SICK
Sensor Intelligence.

Courage

Courage [ˈkə-rij \]:

1.a
The ability to control your fear in a
dangerous or difficult situation.

1.b
The ability to start and continue new tasks
with curiosity, optimism and confidence.

"You must find out where your strengths lie.
Have the courage to use your head to think.
This will double your confidence and your strengths."
Marie Curie

Dear Readers,

When we decided on the magazine title "Courage" at the start of the year we were unaware of how challenging the topic would be given current geopolitical events.
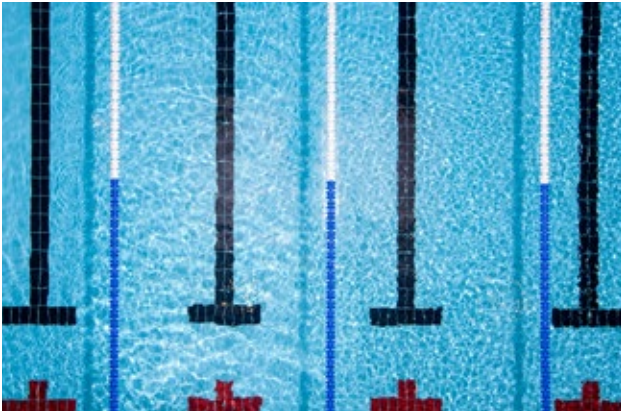
The magazine's articles provide examples of unconventional paths that our employees and customers have taken together, or projects that appear bold at first glance. We want these examples to provide encouragement, and to show that curiosity and determination help overcome boundaries – and that the joint and shared pleasure of sounding out technical potential can lead to astonishing results.

Starting new tasks with enduring optimism and confidence is part of our corporate culture. We accept both setbacks and success as motivation to learn from them – and to develop our abilities.

Be inspired. Have a good read!

Mats Gökstorp
Chairman of the Executive Board SICK AG

The team before leaping into (cold) water.

BREAKING NEW GROUND FOR THE OCEANS

On an unconventional conference and daring leaps into water

Denzlingen Swimming Pool (near Freiburg): The sensor learns with jumps from different heights.

Headlong into adventure

"… getting off well-trodden paths is wonderful, and actually makes great things possible in the first place!"

HINRICH BRUMM

At the helm: Hinrich Brumm.

SICK's maritime applications segment is full of surprises. Two examples: The Sensor Ocean Conference not conforming to the usual model of online meetings, and employees gathering at a swimming pool to develop a new safety solution. This shows that throwing old patterns overboard can be fun – and successful.

The coronavirus pandemic is getting on everyone's nerves – as are the online meetings that have shaped everyday work since the problem started. This was also the view of Hinrich Brumm, Strategic Industry Manager Combustion Engines and Maritime: "Most conferences simply consist of Power-Point presentations," he says. "So we came up with the idea of organizing a live online event in which we presented our portfolio of maritime solutions without PowerPoint foils full of numbers and tables but instead making it as lively and interesting as possible – regardless of how. We set no limits on the imagination of those involved."

Unconventional conference

Hinrich Brumm's small team started work on the conference in January 2021: It recruited speakers, designed flyers, and stirred up interest via social media and SICK's subsidiaries worldwide. The big day came on 16 September 2021: "When we went online in the morning we almost jumped for joy – there were 500 attendees from 300 companies in 58 countries!" says Brumm. During the morning, eleven teams made up of customers, partners and SICK employees presented their maritime solutions in 20-minute contributions – in the form of recordings from on board ship or from SICK works, installations, videos, live demonstrations, or interviews. Brumm and his colleague Ramona Richert, Strategic Program and Project Manager, moderated the conference. "All this was completely new for us," he says. "It was really scary getting through it all. But it was worth it: The participants got very involved and used

the opportunity to exchange information, and we were able to present our portfolio of solutions in an interesting and exciting way."

The content of the Sensor Ocean Conference covered three major areas of application: Process and emission monitoring; digitalization with the possibilities opened up by sensor data; and the detection of persons, objects and hazards. In the latter topic area, a particularly sensational new solution was presented: SICK is currently developing a 'man overboard' application that will soon be ready to market.

The idea is based on a customer inquiry from Norway that we received in 2018. He asked whether SICK could develop a 3D scanner and downstream evaluation unit that identified, as accurately as possible, whether something falling overboard was an object or a person – and trigger an alarm in the case of 'man overboard!'? The background: Although

+ **On course to greater energy efficiency.**

And so it came about that an unusual event at the Denzlingen swimming pool (near Freiburg) took place in September 2020 – marking a high point in the development of the new application: Nine intrepid SICK employees tirelessly jumped all day long into (cold) water, sometimes from the 10-meter springboard. Their task: To 'teach' the artificial intelligence to recognize human forms falling through the scanner field within fractions of a second. Blankets, sunshades and air mattresses were also jettisoned for differentiation. "All this provided valuable data for further improving the algorithm," explains Markus Haas.

SICK built the first prototypes of the solution in summer 2021 and put them through their paces in a rain channel. Further practical tests followed over months, for example on a ferry. The currently unique 'man overboard' solution is to be placed on the market next year, and should convince a wide range of users: It is not only conceivable for use on cruise ships (from which about 50 people actually disappear every year), passenger ships and ferries, but also on fixed houseboats, floating hotels, ports, bridges and drilling platforms. "There are great opportunities here," Markus Haas is certain. "The courageous leap into the wild blue yonder – literally from the springboard, as well as in the sense that we have invested a lot of time and money in developing a new application – will definitely pay off. And this kind of unusual approach is fun!"

And this is exactly the way that Hinrich Brumm sees his Sensor Ocean Conference: "Despite all the work involved in the project – getting off well-trodden paths is wonderful, and actually makes great things possible in the first place!" •

some ships and yachts are equipped with camera-based monitoring systems, the recordings are looked at only when someone is actually missing. But by then it is usually too late for any rescue.

The SICK team got to work: "First, we made a purely mathematical simulation with people falling through scanner fields. That looked very promising," explains Markus Haas, Technical Industry Manager Power & Combustion/Maritime in the GIC Process Automation Department. But theory is always gray – the practical test came hot on its heels: "Our Hamburg colleagues carried out an initial experiment, throwing inflatable mannequins and boxes out of the window," says Markus Haas. Another test run took place soon afterwards in Norway: Here, dummies were dropped into the sea from a crane. The solution was intensively further developed during 2020, and initial talks were held with interested parties. But what we were still lacking was trials with real people.

REVOLUTION IN THE FIELD

You cannot leave a good year to chance

The digital transformation of agriculture forges ahead inexorably, and SICK has courageously opened up new business fields here with its internal Mobile Outdoor Automation start-up.

The green vineyard tractor quickly clatters along the rows between the vines leaving a small cloud of dust behind it. Automatic guided attachments at the back and front ensure efficient and environmentally friendly removal of weeds. The driver relaxes as he sits on his tractor, because sensors from SICK maintain tracking and reliably monitor the vehicle's position. He only has to keep his foot on the gas – the rest takes care of itself.

This winemaker in Baden-Württemberg is not alone in having already taken the first steps from traditional cultivation towards 'Viniculture 4.0'. And agriculture in general is converting to 'Farming 4.0'. On the one hand, a growing world population and demands for good living and sustainability; on the other hand, the loss of agricultural land due to climate change and urbanization: Bridging the gap here requires new technologies, and thus state-of-the-art technology. "Self-driving machines and agricultural robots are a major, rapidly growing, market. We have been active here for several years. Our internal start-up has already been active for two years. We are now working on many projects with leading vehicle producers," explains Manuel Fischer, Strategic Industry & NPI Program Management Lead Mobile Automation.

Co-engineering is the key

SICK's Start-Up Initiative is also a new model for partnership-based collaboration with customers. The New Product Introduction (NPI) approach has been specially developed to enable the sensor specialist to focus on customer requirements – with co-engineering as a key element.

Cooperation goes far beyond a single project, and is a strategic collaboration intended to last for the duration of the customer relationship. Joint co-engineering continues even after completion of a project with serial production – to achieve continuous improvement until the next innovation. Whereby the NPI Program Manager acts as the co-engineering interface.

There is also well-coordinated cross-departmental collaboration within the company. Success and the very positive customer feedback validate this innovative approach. SICK sensor solutions can now be found in many semi-automated and fully autonomous machines and robots on fields, farmland and meadows all over the world. SICK's own Outdoor Technology Center, with a testing area of 3,500 m², enables optimum preparation of the sensors for this type of harsh and complex outdoor use.

Ultimately, under real operating conditions, the vines can be detected and the attachments controlled using the information provided by the robust multi-layer scanners. This enables mechanical and ecological removal of weeds with little or even no spraying.

