The Sensor People

Leuze

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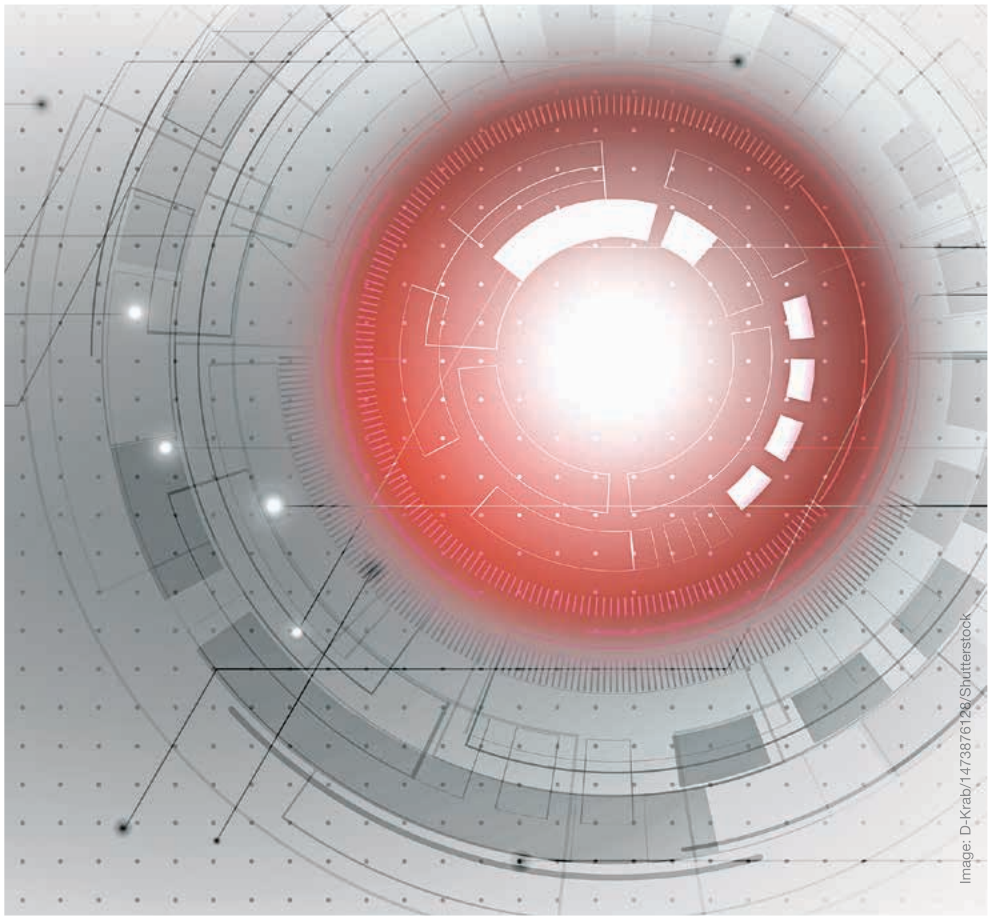

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International

Technology

Aplications

#WeareLeuze

SENSOR

THE LEUZE MAGAZINE

Editorial

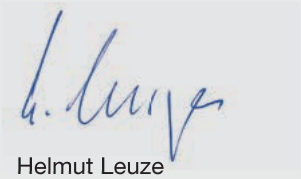
Dear readers,

Success is the result of many people working together towards a common vision – with passion, curiosity and the courage to break new ground. As a medium-sized family business, *innovation* is our top priority in order to be successful in the face of tough international competition! At the “SPS 25”, the leading trade fair for our industry, we were delighted to see that almost half of our exhibits were labelled “NEW”, and the response from our visitors was great!

With this issue of our annual magazine, we would like to give you an insight into our “*Sensor People*” world, so you can find out more about *who* we are, *what* drives us and *how* we strive to put new trends in technology into practice as quickly as possible – always with the aim of providing you, our customers, with the best possible support as you make your way into the future, and making you even more successful.

