions. With such a concentration of data, it is immediately obvious how often a measurement appears outside a tolerance range. A deviation alarm is only triggered when this frequency exceeds a certain threshold. Representing graphically the frequency distribution of all measurements also assists in determining the control performance.



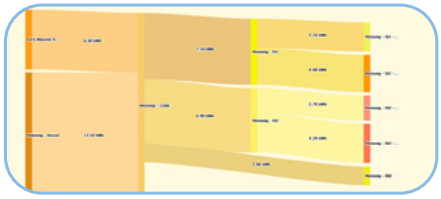
Time series data is condensed into point clouds (scatter plots) and correlated with system function curves. An example: All heating and cooling valve positions measured are plotted as points on an x-y graph as a function of outdoor temperature. They are then compared to the system characteristic. If the scattered points of the valve positions within specified tolerances are identical to the characteristic, the system is running at the optimum operating point.



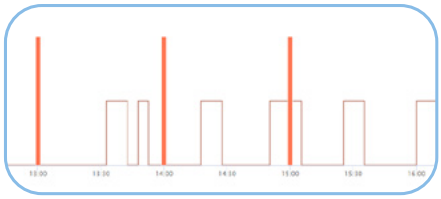
Time series data is condensed into carpet plots. A carpet plot maps the measured values in a colour scale, assigning them to two time axes (daily hours and days). Abnormal operating statuses appear like stains on a carpet and can therefore be seen at a glance.



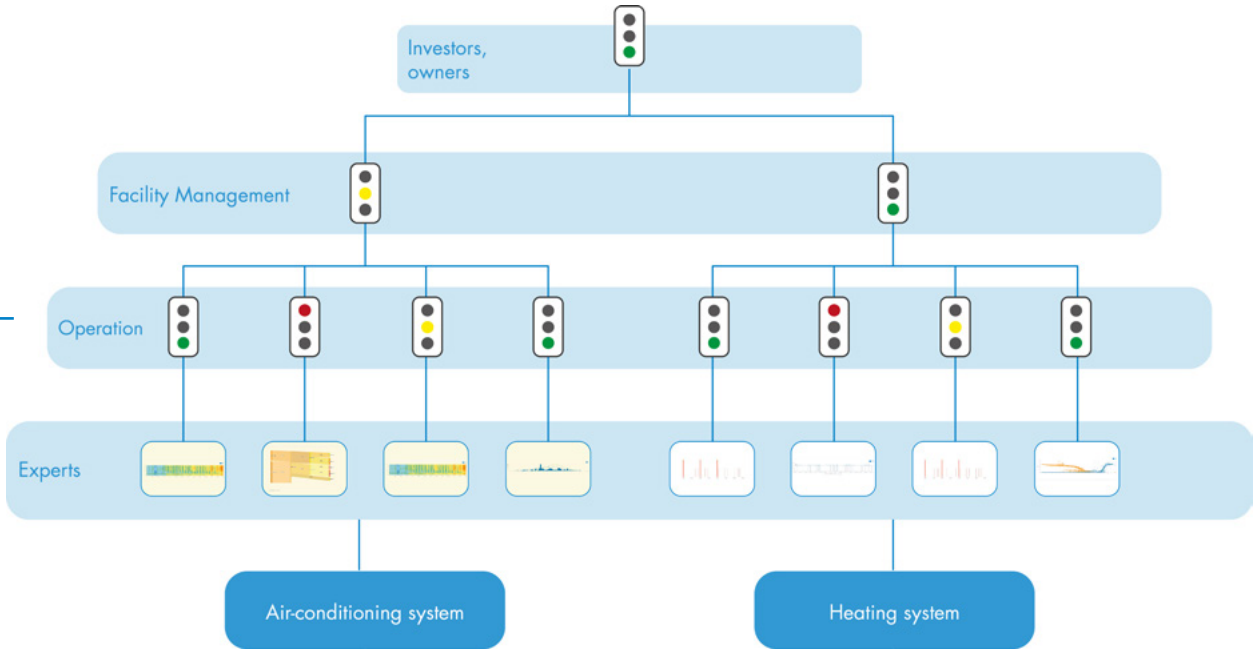
Time series data is condensed into oscillation data in the frequency range. This enables an expert to identify unwanted fluctuations straightaway. Irregular operation of actuators, valves, etc. cause unnecessary wear and tear and hence premature failure of components.



Analysis of energy and quantity flows is represented by arrows, the thickness of which is proportional to flow quantity. These "Sankey diagrams" are useful when assessing energy and resource consumption. They reveal, in particular, imbalances in energy distribution. Sankey diagrams are a sure-fire way of highlighting energy losses.



Counting switching sequences. An example: The sequences where a cooling unit is switched on and off are added together in 6-hour cycles and visualised in a bar chart. When a threshold is exceeded, this triggers an alarm.