Tilt sensors detect movements, supporting accurate tractor navigation. Stereo cameras for 3D monitoring of the surroundings act as sensory organs, warning the driver before any collision can occur. And the start-up has even developed functional safety sensor systems to ensure the safe operation of such mobile machines. If desired, the sensors can also transfer their data to the cloud for the digital representation of work processes.

New work-life balance

"Customers can rely on our technology," underlines Fischer. SICK's daring approach for new sensor solutions in the agricultural sector also contributes towards more and more farmers finding the courage to take up agricultural automation potential. And courage is required because farmers must order their machines at the start of the year, before the first seeds are sown. Then everything must function properly to bring in the harvest. Once the new technology is actually in the farmyard it is often used soon afterwards, almost intuitively, and can lead to a completely new work-life balance. Ultimately, the safety, performance and comfort aspects are already familiar from one's own car. Agricultural vehicles actually already have an edge in this regard: Combine harvesters and other large equipment often have more digital helpers on board than cars do.

Fischer believes that this revolution in the field is unstoppable: "The future lies in autonomous machines combined with cloud-based communication solutions – and intelligent sensor technology from SICK." •

PASSION

01

MIND THE GAPS

A well-prepared cybersecurity team puts to rest the anxieties of SICK customers regarding worldwide IT vulnerabilities such as "Log4Shell".

Since 2019, SICK has had its own Product Security Incident Response Team (PSIRT) to handle the data security of all its products and services. Whereby the uncovering of vulnerabilities is an aspiration shared by a wide variety of interested parties – so customers receive a consistently high level of security. Ulrike Gehring (Project Manager Cybersecurity) and Benjamin Holdermann (Cybersecurity Specialist) explain the roles and tasks of the PSIRT, and talk about systematization with the courage to leave gaps.

SICK has had its own Product Security Incident Response Team for more than three years now. What is this PSIRT and why was it founded?

HOLDERMANN: When the data security of our products is involved, the PSIRT team is the central contact at SICK for customers and other reference groups (such as the authorities or security researchers). We set it up in 2019 within a few months, and it can already look back on many successfully concluded cases.

In addition to the protection of information technology (IT), why is the protection of operative technology (OT) gaining in importance?

GEHRING: More and more industrial products – such as sensors, actuators or entire control systems – offer supplementary cloud or network functions in addition to their actual product functions. The increasing integration of microcontrollers, however, has a price: The risk of security gaps. Operative technology is now just as affected by this as IT systems. The risks facing IT have been present for some time now, and appropriate cybersecurity processes have already been established. With their integrated software, products can now also interact with the IT and run external programs. This means that such products can now also pose major security problems which, in the worst case, could affect a company's entire IT network and production facilities.

ALARM

SICK PSIRT

SICK PRODUCT

GEHRING: It was founded because in this networked world we saw that it was no longer enough to handle weak points locally and individually in our subsidiaries, but overall for the entire company. Whereby we rely on absolute transparency. Anyone, whether a customer or not, can report potential weaknesses to us. After we have confirmed the problem, we unreservedly go public on our website – entirely in the interests of our customers.

What are the PSIRT's tasks?

Searching for vulnerabilities – Ulrike Gehring and Benjamin Holdermann.

HOLDERMANN: Absolute security from the first time a networked product is used cannot solely be achieved by means of technical methods. Ultimately, one must have the courage to leave gaps. It is possible to improve security only gradually, by learning from incidents and reacting as quickly as possible. The PSIRT plays a central role here with its systematization: It coordinates the handling of vulnerabilities in our products, controls the development of countermeasures by our local experts, and provides feedback for implementation in guidelines as well as in practice. What matters is that we gain control over the situation using this systematic approach.

GEHRING: Our team is thus not just the key point for continuously increasing product security, but also the central contact and coordinator for vulnerabilities and security reports.

What are the typical incidents that it becomes involved in?

HOLDERMANN: The appearance of the so-called Log4Shell weak point in December 2021 was a typical incident and, at the same time, a major operation for our PSIRT. This was because it involved a security gap in a library used in the Java programming language. Java is used worldwide, and practically every company laptop was affected. And, of course, such libraries are also active in networked SICK products. Log4Shell was just the kind of vulnerability that would enable a hacker to access an entire corporate network and hijack the IT system. Our customers were naturally nervous, and we had a lot of queries about it. But thanks to our standardized processes and systematics, we were quickly able to dispel their anxieties. Here, too, we rapidly gained control of it by determining the weak point

and making it measurable. In collaboration with our developers, we have inspected all 40,000 SICK products and there is now a patch available to close the security gap for each affected device.

GEHRING: Our systematization approach also enables us to be brave regarding cybersecurity. We know that we can get every situation under control according to the motto 'recognize the risk, avert the risk'. So our customers can exploit the benefits of digitalization with a good feeling.

How should SICK's PSIRT develop in future?

HOLDERMANN: The location and correction of security gaps in all products is no easy task. The organizational competences and the knowledge of a PSIRT can increase the maturity of product security in the company and ultimately reduce costs. The difference that a PSIRT can make is to the level of preparation of an organization for vulnerability reports. Good preparation is decisive for how the company is perceived by customers, security researchers and the media. So we continuously work on improving our unit so that we can close future, and even more complex, security gaps efficiently. •

Measure quantity and quality at the same time

SHAPING THE ENERGY TRANSITION

SICK contributes towards enabling the use of hydrogen as an energy carrier

Solutions from SICK are already used regularly in applications involving hydrogen – and there is still significant potential here. What strategy is SICK pursuing regarding hydrogen applications, and what contribution do the company's solutions make towards the energy transition?

'Green' or 'blue' hydrogen play a central role in the energy transition and are already being used in many pilot plants as an alternative to CO_2-emitting processes – for example in the steel and chemical industries, or in fertilizer production. In future, hydrogen will also be fed into the natural gas network and thus reduce the proportion of CO_2 released during burning. For this purpose, in the first phase, hydrogen made using electricity from regenerative resources (via a power-to-gas system) will be used – exploiting excess electricity created when there is a lot of sun or wind, in particular. All these applications involving hydrogen are gaining in importance, and require new solutions from the participating companies.
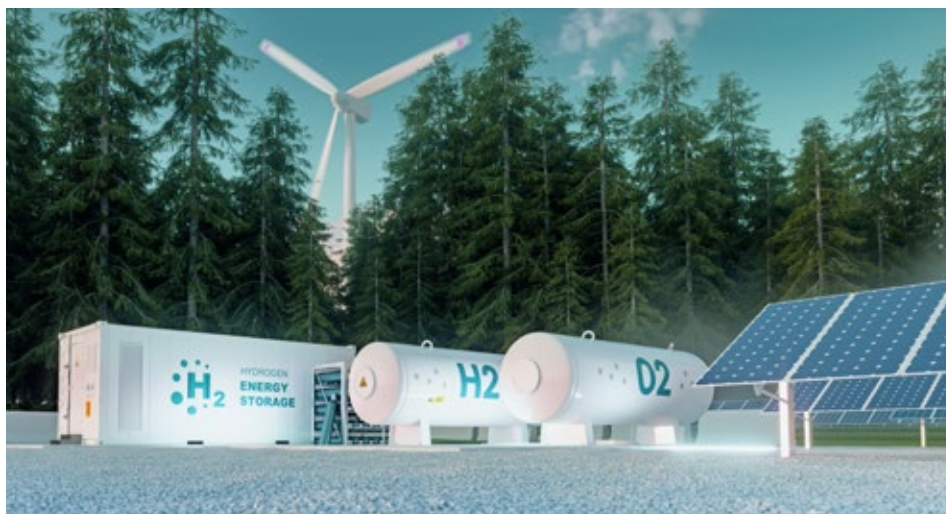
Solutions for hydrogen applications

Let's start by looking at adding hydrogen to the natural gas pipelines: In some parts of the world up to 2 percent of hydrogen can already be added to natural gas. It is assumed that this figure could rise to between 15 and 30 percent in future. Research is being carried out on this because many aspects must be taken into account regarding the design and operation of gas measurement and control stations. This is because hydrogen influences the density, viscosity, explosiveness, flow properties, and sound velocity of the gas mixture. The service life of an entire pipeline is also affected. This imposes completely new challenges on the

TIME FOR HYDROGEN
SICK offers sensor solutions for clean industry.

pipes, compressors, seals, and valves, etc. And the gas flow counters must also accurately and reliably measure the natural gas/hydrogen mix. SICK's FLOWSIC devices can already do this. The team at SICK's Ottendorf-Okrilla site near Dresden has intensively tested how the added hydrogen affects the ultrasound technology of FLOWSIC devices: "Our devices already measure hydrogen-bearing natural gas as reliably and stably as natural gas without hydrogen," says Jörg Wenzel, Head of Product Marketing Services and Flow Measurement. The device can compensate for any measurement uncertainties." SICK has even already developed a solution for a proportion of up to 30 percent. This is necessary because the hydrogen – with its low density – strongly increases the speed of sound in pipelines: "The new dynamics in the plants, in particular, are challenging. Almost no hydrogen is fed in when there is little sun and wind. On the other hand, the proportion of hydrogen can rapidly increase when there are excess renewable energies. Such strong fluctuations are new for the gas infrastructure. The ultrasonic technology of our gas counters is particularly suitable for these rapidly changing process conditions," explains Wenzel. "We measure both small and large flow quantities very accurately."