Happy reading!

Christof Leuze



Helmut Leuze

Contents

“For me, Leuze is an international company with strong roots that, together with the Sensor People, is forward-thinking when it comes to thinking and acting.”

Image: W. Adam, publick.de

Philipp Schüll

Job
Chief Operation Officer of the Leuze Group

With Leuze since:
January 2025

Stations:
Germany, Switzerland, UK, China, Mexico

Private life:
42 years old, married, one son

Hobbies:
running marathons, road biking, travelling

A conversation with our Chief Operating Officer.

A brief insight into the first twelve months

Philipp Schüll has been COO at Leuze for exactly one year now. In an interview with SENSOR, he talks about fast decision-making processes, lean philosophy, international production and logistics – and why marathon running and business surprisingly have a lot in common.

Mr. Schüll, after twelve months as COO, what do you particularly value at Leuze?

I have to say, the Sensor People. Their passion and determination are real unique features for me. We tackle issues together, take responsibility and look for solutions – across business divisions. And decision-making processes are fast, so we can act flexibly and quickly, which is essential in today's world. We are also very open to further developing our operations network and aligning it even better with our customers' needs. Our international positioning with production sites in Germany, the USA, Malaysia and China is a major advantage and gives us proximity to our customers. It's always the people who make a difference and stick in your memory – and I think we are very well positioned in this respect.

What is your philosophy when it comes to Operations?

We want to fulfill the expectations and wishes of our customers in terms of quality, costs, delivery time and delivery reliability. And, of course, we want to do so as efficiently as possible. Understanding our customers' needs better and better is decisive for me. At the same time, however, we also want to bring a high level of transparency to our services. This enables us to continuously improve processes, infrastructure and organization. I have been convinced of the lean management philosophy for over 15 years now, continuously and consistently improving our processes and constantly developing our team – day in day out. I always say: lean management is not a project that gets completed at some point – it is first and foremost an attitude and culture.

What challenges are you currently facing in production and how are you responding to them?

Let me start with the tariffs from the USA: we work across locations as a task force, taking a high level of responsibility and making quick decisions. This is where good cross-division cooperation and a hands-on approach really come into play. Decisions are made and implemented very quickly. Thanks to our international positioning, we are also relatively flexible in the face of volatile customs decisions. Having our own PCBA production in Germany gives us additional independence. A second issue is consolidation on the supplier market: the last three years have also been economically challenging for our suppliers. We can also feel this when it comes to reliability. We counter this by setting great store by ensuring a high level of transparency and close daily coordination between our plants and purchasing organization, as well as systematically strengthening our global supply chain management. Another important issue is the demand for short delivery times and resulting reduced capability to plan. Our international distribution network helps us to stay delivery-ready in our regions. Support on the system side to increase transparency, analytics and forecasting are also areas where we see a competitive advantage –

also for market proximity and understanding expectations. And of course our lean philosophy, focusing on the customer and continuously striving for improvement.

Thank you for your insights into the issues you deal with on a daily basis. Finally, let's talk a little about you as a person: for a COO, you've had a rather unusual career path ...

On the one hand, it may certainly seem that way. I originally come from a working-class household. I studied in Reutlingen and Karlsruhe in Germany and in Monterrey, Mexico. After my studies, I lived not only in Germany, but also in Switzerland, Great Britain and China. I also have a great interest – both professionally and privately – in topics such as organizational development, potential development and coaching, for example. On the other hand, it is also relatively classic. I spent most of my studies and professional life in operations and logistics. I think that my background and many years of experience in football help when it comes to my work in operations – where language can be more direct and clear.

And you've also worked abroad, right?

Yes I have. Every single station has shaped me – both professionally and personally. Different cultures fundamentally broaden your horizon, your approach and – hopefully – also allow you to develop personally.

Is there a country where you feel most at home – outside of the Swabia region in Germany, of course?

I know South Korea quite well – my wife is Korean. We like to travel, especially to warm places, often to countries with a collectivist culture such as Italy, Spain, Croatia – and South Korea. Where togetherness is important and life takes place on the street, so to speak :-)

You run marathons – what fascinates you about them?