Just a few key indicators – simple reporting made possible

The analytical tools in Performance Management not only allow the expert to pick up on weaknesses in the system but they also trigger an action that is normally possible using SAUTER Remote Services. The system can initiate measures automatically or email recommendations for intervention to technicians. At the operation and facility management level, traffic lights for each system are all that are needed to display deviations from ideal operation:

- Red: Critical deviations requiring immediate action from an expert
- Yellow: There are non-critical deviations
- Green: System is working efficiently

Investors might still even find this abstraction too detailed. A single "benchmark traffic light" to indicate what is relevant to them may then suffice. This could include the status of the entire building technology, its efficiency and the climate comfort maintained within the building.

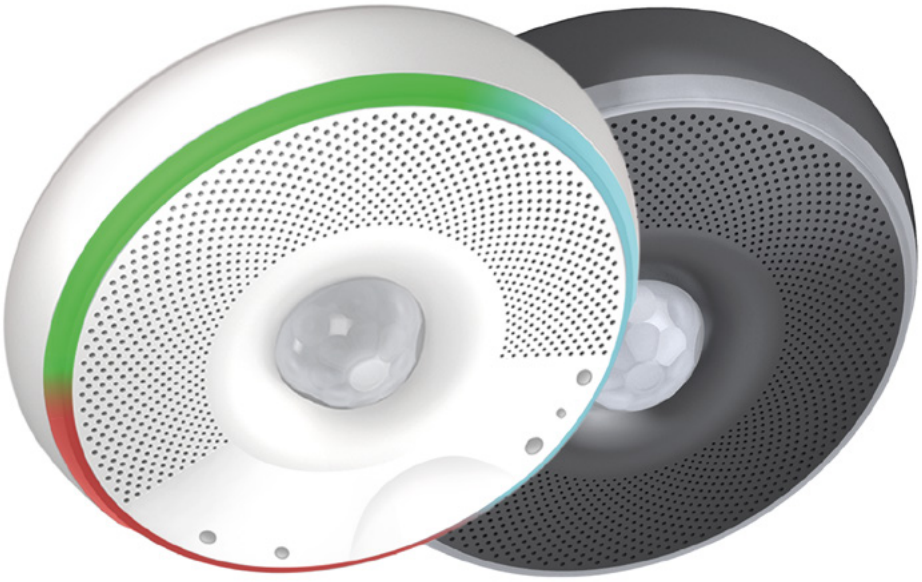
SAUTER Performance Management – a cockpit with autopilot – keeps the building on course and at a safe altitude. Thus, flying blind becomes a thing of the past with regard to energy and operation.

Helping achieve ESG criteria

For facility managers, these are the critical factors for meeting ESG criteria: reducing the carbon footprint, increasing the well-being score, improving risk management.

SAUTER Performance Management is a key basis for fulfilling ESG criteria in terms of building sustainability. Firstly, energy and operating costs can be reduced. Secondly, service quality is increased by cutting response times for troubleshooting and by avoiding unscheduled downtimes. And thirdly, optimised comfort is welcomed by both users and investors, whose properties gain attractiveness and value.

Learn more about SAUTER's Digital Services in our video!



THE viaSens Multi-Sensor: RECORDING INDOOR AIR QUALITY AND SIGNALLING ROOM CONDITIONS

News from our innovation pipeline: SAUTER presents the viaSens multi-sensor. Six sensors measure the ambient conditions and an LED light ring indicates the state of a room. Integration in the building automation system through a wireless Bluetooth Mesh network enables real-time monitoring and room automation. This improves the climate in smart buildings, creates additional automation options and reduces resource consumption.

For round-the-clock applications

Smart spaces in digital buildings need a rethink and building automation, along with the room automation, are due for a redesign. SAUTER is adding the innovative viaSens multi-sensor to its product range, for new, round-the-clock building applications.

0800

The shared workplaces are a hive of activity. Finding a space, however, is not a problem with the multi-sensor and its green LED ring signalling which work areas are free.

1030

At school, classrooms are aired regularly. If the air quality drops, the multi-sensor with the red LED ring suggests opening the windows.

1400

In a hotel, the multi-sensor detects that the guest is present. The integrated beacon means that the guest's smartphone recognises which room they are in. Individual operation of the room functions is also enabled.