Start-up for the environment

The second major area of application for SICK solutions involves the generation, transport and industrial use of pure hydrogen: The quantity and quality of the gas must be measured along the entire hydrogen network – a business field with enormous potential, and one that SICK is in the process of opening up. The prerequisites for this are good: "We are the world market leader in legal-for-trade mea-surements of natural gas using ultrasound gas counters. Our ultrasound flow measurement technology is fundamentally also suitable for applications involving pure hydrogen," adds Frank Hehl, Senior Vice President Global Industry Center Process Automation. The high speed of sound in pure hydrogen is a challenge: The measurement times are in the nanosecond range in low-diameter pipelines. "For this purpose, we are currently working on completely new electronics that we are testing in practical use in collaboration with our customers, and we want to further develop it so that we can rapidly reach market maturity and secure a significant market share," explains Hehl. "The measurement of purity is another important market segment. Determining the quantity and quality in a system is a real competitive advantage."

SICK has underlined the importance of expanding these activities by founding a start-up within the company to explore the new market potential and identify possible applications involving hydrogen measurement.

"Given the numerous possible options, this approach is principally intended to rapidly identify lucrative business opportunities and develop attractive solutions in collaboration with our customers," says Hehl. "We have the expertise and a unique opportunity to combine our commercial success with helping achieve a low-CO_2 future." •

"THE RETENTION, STORAGE AND USE OF CO$_2$ IS INDISPENSABLE FOR CLIMATE PROTECTION"

Carbon capture, utilization and storage (CCUS) technology is used to separate CO$_2$ from certain industrial processes and make it harmless. But the method is not uncontroversial. Aurélie Moll, Technical Industry Manager Carbon Capture Utilization and Storage, explains why we nevertheless need CCUS to achieve the climate goals – and what SICK can contribute.

Ms Moll, how exactly does carbon capture, utilization and storage function?

Mankind has emitted immense quantities of CO$_2$ since the start of the industrial age – with well-known consequences. And worldwide energy requirements are increasing inexorably. Although electricity from regenerative sources is gaining in importance, the path to 'green' energy is still long and will only be completed gradually – from the current coal, through natural gas, to hydrogen, the energy carrier of the future. But we cannot wait any longer. Carbon capture, utilization and storage is now an effective possibility for making at least some of the greenhouse gas 'harmless': The CO$_2$ that is emitted by certain industrial processes and power stations can be separated directly on site. Separation rates of up to 90 percent can be achieved. Then the CO$_2$ is reused by converting it into other products with a greater commercial value, such as synthetic fuels or plastics, while maintaining overall carbon neutrality. Or the CO$_2$ is stored deep underground, for example in empty gas fields. It is important to understand that both approaches can bind CO$_2$ emissions from familiar industrial processes.

But it would be a lot better not to emit the CO$_2$ in the first place...

Yes, but in many sectors we cannot be completely emission-free at present, and emissions cannot be avoided at all in certain industrial applications, for instance cement production. The CO$_2$ emitted here is relatively pure and can therefore be 'captured' very easily and reused or stored. CCUS is therefore a very good solution for making such unavoidable emissions harmless for the climate. The sector is already working on solutions for 'green' cement, i.e. produced climate-neutrally.

But the process is also heavily criticized. Justifiably?

Of course CCUS does not solve the climate crisis. We still need to avoid CO_2 emissions as far as possible. But the technology is safe, including the underground storage of CO_2. So for all these reasons CCUS is an important component in the scenarios of many experts and well-known research institutes, such as the International Energy Agency. We at SICK are also convinced that binding, storing and reusing CO_2 is indispensable for climate protection. Because, and one cannot stress this enough, we are running out of time – we have to act. And carbon capture is a technology that can already be applied to certain plants by retrofitting them, and it will also be installed in new industrial plants. That's why we want to get more involved here with our solutions – even if this may not seem to make much sense at first glance, given the criticism of the process.

What solutions does SICK offer for CCUS applications and technologies?

Carbon dioxide is emitted from a variety of sources, collected and transported via pipelines or ships for further processing, such as storage or utilization. We already offer gas analysis devices that monitor process and emission parameters for the separation process in the CO_2 scrubbing plants. Gas flow measurements are required for the subsequent transport of the pure CO_2 at every transfer point: The quantity and quality of the gas, and any impurities it may contain, must be monitored – to protect health and the environment, as well as to guarantee accurate invoicing with the companies, or the calculation of CO_2 levies and credits. SICK already has solutions that support these CO_2 transport applications. Some of our FLOWSIC models are already suitable for use in CO_2 pipelines, and measure the exact gas quantity at every transfer point in the pipeline. The next step is to further develop our products so that they are also suitable for quality assessment and, for example, can detect any traces of water that could have a corrosive effect on the pipes. So CCUS offers many potential areas of application for our sensor solutions. We see great potential for this technology – for us as a company, but also for climate protection. •

Aurélie Moll wants to make at least some of the greenhouse gases "harmless".

DETECTING AND, IN THE NEAR FUTURE, LOCALIZING LEAKS

How flow sensors are becoming even more intelligent

7%

Roughly 60,000 compressed air plants account for about seven percent of total electricity consumption in German industry.

30%

Up to 30% of compressed air lost.

"EXPERTS ASSUME THAT UP TO 30 PERCENT OF COMPRESSED AIR IS LOST VIA MANY VERY SMALL LEAKS"

A lot of energy is wasted because leaks in industrial compressed air plants are either detected too late or never detected at all. SICK and the Fraunhofer Institute for Manufacturing Engineering and Automation (IPA) are developing a solution so that these leaks can be found quickly and easily in future. The secret: A self-learning algorithm. The effect: A contribution towards environmental protection.

Compressed air is widely used as an energy carrier in industrial automation technology. According to the Fraunhofer IPA in Stuttgart, there are about 60,000 compressed air plants in operation in Germany. Together, they consume approximately 16.6 terawatt hours per year. This roughly corresponds to seven percent of German industry's total electricity consumption. This opens up enormous energy-saving potential because these plants often have leaks via which the compressed air escapes. Noticing and correcting them too late, or even never finding them at all, causes this high level of energy loss. This harms the environment and drives up energy costs in manufacturing companies.

But let's go back a bit first: Regarding compressed air measurement, SICK has been marketing a flow sensor for compressed air and non-corrosive gases – the FTMg (Flow Thermal Meter for Gases) – since 2019. It combines pressure, temperature and flow measurement and can thus also calculate the energy content of the flowing compressed air. The FTMg has an integrated seven-day data logger, and the variant with Power-over-Ethernet (PoE) also offers MQTT and OPC UA communication interfaces as well as an integrated webserver, enabling visualization of its data.

Since 2021, there has also been a supplementary Monitoring Box with a specially developed cloud application from SICK: The data from different SICK sensors can be consolidated here and shown together on a dashboard – which users can access via computer, tablet or smartphone from anywhere. Users can therefore see current and historical data, analyze energy and compressed air consumption, identify optimization potential, and plan maintenance intervals. If desired, automatic notification can be sent to

Teachable flow sensor

the user's end-device when the threshold values that they have defined are not reached or are exceeded. If the customer uses the SICK Monitoring Box, the data are hosted in SICK's own cloud. They can, however, very easily integrate their sensors into their own cloud or their own energy management system: "The MQTT and OPC UA communication interfaces in the sensor make this connection very easy," says Product Manager Helen Zimmermann. "This is a substantial advantage over competitors' products."

Algorithm provides notification

And now to the leaks. They occur relatively frequently in the tubes, pipes, valves and connectors of compressed air systems. "Experts assume that up to 30 percent of compressed air is lost via many very small leaks," explains Thomas Weber, Head of Business Unit Industrial Instrumentation. "This impacts plant productivity and results in extra costs: At a price of 1.7 cents per standard cubic meter of compressed air, this amounts to five- to six-figure sums per year, depending on the size of the compressed air network. And this wastes energy unnecessarily."