In a marathon, as in your career, you need goals, ambition and, above all, endurance and stamina. A big goal is achieved in many small steps, and you have to be able to put up with setbacks, learn from them, adapt and still remain focused. There are plenty of "excuses" along the way – but as is the case in business life too: "Consistency is key" to making progress.

Thank you for chatting with me, Mr. Schüll. ■

Hamburg marathon in bad weather conditions

Enjoying the sea, sun and dolce vita in Liguria, Italy

We would like to congratulate our sales companies on their anniversaries.

35 years of Leuze in the UK
10 years of Leuze in Singapore
5 years of Leuze in Poland

Tried and tested: **Leuze sensors on the Vienna Giant Ferris Wheel.**

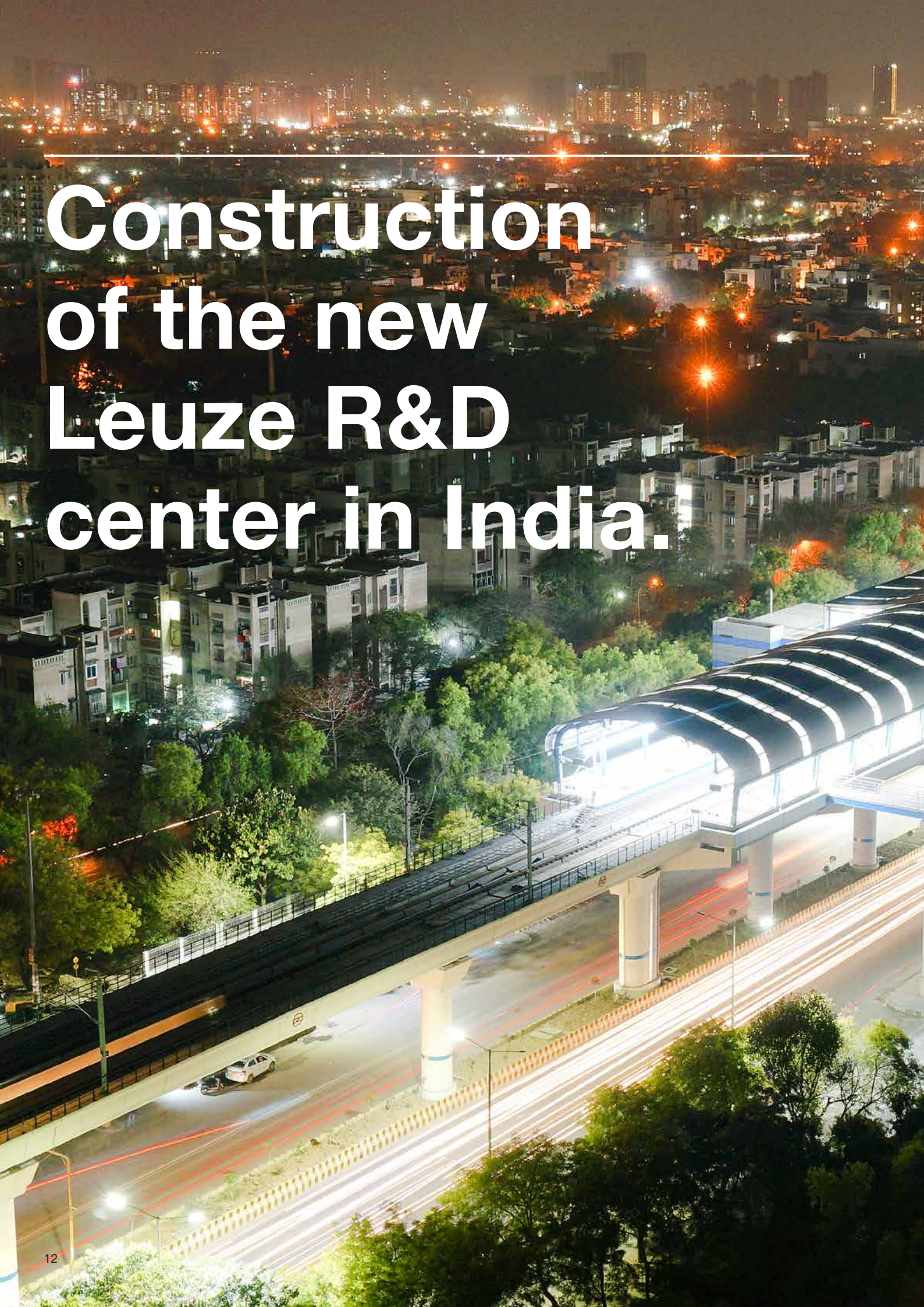
Technology meets nostalgia in the legendary Vienna Giant Ferris Wheel – over 125 years of going round and round.