1830

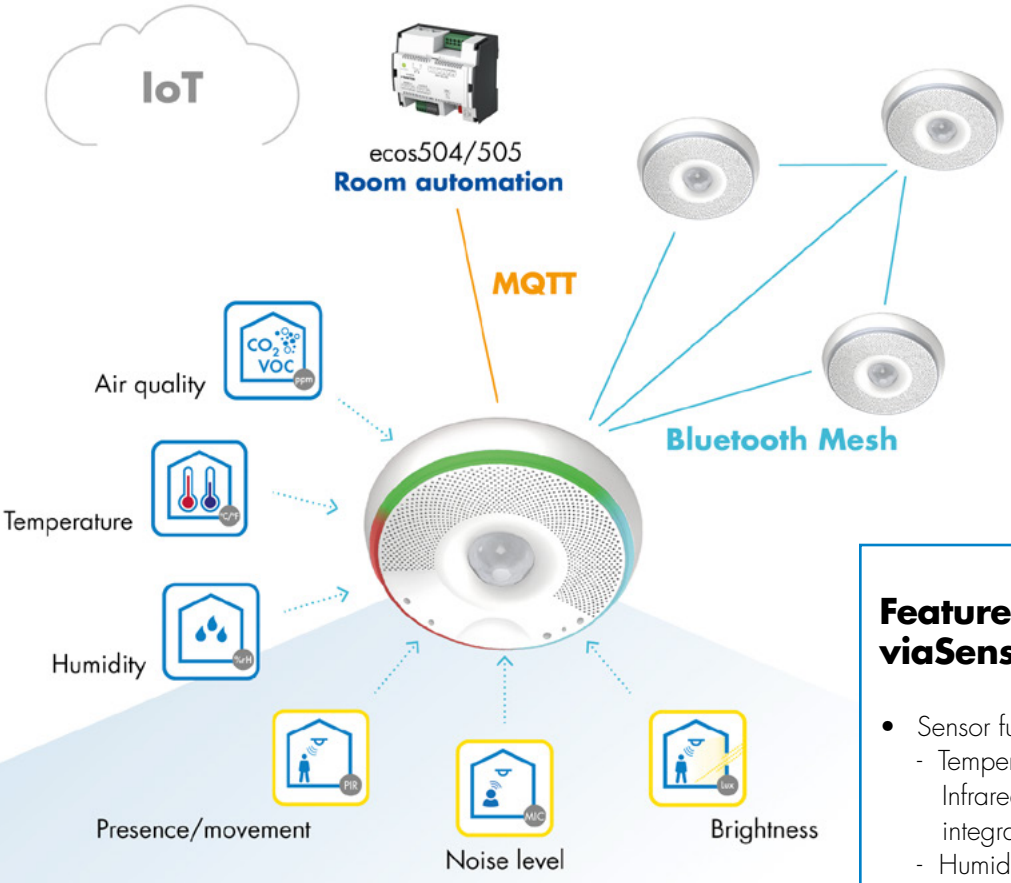
It is evening and there are hardly any staff left in the building. A multi-sensor in the lobby registers little or no movement and so the brightness of the lights are turned down.

2030

Facility management optimises the deployment of cleaning staff. The blue LED ring of the multi-sensor shows which rooms were occupied and therefore need to be cleaned.

Sensor fusion for efficient building operation

The viaSens multi-sensor combines cutting-edge sensor technology, connectivity, networking and communication in a device the size of a normal presence detector. It takes various readings for a room and the surroundings and records temperature, humidity, room air quality, presence, motion, brightness and noise levels. Equipped with these senses, the multi-sensor monitors the areas around it and therefore allows digital buildings to be operated efficiently. Linking up data for multiple variables is referred to as "sensor fusion". The temperature and humidity values are used, for example, to calculate enthalpy – a measure for creating a comfortable indoor climate. Combining the values of an infrared motion sensor (PIR) and noise level sensor generates a reliable presence signal. This means that even people sitting at their desks can also be detected.



The viaSens multi-sensor is incorporated in the building's IoT. It is used for integrated room automation, enabling individual app operation through Mobile Building Services (MBS) from SAUTER.

Features of the viaSens multi-sensor

- Sensor fusion with:
  - Temperature sensors: FIR radiation sensor (Far Infrared) and semiconductor temperature sensor integrated
  - Humidity sensor for calculating enthalpy
  - VOC sensor with VOC index of 0…500 for relative air quality measurement
  - PIR presence and motion sensor (Passive Infrared)
  - Light sensor
  - Noise level sensor
- Bluetooth beacon* for localisation in the building
- Multi-colour LED ring for communication with users
- Wireless communication via Bluetooth Mesh network
- IoT integration for room automation or cloud with MQTT

**The beacon technology is based on Bluetooth Low Energy (BLE). It enables automated, energy-saving identification between transmitters (beacons) and receivers (smartphones) for localisation. The receiver calls upon geographical data to retrieve relevant app information from the cloud. It is then made available for local room control (via Mobile Building Services) and for use in other applications.*

Communication through an LED ring, smartphone and beacon technology

The multi-sensor, however, does not simply monitor its surroundings, it has also been developed to communicate with people in its area. The LED ring provides visual feedback on the room and sensor status. Different colours and ring segments can be configured to signal certain conditions. For example, this might be to prompt ventilation of the room or to show which workstations are free in shared workplace environments. Together with the SAUTER ecos room controller, it can regulate indoor climate and lighting systems or direct cleaning staff past unused areas not requiring attention. The applications possible for the LED ring are diverse.

Individual room control is performed on the room user's smartphone or tablet. The SAUTER Mobile Room Control app – available as part of SAUTER Mobile Building Services – captures the signal from the integrated Bluetooth beacon. Therefore, the app automatically detects the nearest multi-sensor and permits selective room operation. Locating the user via smartphone also means that the stored user profile can be configured to the room. Thanks to NFC, the sensor can be configured before fitting, without a power supply using a smartphone.