The FTMg is already helping detect these leaks. With its integrated data monitoring and automatic storage of data for the last seven days, the sensor shows excess consumption on a particular machine or in a particular area. The user can assume that there are leaks and thus prevent unnecessary energy costs by means of targeted maintenance. The detailed localization of the holes, kinks or leaky connectors, however, must still be carried out 'manually' in a second step, with the help of ultrasonic technology for example.

This detection of leaks could soon become very much easier: Together with the Fraunhofer IPA, SICK is currently developing an additional service for the intelligent FTMg flow sensor – a self-learning algorithm that will evaluate the sensor's measurement data, and reliably and automatically detect the leaks: The FTMg already provides constant data on the pressure, temperature and flow rate. In the future, it will autonomously compare these data with historical data to determine deviations that point towards leaks. "Leaks show themselves with a characteristic progression. One calls this 'clustering'," explains Thomas Weber. "The algorithm recognizes this cluster and automatically informs the defined person." An additional challenge for the developers is that the algorithm should be applicable as broadly as possible, and autonomously adapt to the various plants. In the case of this so-called 'unsupervised machine learning', a human must ultimately check whether the algorithm has drawn the correct conclusions for the information available to it. "We are aiming for a generic solution that is as simple as possible for users," says Weber.

Investment pays off

In this project, SICK provides the sensor know-how and the Fraunhofer IPA contributes its expertise on artificial intelligence and production technology – a perfect combination. In November 2021, SICK delivered a demonstration compressed air plant with several FTMg sensors, pressure sensors, cylinder sensors and edge devices to the Fraunhofer IPA in Stuttgart for further development as near to practical conditions as possible. All conceivable leaks can be worked through on this plant.

Thomas Weber and Helen Zimmermann are convinced that the investment and the major effort of the two partners will pay off: "Having developed the FTMg with its MQTT and OPC UA communication interfaces, we have already put one innovation on the market – and convinced everyone with it, even the skeptics," says the Product Manager. "Together with the Fraunhofer IPA, a strong partner, we are now taking another bold step." And Thomas Weber adds that, "Our solution will make production more energy-efficient, will save money, and will help companies exploit new energy-saving potential. So we are all making an important contribution towards environmental protection." •
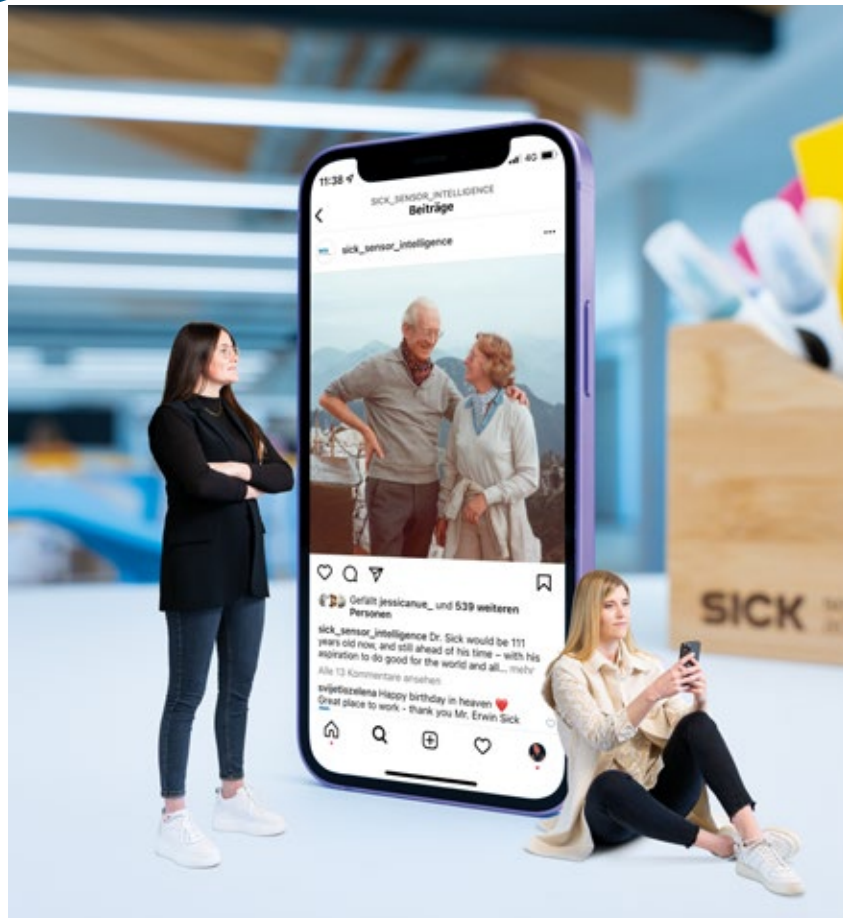
FTMg – the flow sensor with energy measurement.

REDUCED
LOSS OF
COMPRESSED AIR

"OUR SOLUTION WILL MAKE PRODUCTION MORE ENERGY-EFFICIENT, WILL SAVE MONEY, AND WILL HELP COMPANIES EXPLOIT NEW ENERGY-SAVING POTENTIAL."

AUTHENTICITY AS A SIGNIFICANT CRITERION

Social media communication at SICK

Social networkers: Franziska Lehmann and Jessica Nübling

Social media are an indispensable component in the marketing mix. How does SICK bring its corporate interests into harmony with the possibilities offered by online communication?

Do business-to-business companies need to communicate via social media? About ten years ago this question would mostly have received a negative answer. Social media was something for consumer goods brands but not B2B. At SICK, we already had a different point-of-view in those days: "We understood that conversations about our company and our brands were also taking place online. We wanted to exploit the opportunity to find out what was being said there – and participate in this dialog. So we made the decision to start communicating via social media in 2010," explains Jessica Nübling, Global Social Media Manager.

Initially, we very much focused on human resources marketing. The company, however, rapidly recognized the potential that social media opened up for product marketing and sales, and we started creating several more channels in the national companies. In recent years we have initiated and organized all this worldwide. All the threads now connect to Waldkirch via Global Social Media Manager Jessica Nübling. She is supported by Franziska Lehmann, Global Online Communication Manager, and Megan Palkert, Industry Marketing Manager in the USA. The team developed the global social media strategy and publishes relevant topics worldwide via LinkedIn, Facebook and Instagram. In addition to these global channels, contributions to country-specific platforms (such as WeChat, XING, KakaoTalk, etc.) are input and supported by social media managers in the particular countries. Moreover, all social media managers are closely networked, regularly exchange information, and collaborate together on the creation and publication of content via a content management tool. Their top priority is to present SICK uniformly worldwide.

Valuable and relevant content

In the process it is vital to offer users relevant high-quality content, and open up interactions and conversations with them. As a result, the social media team opens up new areas and target groups that have hitherto been inaccessible to the company – increasing SICK's overall visibility.

One challenge here is the rapid rate of change of social media: New platforms, formats and trends are being created all the time. The social media team analyses this very closely – and is also courageous enough to refuse to participate in certain situations or on particular topics. "Our decision-making criteria are always: Can we offer our users relevant high-quality content on this topic, on this channel, on this occasion? Does this fit with our company, our values and our strategy?" says Franziska Lehmann.

SICK is currently taking a new approach to create this valuable content: "It's the employees that are responsible for the company's success. As experts, they develop products and innovations – they are the face of the company. So it is also very important for us to integrate them into social media communication and make them visible as brand and corporate ambassadors," explains Nübling. So the ambassadors, as they are called in social media jargon, use their private social media profiles. What is different here is that they are trusted by the social media team and can decide for themselves what they post. So they communicate private, specialist and corporate content in equal measure on their channels.

Raising awareness

"Of course, as a company, it's a brave decision to hand over control, but this is the most authentic form of communication. This enables us to build up very good credibility for SICK and reach even more users," adds Nübling. Our good experience with this, and the employees' commitment and interest, means that the social media team wants to make use of the potential and will increase the number of ambassadors across the nations.

Felix Bartknecht, Technical Industry Manager Infrastructure, has already been communicating as an ambassador for SICK on his personal LinkedIn channel for five years. He has succeeded in drawing attention to SICK with his posts in his special field of interest – the cement industry. "I generate market recognition and visibility for our many solutions, and have an opportunity to gain new customers for SICK," he says. This is nothing other than classic business development – just that it takes place via social media. And, in this regard, another aspect is interesting: It is not just in the world of social media that Felix Bartknecht is appreciated as an expert on the cement industry, but also in the 'real world' – he is now invited to congresses and other events as a speaker. This not only shows the possibilities that social media offer, but also how perfectly the use of social media blends into SICK's overall corporate communication. •

TRUST

03

GIVING TRUST MORE SPACE

Functional compliance is no accident:
The SICK Integrity Line resolutely drives
the company forward.

We want to be compliant and offer our employees every opportunity to report suspected violations.