Leuze sensors keep things running smoothly in the background to ensure that the wheel works safely and reliably, today and into the future. They check that the cars are present and are precise, robust and completely reliable, no matter whether it's raining, snowing or dark. A good example of how our technology can be seamlessly integrated into existing systems and ensure maximum safety, running in the background during operation. The oldest Ferris wheel in the world has stories to tell and Leuze ensures that it can keep doing so.

New: **a Leuze sales company in the metropolis on the Danube.**

Leuze Austria Headquarters
Am Europaplatz 2, 1120 Vienna, Austria

This is not a new project, but we are particularly pleased that our sensor technology is working well on the Vienna Giant Ferris Wheel – a landmark with views far and wide that fits perfectly with Leuze. What is new is that 2025 saw Leuze open its own sales company in Vienna. Vienna is more than just a location for us: the metropolis on the Danube is our strategic gateway to the markets of Eastern Europe – a hub we can use to support our partners in the region even more closely and tap into new opportunities together. In Austria, we continue to rely on our tried-and-tested collaboration with our partner Schmachtl and are driving the market forwards together. This is strengthening our presence in Austria and enabling us to provide our customers with even more direct and personal support on site. ■

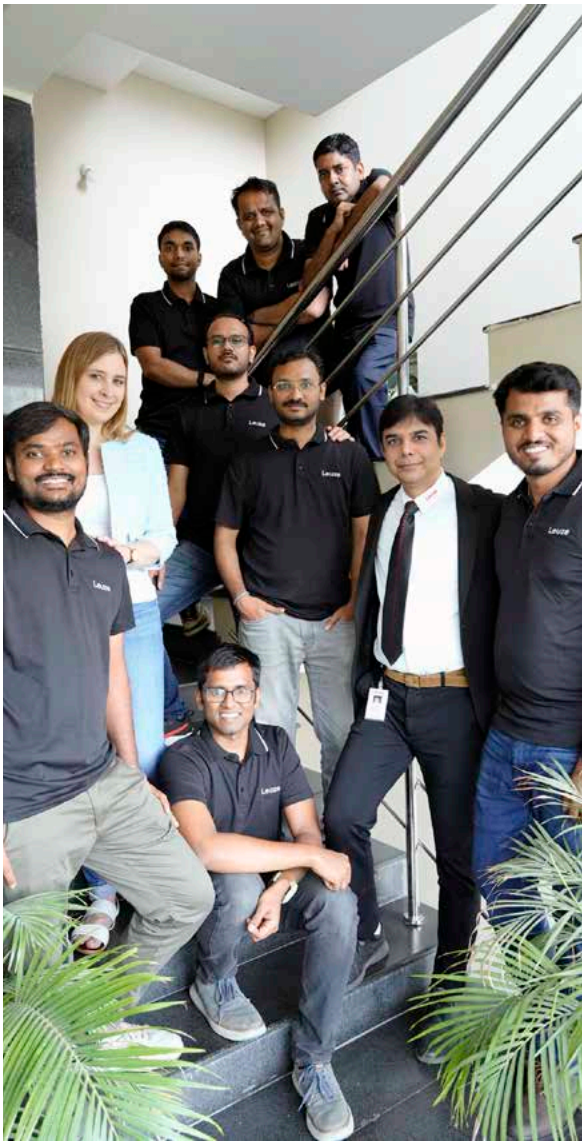


Construction of the new Leuze R&D center in India.