Intelligently networked sensory equipment with IoT and cloud connection

The multi-sensor features the very best in wireless technology for easy integration in the SAUTER room automation. In the Bluetooth Mesh network, all the multi-sensors function as "Mesh nodes" (type viaSens116), therefore, they transmit the received measurements wirelessly to the multi-sensor gateway in the Mesh network (type viaSens196). This also forms the interface to the SAUTER room automation.

Ethernet-based field device communication with the SAUTER automation station is another technical first. The same IoT mechanisms and MQTT protocol of the sensor network also enable use of viaSens in cloud applications.

The outward Ethernet interface and inward BLE Mesh network also give the wireless communicating multi-sensors IoT capability. Connection to the IP network paves the way for extensive integration in the ecos room automation system, modulo 6 building automation system – i.e. the installation technology – and in the SAUTER Cloud. SAUTER room automation features different communication interfaces so sensor information is also available in systems such as BACnet and KNX.

The viaSens multi-sensor from SAUTER dovetails six different physical measurements, the LED ring, mobile app, Mesh network and IoT integration to form a new system of sensory room elements. This has been long awaited by many applications in the realm of digital buildings.

The viaSens multi-sensor will come to market in 2023.

FLEXIBLE, SUSTAINABLE SOLUTIONS FOR THE WORKING WORLD AT Axel Springer

In the 45-metre-high atrium, large-scale work areas are interconnected and arranged in terraces.

© Nils Koenning

The new Axel Springer building in Berlin is a symbol and accelerator of the publishing group's cultural transformation. Efficient building operation and comfortable indoor conditions are ensured by the building automation and building management solution from SAUTER.

Digitalisation has disrupted the media and entertainment industry like no other. There has been a change in consumer behaviour and an influx of new players into the market. This has meant media companies having to embrace this change and investing massively in online business. Axel Springer has been one such company, driving this structural change consistently and successfully in-house. Overall, the group now generates more than 70 percent of its revenues from digital businesses and operates in over 40 countries.

The media and technology company was founded in post-war Hamburg and is headquartered today in Berlin. The new build, ceremonially opened in October 2020, is an addition to the Axel Springer quarter. Designed by Rem Koolhaas of the Office for Metropolitan Architecture (OMA), the building is an absolute eye-catcher. The interior is no less impressive either. Besides traditional office spaces and television studios, it features large-scale work areas with an atrium 45 metres high, and interconnected, terraced storeys. The mainly open-plan layout offers more than 3,000 employees space for interaction.

"We wanted the new building to be a symbol and accelerator of our own transformation," says Mathias Döpfner, CEO of Axel Springer SE. "The brief – formulated long before Covid – was to provide a fresh

answer as to why office space is still needed at all in the digital age. Rem Koolhaas has been spectacularly successful here. Open multifunctional spaces enabling maximum flexibility of use. Avant-garde architecture as a magnet for people meeting and communication. A building as a powerhouse of creativity."

Building technology requirements for modern workspaces

An extremely busy work environment, the wide-ranging use of the interior – from TV studios to the auditorium and individual offices – as well as the architecture itself, all meant that the building automation had to fulfil quite specific needs. Flexibility, efficiency and sustainability were of key importance. The control system with dimming function responds to the presence of people and brightness. The lighting of the smart workspaces is thus highly energy efficient. Such an undertaking can be a major challenge where installing lamps, sensors and operating devices is difficult – as was the case, for instance, on the terraces and open areas of the 45-metre-high atrium. The large and individual offices are easy to segment, allowing repurposing or conversion at minimum cost. This investment secures a viable long-term use of the property.

Lean construction concept for the latest automation solutions

SAUTER Germany was tasked with controlling, regulating and monitoring the technical building facilities. A "lean construction concept" meant that the tight deadline was achieved with little problem. Planning was performed continuously, running parallel with the installation. It took, in total, just over twelve months to install and commission the entire building automation. Systems are constantly monitored and optimised through a service and maintenance contract with SAUTER.

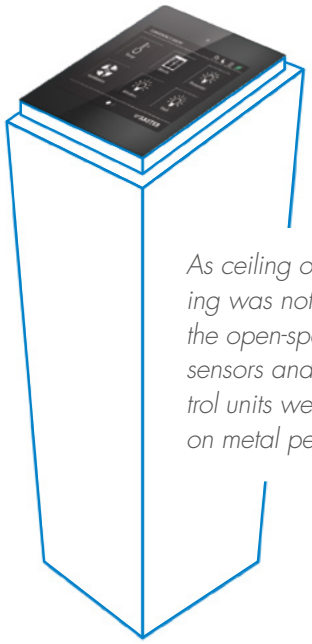
A vast array of components and equipment were installed – 800 system distributors, over 850 BACnet devices, 2,600 DALI brightness sensors (and more than twice as many DALI lamps!) and 55 mechanical equipment rooms. The ventilation, heating and cooling systems thus run at maximum efficiency and equipment is controllable segment by segment.