Compliance is a top priority for companies around the world – and not just since the diesel scandal. SICK has also traditionally treated the observance of laws and internal guidelines seriously. Shared values and mutual trust are the long-term basis of SICK's global community, made up of employees, customers and partners. The company expanded its comprehensive compliance management system in December 2021 with a digital whistleblower system – the SICK Integrity Line – in order to maintain and protect these values.

Going further than EU regulations

The external reason was the EU directive on whistleblowing and the protection of whistleblowers introduced in late 2019. This, however, has not yet been implemented in Germany's national legislation, and does not stipulate integration of the type of electronic whistleblower system that has now been introduced at SICK. According to the EU directive, for example, the use of an ombudsperson would have sufficed. "For us, the whistleblower system is important not just for legislative reasons, but also for corporate strategy purposes. We want to be compliant and offer our employees every opportunity to report suspected misconduct. And in order to be able to take direct action, we would prefer to be informed about any non-compliance ourselves rather than find out from external authorities or the press," explains Dr. Matthias Rebmann, Chief Compliance Officer Europe & Africa.

Complete anonymity guaranteed

For this purpose, SICK's system is particularly wide-ranging. It is not just a platform for evidence, but also for information and case management. Compliance viola-

tions – such as corruption, discrimination or the misappropriation of company funds – can be reported quickly and easily. At the same time, employees or business partners can ask the compliance team questions regarding all aspects of compliance. The confidential information on cases under examination is also securely stored there and protected against access by third parties. This is guaranteed by using an external website, accessible worldwide, to which even SICK's own IT department has no access. If desired, communication takes place in one's local language and completely anonymously throughout the entire development of the case. In the USA and Canada it is also possible to phone and leave a compliance-related message in the system via a voice box – as is usual there.

"We want to encourage reporting of any suspicions regarding compliance violations. Criminal acts and other legal infringements can then be resolutely investigated and followed up. Many smaller mistakes take place, however, due to uncertainty about regulations. In such cases it is important for us to provide information on the proper conduct required, in order to prevent any future infringements. Whereby the focus is not on punishment, but on raising employee awareness and optimizing the underlying processes," stresses Rebmann. He believes the new SICK Integrity Line is a very important instrument that will lift the many years of work by the compliance team to a new level. Rebmann thinks that SICK is therefore well positioned regarding compliance: "We are deliberately going a step farther than other companies in this regard. It is simply important to make clear to all that violations not only affect the individual employee and their team, but also the entire company and its external business relationships. In this respect, the SICK Integrity Line will be very helpful to us in future." •

TRUST

03

COLLABORATION LEADS TO INNOVATION –

for tomorrow's intralogistics

Michael Badeja has the courage of his convictions.

"OUR COLLABORATION DID NOT JUST FIT IN TECHNICAL TERMS BUT ALSO AS PEOPLE: WE ALWAYS ACT AS EQUALS WITH ENORMOUS MUTUAL RESPECT AND TRUST."

MICHAEL BADEJA, PRODUCT MANAGER
SAFE OUTDOOR AUTOMATION, SICK AG

TRUST

03

Intralogistics that seamlessly and comprehensively master all the tasks in a particular production area could become reality in the near future. SICK and Schiller Automatisierungstechnik GmbH are working together on a platform solution for this purpose.

The aim could hardly be more ambitious: Nothing less than an autonomous modular intralogistical fleet of picking robots, forklift trucks, and a free-driving tugger train which together cover all intralogistical needs – and which can also travel on outdoor routes. This project represents the high point of the collaboration that has taken place between SICK AG and Schiller Automatisierungstechnik GmbH (based in Osterhofen in Bavaria) up to now.

Collaboration started in 2016. Peter Stoiber, Manager Mobile Robotics at Schiller, explains, "A customer in the automotive sector asked whether we could deliver autonomous and freely moving tugger trains (i.e. without any lane guidance) that could travel stretches up to 1,000 meters long in factory halls. We had no previous experience in this field but we definitely wanted to bring the project to a successful close." By a happy coincidence, Peter Stoiber came across the contour-based localization solution that

SICK was just developing at the time: "We at SICK were also looking for a partner with access to industrial use who would be prepared to test this solution with us in quasi practical operation," says Michael Badeja, Product Manager Safe Outdoor Automation at SICK. So this contact provided a win-win situation that could hardly be more suitable.

Self-driving tugger trains

The two partners worked on a solution together. The aim was to enable tugger trains to transport production goods to the next deployment location in up to four trailers (i.e. ten meters long with a trailer load of about three tonnes) and at up to ten kilometers per hour without any need for lane markings. The train's autonomous navigation system uses the laser signals of NAV310 2D LiDAR sensors from SICK: An algorithm continuously compares the distances derived from current scanning data against the reference map, providing the vehicle's current position and orientation angle. In addition, SICK's microScan3 safety laser scanner prevents collisions – a risk that is considerably higher for free-driving AGVs than when they follow lane guides. The tugger train automatically brakes when a person or object is detected. The complete solution can be

"OUR SOLUTION ENABLES COMPANIES TO GRADUALLY AUTOMATE THEIR INTRALOGISTICS BEYOND PRODUCTION HALL BOUNDARIES TO BECOME FIT FOR INDUSTRY 4.0."

PETER STOIBER, MANAGER DEVELOPMENT AUTOMOTIVE,
SCHILLER AUTOMATISIERUNGSTECHNIK, GMBH

retrofitted on existing tugger trains, whereby it is still possible to use them with a driver. So this is an attractive solution that enables new applications – for example dynamic routing according to delivery priority.

The next milestone in this fruitful collaboration took shape in late 2018. The same customer's tugger train was now also to travel along additional outdoor stretches and complete journeys of several hundred meters between two production halls – another completely new challenge. And there was another fortunate coincidence in the collaboration: At this time, SICK had just started marketing the world's first safety laser scanner for outdoor use under the product name outdoorScan3. "This product first enabled us to consider going outdoors at all," reports Peter Stoiber. The outdoor scanner's performance is remarkable: "Sun, fog, rain, snow, ice, wind – none of this can be permitted to impair the functionality and reliability of the automated system," says Michael Badeja. "A successful solution must also be safe and productive outdoors. There's a very great amount of expertise involved in this."

Reliable outdoors, too

So the cross-company team went into development mode again: Experts from Schiller Mobile Robotics and mojin robotics – founded in 2015 as a spin-off from the Fraunhofer Institute for Manufacturing Engineering and Automation (IPA), and a Schiller subsidiary since late 2020 – worked with SICK developers to further optimize sensor performance in poor environmental and weather conditions for special application on the free-driving tugger train.

One detail shows how pragmatic and practical the collaboration was: It turned out that spray that hit the sensors from below was a particular challenge: "Fine drops, for example from a preceding vehicle, act as tiny lenses on the sensor and make its job difficult," explains Michael Badeja. "To overcome this problem, we worked together to develop an automatic cleaning function with compressed air and water," says Peter Stoiber. "In principle it works like a kind of wiper blade using air." This solution also had to prove

Peter Stoiber lets his vehicles outside the door.

itself quickly in practical use: The autonomous outdoor tugger train is now running at a well-known carmaker – 100 percent safe and with high availability in real field use.

Platform solution in sight

But this special collaboration is by no means over: Schiller is currently working on a platform solution for a comprehensive 'gap-free' intralogistical vehicle fleet that covers every eventuality – whether indoors, outdoors, free-driving or lane-guided. "Our vision is a complete scalable and flexible system made up of smart individual components. To achieve this, we need a chain of autonomous vehicles that undertake different transport tasks individually or in a group and cover the logistics chain seamlessly – whether indoors or outdoors," explains Peter Stoiber. The next milestones on this path are an autonomous forklift truck and a picking robot. SICK is providing support with its extensive sensor expertise.

This shows that the two partners are not afraid of major objectives because they know what they are capable of. "The high level of design complexity, the standards requiring compliance, the pressure of rapidly delivering a solution for the customer – all this made our previous projects risky. But we succeeded," says Michael Badeja. "And both companies dared enter territory that was not their original core business," adds Peter Stoiber. "That also required courage." The two of them agree that the key to success is trust and the readiness to undertake advance investments for each other. The ideal prerequisites for working together to create a solution that could revolutionize the extremely dynamic intralogistics segment. •

COURAGE IS GOOD FOR YOU

people at SICK

ANDREW WRATH

PRODUCT MANAGER

'Hope for Justice' is the name of the organization to which Andrew devotes his free time. Since 2011, he has been committed to fighting modern slavery by repeatedly drawing attention to the issue with campaigns. The ascent of Mount Kilimanjaro in Tanzania was certainly among the most spectacular. "Sometimes things seem like a huge mountain to us. But we only have to take one step at a time to climb the mountain. We must fight slavery with the same perseverance and tenacity that the team showed on Kilimanjaro. Because freedom is worth it!"