Image: Amlan Mathur/1134828912/gettyimages

Location: Bengaluru

If there's one city that never stands still, it's Bengaluru. And that's where our new Leuze R&D center is being built, where high-tech, tradition and pioneering spirit unite. The city's significance is highlighted through its continuous urbanization with large office complexes, new residential areas and a growing metro network, and it has long since become South India's most important location for technology and innovation. In the midst of the emerging market, the new R&D center in Bengaluru is participating in the rapid developments. The aim is to be close to the needs of the Asian market on the one hand, and to expand the current product portfolio on a global scale with additional products, on the other.



The Indian R&D team together with General Manager Manish K Sahay in the stairwell of the office building

Infrastructure

The R&D center is located in a modern office building, which our sales colleagues moved into in 2024. A warm, open working environment is the order of the day here. Issues such as kitting out the laboratory, finding suitable suppliers and ensuring an efficient IT infrastructure for global collaboration dominated initially. As each step is taken, the focus is increasingly shifting to developing new products.

Many hands are still needed to get the camera system up and running.

Talent and future technology

Dedicated HR manager Ramya C is heading up the search for suitable applicants from different regions of India, and a variety of experts from the company's headquarters provide support during the selection process. Long-standing, experienced General Manager Manish K Sahay is on hand with help and advice for the set-up, establishing contact with local and very renowned universities. Campus visits with technical director Dr. Henning Grönzin also help to attract qualified graduates who could see Leuze as a good employer for them. It also becomes clear where high-level research is being carried out here.

Ramya C shows new applications being received.

Dr. Daniel Michaelis discusses the market requirements for inductive sensors with the R&D team.

Team building and projects

A complete development team with specialists in electronics, mechanics, software and project management is gradually being formed. The team will add new products to the company's global product portfolio. In close coordination with Product Manager Dr. Daniel Michaelis, ideas for the development of inductive sensors are being devised and the details in terms of market requirements discussed. Under the guidance of Wolfgang Kokoska, Project Manager at Leuze headquarters, a shared technical understanding of a camera system's structure will be developed as part of an on-site visit. Contact between locations should intensify over time, leading to an effective, profitable collaboration.

Company culture

With Moritz Mullis from Electronics Development, the team will get to know how the headquarters work and experience hands-on how to advance product development in a targeted manner. In return, he can enjoy a potluck lunch and experience the diversity of Indian cuisine. Such visits and joint initiatives promote team spirit and intercultural exchange.

Organization and processes

In addition to technical projects, there is also a focus on matters of organization. Processes, roles and rules are being defined so as to establish a long-term, sustainable structure for the site. A new foundation stone has been laid for expanding the global R&D structure. ■

Barbara Grupp
Management Consultant

Leuze reflects on a successful SPS trade fair appearance.

The SPS 2025 in Nuremberg was a complete success for Leuze: after a well-attended trade fair and lively discussions at the stand, the Sensor People can look back on a successful SPS. Trade visitors were particularly interested in the RSL 200, the smallest safety laser scanner on the market. It safeguards machines, automated guided vehicles and robots. Thanks to its minimal dimensions, it can be easily integrated even where space is at a premium – setting new standards in industrial automation.

SPS – Smart Production Solutions 2025

1st place for the RSL 200

The readers of GIT SICHERHEIT magazine were impressed as well: the RSL 200 won the prestigious GIT SICHERHEIT Award 2026. It was voted first place in the Machine and Plant Safety category by experts and users. Further information on the RSL 200's first place can be found at https://git-sicherheit.de/en/.