Ceiling mounting in the open area was not possible. Sensors and touch operating units were therefore fitted on metal pedestals.

The building management system SAUTER Vision Center permits visualisation, monitoring, operation and logging of the building technology across systems. It is assisted by access to 100,000 data points. A customised programme flexibly regulates the large spaces of the new Axel Springer building. Segments are grouped into imaginary single rooms and can thus be operated separately.

Smart solutions supporting energy efficiency

SAUTER's energy management system saves resources during operation and optimises the maintenance intervals. It also features an automatic SAP export function for easy energy cost billing, as requested by the customer. The interior temperature is controlled not only by underfloor convectors and chilled ceilings, but also by "concrete core activation". The concrete ceilings here contain water pipes which can be heated or cooled as necessary. The SAUTER solution controls this cooling method by means of weather forecast data. Changeovers take place overnight so that a pleasant indoor climate awaits employees the following morning. A smart solution from SAUTER for Europe's leading digital publisher!



As ceiling or wall mounting was not possible in the open-space area, sensors and touch control units were installed on metal pedestals.

Nespresso headquarters

COFFEE CULT IN THE RIGHT ENVIRONMENT

There is hardly a slogan so entwined with coffee such as the three words «Nespresso – what else?». One year ago, Nespresso moved their headquarters to new, innovative workplaces in Vevey. Like other sites of their parent company Nestlé, the international coffee brand relied on the competence of SAUTER to create the right environment for their employees and for the creation of quality products and services.

Good coffee is no coincidence but a true science: brewing temperature and pressure are as important as the duration of water flow through the coffee grounds. Speaking of coffee grounds – are they milled right? Is the grinding degree too coarse or too fine? Is enough coffee ground added? Or too much? To make it even trickier, the grinding degree and the amount of ground influences brewing pressure. Some people have made an expertise out of coffee making and drinking, but the majority simply wants to enjoy a good cup of brew with minimal effort. One of the most popular ways to do so are coffee capsules, and one of the major players in this market is Nespresso. Simply put in a capsule and with just one click, your mug is filled with the desired blend. Every single Nespresso capsule is produced at one of their three factories in Switzerland.

Back to the roots

To get closer to Nestlé's sites, Nespresso's headquarters was relocated from the city of Lausanne to Vevey in 2021, back to its historic site in the former industrial area where Henri Nestlé once started his business. The existing building complex was transformed into new innovative workspaces.

In this modern setup, building and energy management systems were installed to ensure high levels of flexibility, prevent potential energy wastage and reduce energy costs. The management system also helps improve buildings in terms of surveillance, control and general optimisation. Combined, the two systems can function as an overarching building automation system. Nespresso's goal was to make the building's interior IoT-capable in order to monitor energy consumption and to be able to control the building's systems. Additionally, there should only be one core device as main knot where all systems converge.

New and old combined: Nespresso's new location is where Nestlé's history began in the mid-19th century.

Nespresso and SAUTER

Nespresso relied on SAUTER's experience in the field of building automation. In this project, SAUTER Switzerland implemented the building control system while taking into consideration the construction and design features the historic building holds. One major aspect of modernisation was to combine all necessary modern technology with the existing facilities. With SAUTER modulo 6, Nespresso can cover all its required tasks.

The focus of future-oriented building control systems lies in the performance of all technical components. In times of digitalisation and IoT, fast and reliable evaluation of large amounts of data is key. modulo 6 is a smart building automation system that unites performance and IoT architecture while ensuring the highest possible security standards. Modern building control also requires communication with a variety of connected devices. Therefore, control systems need to communicate in different standards. modulo 6 communicates via diverse communication protocols, like BACnet/IP, BACnet MS/TP, Modbus, KNX, DALI, SMI or M-Bus. This multipurpose connectivity combined with SAUTER's programming tools result in a stable and secure system.

SAUTER Switzerland's experience in building automation was one key argument for the cooperation. For example, incorporating cooling machines and stand lamps from the Austrian manufacturer Zumtobel was an easy task to solve. Furthermore, all collected and processed data is available in MQTT format for integration into Microsoft Power BI. This data analytics solution creates customised, interactive data visualisations with an interface simple enough for end users to create their own reports and dashboards. The integration was a prerequisite as the system is already in use in other Nestlé buildings. With Power BI, building data can be reviewed and checked as HTML. The client is able to see a range of analytics KPIs such as occupancy, IAQ, climatic conditions and others. The open protocols ensure modernisations and safe operation in the future.

Over the whole process of planning, implementation and putting into operation SAUTER always stood supportive by Nespresso. SAUTER's modulo 6 allowed Nespresso to transfer its vintage buildings into a state-of-the-art and internet-of-things-capable headquarters.