Commitment and passion

RAMONA RICHERT

STRATEGIC PROGRAM & PROJECT MANAGEMENT

"I want to inspire children and young people for nature." In her spare time, Ramona is actively engaged with young people in the Schwarzwaldverein. She wants to show them the Black Forest in all its facets. Together, they discover the wilderness on the doorstep with trekking tours and canoe trips. "We offer a lot to experience. Sleeping under the stars requires a bit of courage and a thirst for adventure – one doesn't always need to fly to distant places."

BEA RUNGE

CONTROLLING

Bea's passion is intuitive archery. She spends her free time with bows and arrows, whether as a trainer at the sports ground in the forest or as an expert in her own shop. Her sporting successes demand respect: Six times German Champion, successful participation in World and European Championships, and gold at the IFAA World Championship in Buenos Aires in 2009. "It's easy to be motivated when one's spirit burns for something. Of course, one also needs the courage to go one's own way and confidence in one's own strengths."

MICHAEL GOH

MANAGING DIRECTOR SOUTHEAST ASIA

Michael has been a sportsman since childhood: From sprinting, to middle-distance and cross-country running – before two slipped discs temporarily slowed him down. After that, his ambition took hold and he trained until he completed a marathon without pain. He found his next challenge in Ironman triathlons. But a serious bike crash and several broken bones again forced him to take a break. "I needed time and courage to get back into sports. Today, I prove to myself that anything is possible, overcoming mental barriers by completing ultramarathons of 50 or 100 km."

Curiosity and ambition

LUDOVICA GIORGETTI

QUALITY & HSE MANAGER

Ludovica is a midfielder for the Italian national lacrosse team and is looking forward to the World Championship in July 2022: "For me, sport has always been like the air I breathe. I just can't live without it." She discovered lacrosse (known as the 'fastest sport on two feet') ten years ago, and started playing in Italy's top women's team. She took part in the World Championship in the UK in 2017. "Achieving something as a group on the pitch is a wonderful feeling. I really hope that I can play for our country again with our great team at this year's World Cup in the USA."

COMMITMENT

04

ROMAN SCHLOSSER

PRODUCTION ENGINEER

When Roman Schlosser started bee-keeping he had an idea. With help from online communities and OpenSource software he converted his old mechanical hive scales to work digitally. "Industry 4.0 networks humans and machines. This is precisely what my home-made digital hive scales do – they determine, process and visualize data on honey yield in an app. Without digital hive scales I would have to open the hive and see how full the individual honeycombs were. I really enjoyed getting very palpably involved with the possibilities of digitalization. I never studied IT, but it also worked with curiosity and a thirst for knowledge."

KNOWLEDGE: DARE TO SHARE

How corporate communities
secure the future of knowledge

Our knowledge is getting too much for our heads to hold! And that's good – because it should not stay in our heads.

What applies for love also applies for knowledge, says the Let's Connect team: If we share it, the chances are good that it will grow. That it will enable other people to do new things. To experience more; possibly to create more with new stimuli. More and more large companies (such as Bosch and Daimler) are relying on corporate communities to solve just such situations. Those behind Let's Connect want to prepare the stage for this at SICK, too. Markus Dambacher, Dirk Eyfrig and Ute Hettel have been involved with this from the start.

"Sharing knowledge is not a new approach. But we want to restructure parts of this," explains Markus Dambacher, a developer who has been actively working in communities and forums for many years. "Imagine the following: In an organization like SICK, I am looking for an expert on a particular type of software. If I'm lucky, I know who I have to talk to or someone I know knows. Then I ask this expert and she helps me make progress. At the same time, five colleagues have the same problem independently of me and each other. Four also find this expert; one doesn't. The expert therefore answers the same question five times – and the wheel is re-invented once. This is not efficient."

"Now let's imagine that our software expert could make her knowledge available to an interested community in a way that was completely transparent, comprehensible and easy to find? Everyone could access it, work with it, and even perhaps further develop it by means of their feedback," adds Ute Hettel, for whom such communities are close to the heart. "For us, the self-organized exchange of experiences plays a central role in collaboration. We want to create a space in which all collaborating employees are networked in communities and can share experiences and knowledge, find answers, and develop new ideas together."

Sharing is caring

Making knowledge and the communities themselves visible is an important prerequisite for ensuring that this type of knowledge organization and enrichment can function properly. "That's why we are currently starting an intranet platform that we are testing with various communities," explains Dirk Eyfrig, another early member of the Let's Connect team. "In the future, all the communities in the company will then be able to set themselves up here. All existing communities are listed with their contacts, and any new contributions are also flagged up."

Consulting colleagues in the communities is much more time-intensive and fundamental than preparing a technical solution. As productive knowledge platforms, self-organized communities also need certain prerequisites to be met. They should have a particular objective to promote a lively exchange of knowledge, and all members must share this aim. Because a community is only as good as its members. "This does not mean that only experts should participate. Lack of knowledge in a real interest is just as important a driver for exchanges and discussion as the knowledge itself. After all, I can only provide answers to questions that have been asked," notes Ute Hettel, and swiftly raises the next point that characterizes communities: They consider themselves to be a protected space in which contributions and contributors are treated with respect. "Those with the courage to ask for help will receive help here. Those with the courage to present a 'crazy' idea will find their sounding board and reality check here."

+ **GOOD TO KNOW**

Let's Connect is a new platform for corporate communities at SICK. It enables the company's communities to be found, knowledge to be accessible transparently, and it promotes the networking and expansion of knowledge. It is created from the bottom up; it is borne by commitment and the convictions of a team of nine. It unites the most varied of corporate departments: From Development, through Marketing and Communication, to IT and HR. With this mix of competences and different points of view, the team behind Let's Connect is the best example of the community spirit of sharing and networking beyond one's own field of activity.

TEAM LET'S CONNECT:

Heiko Steinkemper, Eliana Schillinger, Kerstin Bernhardt, Jochen Hahn, Ute Hettel, Matthias Lutz, Robert Fader, Dirk Eyfrig, Markus Dambacher

"In communities we live by the principle of 'leadership by competence'. In a community it is knowledge that counts, i.e. competence, and not hierarchies. Here, shared interest in a shared subject is what matters," says Markus Dambacher. "Communities function from the bottom up. They are not founded to fulfil any commercial order. They are set up because someone has recognized a need, is looking for fellow campaigners, and simply makes a start. It was the same with Let's Connect. We were initially like tender shoots spread around the company, then we got together and became a grassroots movement – and now we are growing within and into the company."