Automation solutions for every requirement

The SPS 2025 impressively demonstrated that Leuze offers the right solution for every machine and system, regardless of the industry. From intralogistics to manufacturing, from the packaging industry to robotics – the customized sensor and safety products can be flexibly and efficiently integrated into a wide range of industries and applications. At the newly designed exhibition stand, trade visitors were able to take a closer look at more than 20 innovative solutions from the world of precise sensor technology and reliable safety technology. In addition to the RSL 200, the ROD series' laser scanners for efficient contour detection also attracted a great deal of interest.

Expert meeting point

The new expert talks on current industry topics held every day at the Leuze trade show booth were also well received. The topics, such as the Machinery Directive, safety solutions and security in automation, provided ample opportunity for discussion and interaction. Summary: the feedback from visitors was consistently positive. The solutions' ease of integration, their contribution to high system availability, and the products' ease of maintenance were particularly appreciated. These aspects convinced users and decision-makers alike. ■

Technology meets team spirit.

Leuze Assembly technology day gets participants inspired

This year's competence forum held at Leuze Assembly in Unterstadion was all about the future, networking and technological expertise with a practical orientation. From cyber security, presented by our R&D colleagues from company headquarters, to "Design to X" and modern procurement strategies, through to traceability and assembly protection: the diverse presentations given by 17 speakers impressively demonstrated how Leuze Assembly is driving innovation forwards together with its partners NCAB and U&R. A particular focus: the role played by Leuze Assembly as a leader in technology in the PCBA sector and the importance of a strong network based on partnership.

In addition to the specialist presentations covering twelve topic areas, guided tours of the production facilities and round tables provided the opportunity to delve deep into technological topics and discuss individual issues. With authentic presentations, inspiring discussions and an all-round well-organized supporting program held in the Bürgersaal in Unterstadion, the forum was a real success and sent a clear message signalling cooperation and future orientation in electronics production. ■


29.399


Reliable PCBs

The smallest safety laser scanner on the market: the RSL 200

Minimum size, maximum safety.

GIT SICHERHEIT AWARD 2026 WINNER

In industrial automation, efficiency and safety must go hand in hand: people, machines and processes must be reliably protected without impairing production processes. However, space is limited in narrow production lines, on automated guided vehicles and robots. This is where the new ultra-compact RSL 200 safety laser scanner from Leuze scores points: as the smallest safety laser scanner on the market, it can be integrated effortlessly and used flexibly to safeguard danger zones and access points.

Safety laser scanners are increasingly in the limelight in almost every industry. This is because the versatile devices are indispensable in many cases to ensure the highest safety standards for the protection of people. Thanks to configurable protective and warning fields, they can be used very flexibly for danger zone and access guarding – for both stationary and mobile applications. A typical area of application is protecting a machine's dangerous working ranges against access and the presence of persons. Laser safety scanners are also ideal for safeguarding autonomous mobile robots (AMRs) and driverless transport systems, also known as automated guided vehicles (AGVs).

Maximum safety in the smallest space: the future of laser scanners

Modern safety laser scanners have to meet a wide range of requirements at once: besides their main task of safely shutting down machines or systems, they must not impair machine availability or lead to unnecessary downtimes. In addition, laser scanners are expected to have an impressive operating range and scanning angle, while the system operator takes safety classifications in accordance with Type 3, SIL 2 and PLd as given. The system operator must also be able to rely on convenient configuration and diagnostics, which can be carried out effortlessly and intuitively via various interfaces such as Bluetooth, USB or Ethernet TCP/IP. Last but not least, modern safety laser scanners are selected based on their device size. That's because increasing automation is making spatial efficiency ever more important in many production environments. Systems are becoming more complex, while the space available for safety technology is shrinking. There is often little room for this, especially in mobile use on AGVs.

Innovative solutions are needed to meet these challenges. The Sensor People from Leuze are setting new form factor standards with their advanced safety laser technology that keeps the user as the number one priority. The ultra-compact RSL 200 safety laser scanner is currently the smallest device on the market. It c ombines state-of-the-art LiDar technology in a minimal space of just 80 x 80 x 86 millimeters. This makes it easy to integrate even in extremely confined spaces, whether in stationary or mobile applications.