WELL 22

A SMART BUILDING WITH MAXIMUM COMFORT

The health and well-being of users is paramount to the innovative "WELL 22". This is the first office building in Luxembourg constructed to the WELL Building Standard®. Assisted by SAUTER's automation solutions, it offers maximum and intelligent comfort at various levels.

Providing protection from the weather, wild animals and enemies – buildings have always needed to be strong. Yet the criterion of a cosy "roof over one's head" as we know it isn't actually that old. However, we now spend around 90 percent of our time indoors and comfort is even more important. Individuality and self-realisation are also valued, as well as enjoying all this into a ripe old age. Extensive research has shown that the buildings we spend time in directly affect our physical and mental health. It therefore also comes as no surprise that real estate operators and investors are constantly having to up their game.

Certified health and well-being in buildings

In the building industry, the notion of a health-promoting environment is a key factor, especially when designing office buildings. This approach gained added impetus when the WELL Building Standard® was introduced in 2014. This is the first building certification system that focuses on people's health and well-being. Around 33,600 projects in 109 countries have so far been certified.
The list of certified projects continues to grow. Last year, the first office building in Luxembourg to fulfil this standard was constructed and subsequently registered for certification. The innovative WELL 22 commercial building is located in Howald, a neighbourhood south of Luxembourg City. It showcases in many details the standard's benchmarks for buildings in the working world of today and the future.


© IKO Real Estate

WELL 22 encompasses 4,700 square metres of office space. Various technical measures ensure superior room air and excellent drinking water quality at all times. Lots of natural light plus biorhythm-adapted illumination also promote the mental and physical well-being of users. Temperatures inside are kept at ideal levels through a sophisticated heating, ventilation and air-conditioning system (HVAC), while the optimisation of acoustics also brings increased health benefits. Communal areas such as the green roof terrace allow people to meet and the entire building's natural design provides added calmness and satisfaction for its occupants. The integrated restaurant, which will open soon, has a varied all-day selection of healthy food for tenants to enjoy during work breaks. There is also a gym in the basement – or the neighbouring woodland – for anyone wanting to get some exercise.

Sustainability and resource conservation were prime considerations during construction. Only materials with a minimum carbon footprint and harmless to both people and the environment were allowed. With outstanding ecological credentials and having attained WELL® Gold certification, the office premises are

also aiming for an "Excellent" rating under BREEAM – a standard awarded to particularly environmentally friendly buildings.

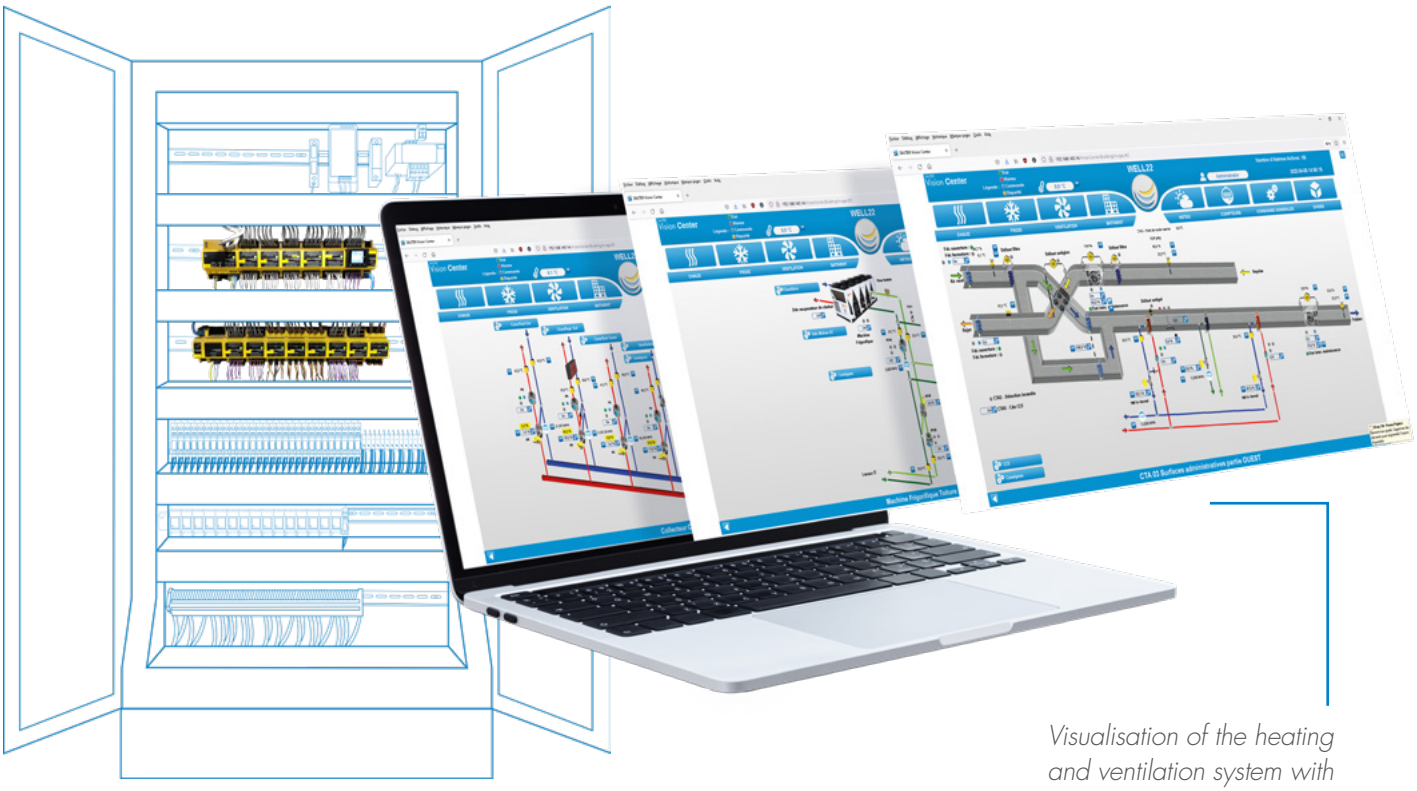
Smart building concept with building automation from SAUTER