The future comes from daring

The Let's Connect team has been growing from the community spirit at SICK for one year now, as Dirk Eyfrig explains. "We gained supporters from within the entire company. They were very committed to this, and our team grew. We have now reached a very exciting point. We are going live with our community platform. We are starting with a beta version, a so-called minimum viable product. We will then trial Let's Connect and further develop it together with some active communities from the most varied of fields – and finally roll it out for everyone at SICK."
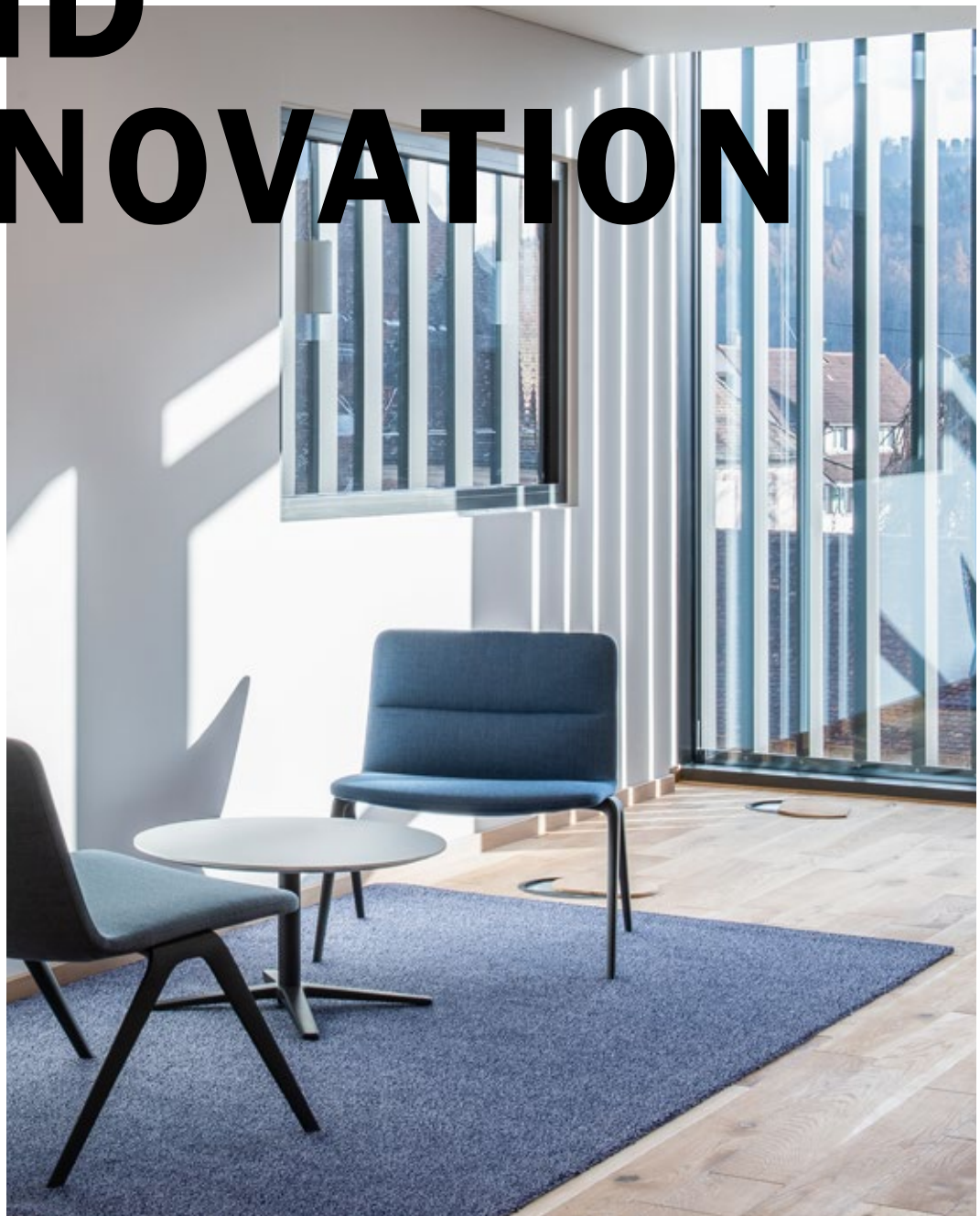
"Here it is really important to understand that Let's Connect is not just a tool – it is an attitude. Corporate communities open up a wonderful multi-dimensionality under the umbrella of the corporate organization. They do not change organizational structures; they supplement them with a place for exchanges based on competence or interests. Communities are the putty in the organizational structure of tomorrow. Cross-departmental work becomes a reality with their help. We always speak of big data. But big data only functions with big knowledge. Our knowledge must grow, and it must be retrievable by many people simultaneously – because only then will we be able to shape the future as quickly as it unfolds before us," adds Ute Hettel. •

"It was the same with Let's Connect. We were initially like tender shoots spread around the company, then we got together and became a grass-roots movement – and now we are growing within and into the company."

SPACE FOR INSPIRATION AND INNOVATION

The SICK Sensor Intelligence Academy campus in the Schlosspark

+ The modern building was financed by Sick Glaser GmbH – and by Renate Sick-Glaser, daughter of the company founder Dr. Erwin Sick – with an investment amounting to about 19 million euros.

+ Come in and wonder – the SIA's entrance.

New building for the curious

Sitting at school desks is a thing of the past. One can clearly feel a fresh spirit as soon as one enters the new building. The modern, open and bright architecture indicates that further education can be inspiring, demanding and fun – and shows how important SICK considers the communication and exchange of knowledge for its corporate success.

The kind of further education where someone stands at the front while the others listen is an outdated concept – after a bit of role play and a round of feedback, students receive a file full of papers and a certificate and then trot back to their daily work. This is not the case at the SICK Sensor Intelligence Academy (SIA). Since its founding in 1998, it has rapidly discarded the image of an 'internal adult education center' and continued to develop. The range on offer was expanded to employees at the international subsidiaries in 2014, and a start-up focusing on customer training was founded in 2018. The start-up was integrated into the SIA in early 2019 and the teams moved on to the campus together.

The new building in the Schlosspark in the Buchholz suburb (just three kilometers from the company's headquarters) provides SICK with a modern and innovative learning environment. On the one hand, the opportunities for further education are still available for SICK's employees to expand their specialist, methodological, and social competences. On the other hand, the new customer center offers the possibility of providing customers with practical training. In addition, companies outside SICK's customer base are also sincerely welcome to use the highly varied opportunities offered by the new premises. SICK thus mirrors its open, solution-oriented approach on an international campus.

The right mix

"We brought together what most companies usually separate from one another because we have seen that we can create and exploit many synergies," Nico Zimmermann, Head of the Sensor Intelligence Academy's Department for Infrastructure, Process and Employee Qualification,

Localization portfolio
by SICK

SICK
Sensor Intelligence.

+ Unique room variants and philoso-
phies support innovative learning
with appropriate media technology
and furnishing concepts.

Beautiful learning!

"We are not afraid of employees chatting with customers, or even customers with other customers."

MARCUS NEUBRONNER

describes the approach. "For example, I can specify a product training course for customers despite it normally being used for sales staff – without having to completely redevelop it."

The new on-site possibilities allow the Academy to modernize the range of courses it offers whilst orienting itself towards a digital future. "With the infrastructure here on the campus everything is hybrid. I can easily digitalize all the rooms and everything that takes place there. And this melding of digital learning content with face-to-face learning content – even parallel to each other – is something very special. We are well ahead of other company academies in comparison," adds Nico Zimmermann proudly.

It is not just the modern architecture of the new building that impresses – the SIA also uses modern learning concepts, in particular those that cover the topic area of digitalization. In future, all training courses will be flexibly adaptable to customer or employee needs through the use of individual modules. The focus is on co-creation: Customers bring their technical requirements with them to the SIA event. There, working with SICK's experts, they develop individual solutions directly with and on the product. This takes place, for example, by simulating device

sections and plant clones in process, factory and logistics automation. The methods follow the 'design thinking' approach, and were specially developed by the Sensor Intelligence Academy for such special learning requirements. Unique room variants and philosophies support innovative learning with suitable media technology and furnishing concepts.

Daring to network

Meeting areas and modular room concepts lead to undreamt of, but desirable, encounters. Discussions and ideas can develop in a relaxed atmosphere in chance conversations struck up during breaks by participants attending different events. "We deliberately developed the entire space concept to bring people together," explains Marcus Neubronner, Head of Sensor Intelligence Academy Sales, Marketing and Customer Training. "We are not afraid of employees chatting with customers, or even customers with other customers. On the contrary, we are already seeing the positive effects of such open exchanges. New concepts and solutions are thus created ad hoc – and instill trust."

The SIA has dared to become its own Business Unit. Measuring itself on the basis of sales was a major change for the whole team, currently consisting of 23 personnel. Slightly more than 120,000 e-learning courses have been completed, and there have been several thousand events – impressively demonstrating that knowledge is a crucial commodity. •

Learning and having fun: Nico Zimmermann and Marcus Neubronner.

HACKING FOR THE FUTURE; HACKING FOR GOOD!

Getting out of the silent rooms

SICK has been developing and encouraging innovative solutions for more than 75 years. Two things, above all, are required if the company is to continue to meet these aspirations: The systematic and sustainable support of disruptive ideas, as well as the courage to open up such innovation processes. The ideal prerequisites for this are created when tinkerers, inventors and digital natives put their heads together: At hackathons.

Employees from SICK have been attending hackathons for several years – as coaches, participants and organizers. "A small dream of mine came true when SICK organized its own hackathon for the first time last year," explains Alexander Aberle, a Project Manager working on Industry 4.0. "I have attended a lot of these types of events in recent years and I have always been impressed by the very special energy found in the halls they took place in. So many individuals with the most varied of interests come together there and, while working together, their perspectives flow into a particular idea."

Alexander Aberle is already dreaming about the next hackathon.

Hackathons as a source of ideas

Providing a creative environment for tomorrow's innovations was also the purpose of the hackathon that took place at the SICK Solution World event in October 2021. Under the motto 'Hack the future of industrial automation', 48 hours was given up to developing significant digital solutions that would make a lasting improvement to the industrial environment – hacking for good, so to speak.

Even in his day, Dr. Erwin Sick, innovator and pioneer, was already convinced that technical innovations should contribute towards sustainable treatment of the environment. "Technology for the benefit of humanity," was his motto and, even after 75 years, there is nothing to add to this in terms of reasonableness. SICK is still guided by this concept of improving the world with innovative drive.

Hackathons bring this principle to life. They offer an ideal breeding ground for precisely such disruptive and sustainable innovations. Because this is where experienced companies meet young inventors, digital natives and exceptional up-and-coming talent. "It is this interplay of differing influences that holds enormous innovative potential," says Alexander Aberle. "Real innovations are rarely created in silent rooms. On the contrary, they are the result of collective brainstorming, multi-perspectives, and swarm intelligence."