The innovative mounting bracket specially developed for the RSL 200 makes it very easy to align the safety laser scanner horizontally and vertically. If servicing is required, the laser scanner can be replaced quickly and easily with just four screws.

A small but extremely helpful detail: the safety laser scanner's rotatable connection allows flexible cable routing and therefore space-saving mounting of the RSL 200.

Practical to replace: the configuration is quickly and easily transferred to the new device using the removable configuration memory.

Communication options via USB and Bluetooth, as well as via TCP/IP with the RSL 230/235, enable flexible configuration and diagnostics.

Simple, flexible installation.

Simple installation today

The compact safety scanner from Leuze gives the user more options for simple and more flexible installation, especially in confined environments, thanks to its space-saving mounting bracket or connection technology. The right mounting accessories are key to quick integration: that's why Leuze has developed its own innovative mounting bracket for the RSL 200 to provide effortless fastening and allow the safety laser scanner's scan level to be aligned horizontally and vertically. Simple servicing is also ensured: The RSL 200 can be replaced quickly and easily with just four screws, and the sensor parameters can be transferred from the old to the new sensor via a memory card without any sensor knowledge required.

Connections and cables must not cause any obstacles either. Rotatable M12 connections on the RSL 200 laser scanner allow extremely flexible cable routing for I/Os, power supply and data transmission. These are essential criteria, particularly for use on small AGVs. The Sensor People also offer a new mobile diagnostics app that allows status information to be conveniently retrieved even if the laser scanner is installed in locations that are difficult or impossible to access.

Aligned to your every requirement

For a safety laser scanner to work optimally, its 'inner' values are also important. For example, the scanning angle must be large enough to reliably fulfill the application-specific safety task, e.g. to completely cover blind spots or hard-to-see zones behind machines or conveyor belts.
It must also be able to safeguard small omnidirectional AGVs/AMRs in every direction – for example, the RSL 200 from Leuze offers a 275-degree scanning angle at an operating range of three meters. The large scanning angle allows the user to ensure all-round protection with just two diagonally positioned devices, even taking mounting tolerances into account.
32 switchable sets of protective and warning fields enable the AGV/AMR user to continuously adjust the speed and direction of travel. The monitored areas can thus be optimally adapted to curved paths, different speeds and various load conditions.

Successful market launch and look ahead

The RSL 200 has been successfully launched on the market and has already gained its first impressive references – proof of the product's value and Leuze's confidence in its own technology. With the safety laser scanner, the company is setting another strategic milestone in its portfolio and is actively enhancing operating range, resolution, user-friendliness, and robustness to better support a wide variety of applications, especially in navigation. Future enhancements, such as an expanded safe operating range at low temperatures, are expected to further strengthen the RSL 200's competitive edge.

Dr Albrecht von Pfeil
Director Business Area Safety

Compact technology makes a big impression.

Benjamin Schmid:
Chief Innovation Officer

Safety laser scanners have established themselves as efficient solutions for the protection of people and machines in automated systems and production environments. Benjamin Schmid, Chief Innovation Officer at Leuze, explains the advantages of this technology and why ultra-compact models are on the rise.

Mr Schmid, why do safety laser scanners play such an important role in many industrial applications?

Benjamin Schmid: Safety laser scanners are a key tool for reliably protecting people and machines in Industry 4.0. They provide enormous flexibility with their freely configurable safety zones that can be adjusted dynamically. One example is the safeguarding of automated guided vehicles in logistics: Here, the scanners not only have to detect obstacles, but also adjust the safety zones to the vehicle's direction of movement at all times. They are also suitable for monitoring access to production plants, such as robotic welding cells. The scanner detects when someone enters the danger zone and can stop the machine immediately. This technology is also indispensable for collaborative robots, where laser scanners can flexibly monitor the working environment. They can then reduce the robot's speed or stop it altogether when a person approaches. All this makes the devices indispensable in industrial automation in my view.

Compact devices have become increasingly important in recent years. Why is a safety laser scanner's size and integration options increasingly crucial for system operators?