Just as building users vary, so do their requirements. The sophisticated smart building concept at WELL 22 recognises this fact. Tenants are given access to a mobile app. It offers not only digital services like parking space management or reserving meeting rooms but also customised control of the HVAC system. The property developer, IKO Real Estate, commissioned SAUTER Luxembourg to automate the entire system alongside the integrator of the app solution.

SAUTER supplied all the necessary building automation functions with its modulo 6 system. This innovative automation solution supports the communication protocols of wide-ranging equipment types. It is also simple to implement and creates a stable and reliable system. BACnet data is provided on a management and operating level (or "Building Operating System"), enabling easy building integration and interaction with the Smart Building System. BACnet controllers from SAUTER's ecos range are installed as modular room automation stations. Linked to KNX and DALI interfaces, they provide maximum convenience for room climate, lighting and window blind control, while also minimising energy consumption.

SAUTER Vision Center is used for efficient building management in WELL 22 and controls around 25,000 objects in the project. The integrated energy and maintenance management that it offers is particularly valued by the real estate operator.

IKO Real Estate has been relying on SAUTER know-how for about 15 years. In the WELL 22 project it has benefited once more from SAUTER's vast expertise in building and room automation.



SAUTER modulo 6

Visualisation of the heating and ventilation system with SAUTER Vision Center

Seoul National University

SMART TECHNOLOGY FOR THE FUTURE

Seoul National University is getting ready for the future by building a smart campus to create a sustainable environment that fosters education and research of topics that dictate tomorrow. SAUTER's integration solution, as well as certified products and systems, lay the foundations for campus management.

With a population of approx. 10 million Seoul, the bustling capital of South Korea, is one of the world's top high-tech cities and known for its smart city innovations. Technology is used to improve quality of life and meet many of the challenges rapid urbanisation places on the city. It seems only fitting that some of the world's most famous technology companies are headquartered in Seoul. The city is also home to South Korea's most prestigious institution for higher education, Seoul National University (SNU).

Striving to the top

Established in 1946, it was the first university of independent Korea and played an important part in modernising, democratising and economically developing the country. Today, more than 30,000 students pursue their undergraduate, master's degree or doctoral program at SNU. The university offers 15 colleges, 10 graduate schools as well as a variety of research institutes and collaborates with numerous universities worldwide.

While many Koreans strive to enter the distinguished institution to follow their dreams, only the top 1% succeeds. Famous SNU graduates include the former Secretary-General of the United Nations, Ban Ki-moon as well as the former Director-General of the World Health Organization, Dr. Lee Jong-wook.

SNU is expanding beyond Seoul with the vision of becoming a world-leading university. In 2014, SNU opened its biotechnology campus in Pyeongchang, the county that hosted the 2018 Winter Olympics and Paralympics. As part of its strategy of establishing a foundation for sustainable university development, the construction of a new campus in the city of Siheung, located in Gyeonggi Province in the metropolitan region of Seoul, is in progress.