This open approach to innovation also creates valuable partnerships that combine knowledge and resources beyond corporate boundaries. "At our hackathon, for example, we were supported by products and hack coaches from partner companies. Whether Microsoft, Amazon, Universal Robots, Bosch or Trumpf – they all invested together in tomorrow's world of ideas. This is because nobody can master the challenges of the digital transformation single-handedly," Alexander Aberle sums up.

Innovations and ideas that will endure

Sooner or later, however, every hackathon comes to an end. Work should be carried out on further implementation straightaway to ensure that good ideas do not fizzle out during their formative stages. "A hackathon is really just the start – an initialization of far more. So if a company wants to profit from the ideas it must encourage and develop them with all involved. This requires, above all, an appropriate culture of innovation. This is the only way to create innovations and ultimately marketable business models," concludes Alexander Aberle. •

CURIOSITY

05

Getting out of the silent rooms

HACK EXPERIENCE: MANY IDEAS AND A LOT OF DIFFERENT RESULTS

Mouliha Sree Subbian Veluswaami and Sabari Kannan Muthalagu won first prize in the 'Technology Excellence Award' category at the SICK Solution World Hackathon in October 2021. At the time, they were both studying for Masters degrees in Embedded Systems Engineering at the University of Freiburg. When she finishes, Mouliha plans to make a career in Analog/Mixed CMOS circuit design, while Sabari wants to do a Doctorate in sensor development and then gain industrial experience as a hardware engineer in Germany. Team Work.Place.Cool.: Mouliha Sree Subbian Veluswaami and Sabari Kannan Muthalagu tells it like it was:

Why did you take part in SICK's hackathon?

Participating in the hackathon gave us the fantastic opportunity to get to know several hack enablers from a variety of sectors, get into contact with them, and work together to find approaches for solving the most urgent industrial problems of our time. We were also interested in discussing things with other participants. It was exciting to see the innovative ideas that the others came up with, and how different they were – even when they used the same hardware.

Can you briefly describe your project? What exactly have you developed?

In our project, which we call 'Work.Place.Cool', we have developed a solution for the automated and individual adaptation of workplaces. The computer monitor at the workplace automatically adapts to the height of the employee, preventing poor posture. The background is that people spend most of their time at the workplace. But as a result they suffer from all sorts of spinal and musculoskeletal problems that have been shown to be caused by poor sitting and body posture. The main reasons for these problems include the rigid arrangement of the workplace – which may be suitable for one person (someone tall for example), but not for another (e.g. someone short).

Mouliha Sree Subbian Veluswaami and Sabari Kannan Muthalagu present their successful project.

And how can one implement this in technical terms?

First one must identify the individual workplace preferences of employees and convert them to a QR code. Then every person has their own QR code made up of individual furniture and machine settings. On entering the company, employees could then scan this code with a SICK camera, installed in the entrance area for example. The data in the QR code would then be sent from a computer to Amazon's AWS cloud and received by a ctrlX core computer installed at the workplace. The height of the PC monitor would then be appropriately adjusted using a robot arm from Universal Robots. This means that a single workplace can easily be used by a variety of employees, but always individually adapted.

Was this your first hackathon?
Did you like the event?

Yes, this was our first hackathon and we were delighted by it. The event was very well organized. And, above all, we got a lot of support from the hack enablers, who were very helpful during the brainstorming and prototype development phases. •
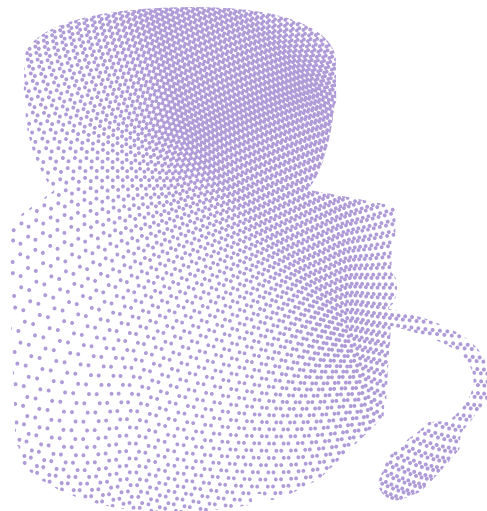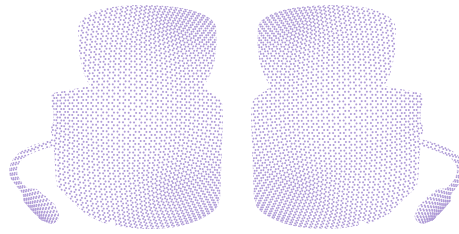
GOOD TO KNOW

The term hackathon [ˈhɛkatən] is a fusion of the words 'hack' and 'marathon'. Whereby 'hack' is derived from the English verb 'to hack', and in this case describes exploratory programming, not the breaching of computer security. Since the end of the 1990s, 'hackathon' has been used to describe a variety of hardware and software development events worldwide – organized by companies or not-for-profit groups and aimed at students or those starting careers. Interdisciplinary teams work on creative and innovative software products to solve one or more previously defined problems. They are supported by so-called hack enablers, who provide the necessary hardware and software components as well as advice. A hackathon lasts between 24 and 48 hours, and will generally end with a pitch during which ideas and initial prototypes are presented.

Exploiting swarm intelligence

DIGITAL SENSOR TWINS

Dare to simulate

While the concept of the 'metaverse' as the virtual parallel world of the future is doing the rounds, it has long been reality in the industrial environment. Digital engineering is the name of the process that creates virtual production plants before they are actually constructed on the shopfloor.

This offers clear advantages: Significantly shorter construction times, state-of-the-art technology, precisely adjusted plants, and rapid commissioning.

In the process sensors take on a special task: "Intelligent sensors get the plants and robots moving. They measure, inspect certain patterns or materials, and process data so that operative steps can be set up efficiently and individually. We have developed the first generation of digital sensor twins to ensure that this versatility can be integrated during the early planning phases of the future plant," explains Samir Belgharda, Technical Industry Manager. Plant designers can already use the digital twin during an early phase of the engineering process to test which sensor is the right one for the future application.
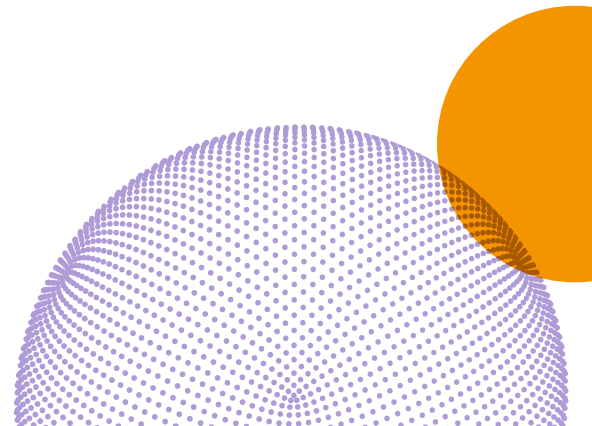
Virtual commissioning offers new possibilities

The first digital sensor twins from SICK form the basis for a growing portfolio of virtual sensors. 2D or 3D models of sensors are currently standard. The aim now is to develop the digital twin as a 4D CAD model in the future, and make it available to plant designers. Samir Belgharda gives an example: "We have already created virtual depictions of our safety laser scanners. Our laser scanners play an important role in plant safety: Their scanning fields detect the surroundings of a plant. They switch off the plant when a person or object comes too near. The protective fields must be precisely parameterized to ensure that they do not switch off the plant too early or too late. In the past, the inputting of these settings could only be undertaken on the standing machine itself – this was time-consuming and not without its dangers. Our virtual sensor models now open up the possibility of carrying out configuration during the phase of virtual commissioning."

The virtual simulation of plant processes prevents time-consuming post-adjustment during plant construction. Simulating errors and taking the control logic into account allows a variety of scenarios to be digitally mirrored and trained for. Another advantage of digital engineering is the contemporary nature of the installed components and software solutions. "By using digital twins of all the plant's components we can drastically shorten the time required for a plant to start operation. Nevertheless, years may pass between starting on the planning and the first productive throughput. So what may have been state-of-the-art when the planning started could already be out-of-date two years later. This, however, is not a major problem in the virtual world: The designer can flexibly adapt the plant to the latest state of the technology."

Bridges to the future

But Samir Belgharda and his team want still more than this: "We want to create a bridge between virtual commissioning and actual commissioning. In future it should be possible to transfer all the configurations and specific settings from the virtual engineering to the plant control system for real use. We would thus take enormous steps towards achieving plug&play solutions for commissioning large plants. This is a milestone for the digital transformation in industrial automation." •

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