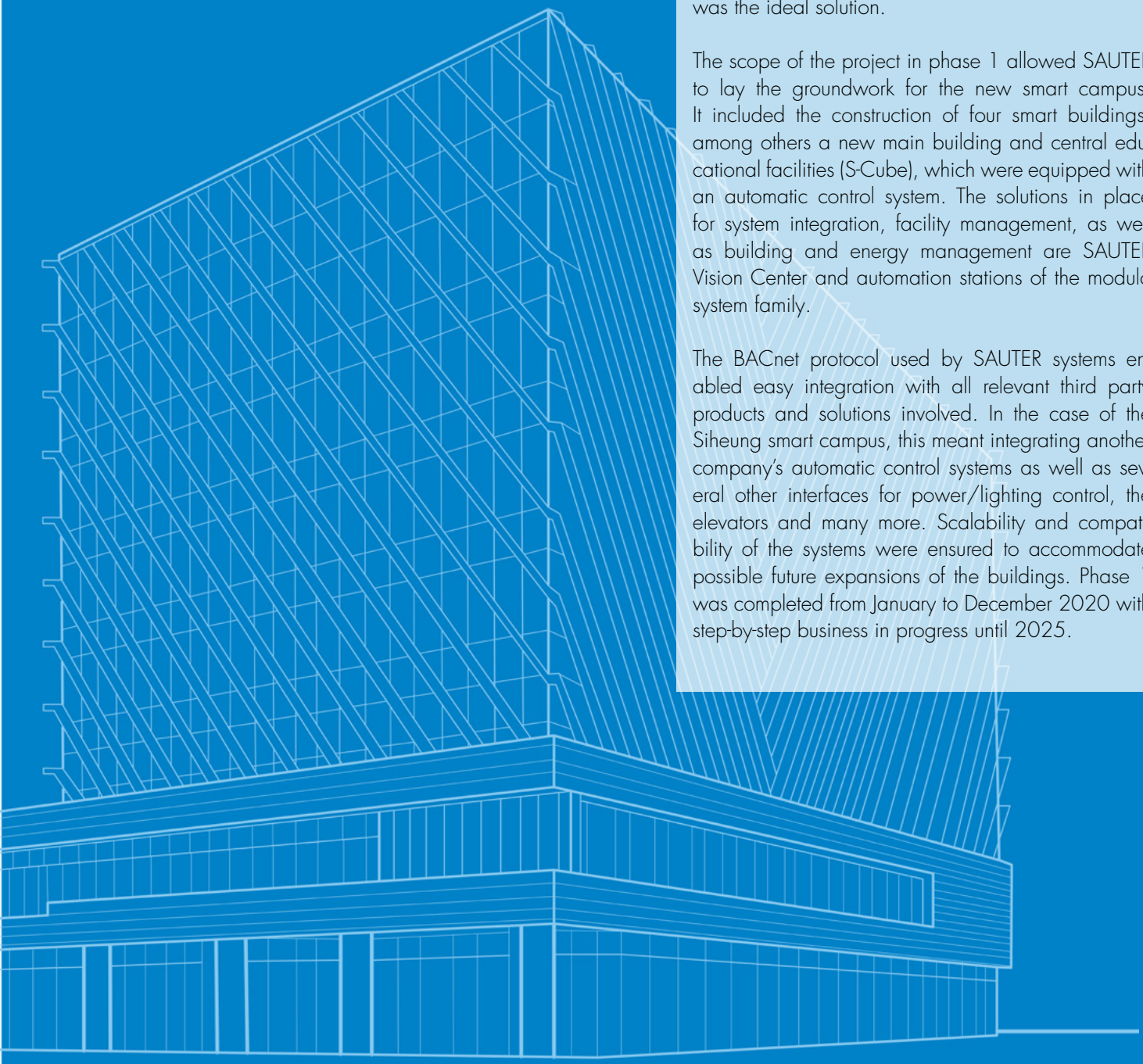
In line with Seoul's smart city ambitions, the aim is to create a smart campus to develop an education environment to promote R&D in the fourth industrial revolution and other growth areas. Additionally, the new smart campus is envisioned to be more sustainable, for example, by saving energy and facilitating the response to changes in the future.

SAUTER solutions enabling smart campus

SAUTER Korea won over Seoul National University (SNU) as a new customer with their proposal of basing the new Siheung Smart Campus on SAUTER's building intelligence hub SAUTER Vision Center. The smart campus implementation plan proposed combined SAUTER Korea's domestic building construction experience and engineering capabilities with a verified product portfolio. Especially SAUTER's engineering-based integration proposal convinced SNU that this was the ideal solution.

The scope of the project in phase 1 allowed SAUTER to lay the groundwork for the new smart campus. It included the construction of four smart buildings, among others a new main building and central educational facilities (S-Cube), which were equipped with an automatic control system. The solutions in place for system integration, facility management, as well as building and energy management are SAUTER Vision Center and automation stations of the modulo system family.

The BACnet protocol used by SAUTER systems enabled easy integration with all relevant third party products and solutions involved. In the case of the Siheung smart campus, this meant integrating another company's automatic control systems as well as several other interfaces for power/lighting control, the elevators and many more. Scalability and compatibility of the systems were ensured to accommodate possible future expansions of the buildings. Phase 1 was completed from January to December 2020 with step-by-step business in progress until 2025.



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IMPRINT
SAUTER FACTS N° 41

Publication date: September 2022

Concept	SAUTER Head Office
Articles	SAUTER Head Office
	TANNER AG
	TEMA AG
Translation	RWS Group Deutschland GmbH
Layout concept	Sieber & Wolf GmbH
Graphics	doyou GmbH
Cover	©Fr. Sauter AG
Printing	Koprint AG
	LuxoSatin Paper, FSC certified

FSC MIX Papier FSC® C031954

SAUTER FACTS is published in German, English, French and Dutch.

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