To put it a little more pointedly: in industry today, practically every millimeter counts. Production and logistics environments are becoming ever more densely packed, which often leaves less space for safety solutions. That means a safety laser scanner with small dimensions is much easier to integrate. There is also the issue of weight. Every extra gram counts, whether on machine fronts or robots, narrow conveyor lines or AGVs, where space is limited anyway. Another important aspect: sophisticated installation methods are another key aspect, as they can reduce installation costs by using simpler mounting brackets with no or only small housing constructions required for the safety components. Sometimes system operators will not even need to modify their existing system if the new scanner is significantly more compact than the old one. All of this reduces complexity, effort and therefore costs.

But can these ultra-compact scanners keep up with larger models in terms of performance?

Absolutely. Thanks to modern technologies, compact models are in no way inferior to their larger counterparts. Performance does not depend on size, but on the underlying technology. Even very small laser scanners offer the same precision and functionality – and in some cases even more. Ultra-compact devices such as our RSL 200 are ideal for use on AGVs and AMRs. It is currently the smallest safety laser scanner on the market, but thanks to its three-meter operating range and 275-degree scanning angle, it is also ideal for area guarding on machines and systems. All that with a smaller footprint. Of course, longer operating ranges are sometimes required depending on the system. In this case, it is worth getting a safety laser scanner like the RSL 400, the big brother with an operating range of up to 8.25 meters. This works with up to two independent protective functions and can therefore replace two scanners – which in turn makes up for the larger dimensions.

What else should system operators look out for in safety laser scanners?

It is important to analyze the specific system's requirements. Does the scanner need to be stationary or mobile? What operating range and resolution are required? Besides size and performance, factors such as interfaces and flexibility also play a role in configuration and diagnostics. For the RSL 200, for example, we offer the RSL 200 app to access status information and diagnostic data. All important information can be captured remotely via Bluetooth. This can be very practical if the laser scanner is installed in system areas that are difficult to see, or if access to the device is restricted. The protective field does not need to be entered to read out the information, so the machine can continue working without interruption. Don't forget: The new ISO 13855 has been in force since January 2025 and the basis for calculating the safety distance has changed. Every system operator therefore needs to have their systems and the positioning of protective devices checked in this regard. Leuze will be happy to assist with any questions. ■

The Leuze family of safety laser scanners RSL 200 and RSL 400

Trained for precision – no problem!

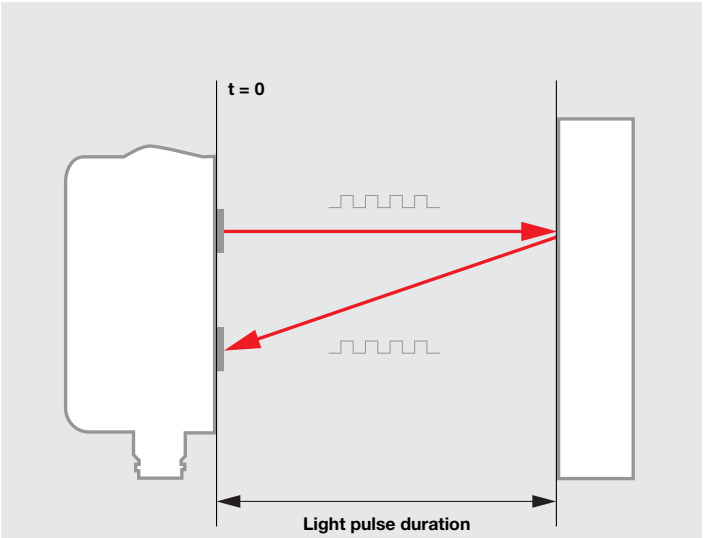
Leuze uses artificial intelligence (AI) to significantly improve the measurement accuracy of optical distance sensors for challenging industrial applications. This innovation reduces measurement uncertainty by half without the need for additional computing resources during operation. The solution is based on a neural network.

Janina Sanzi
Software engineer,
specializing in AI

Image: RollingCat/1453311080/iStock

Object surfaces as challenges

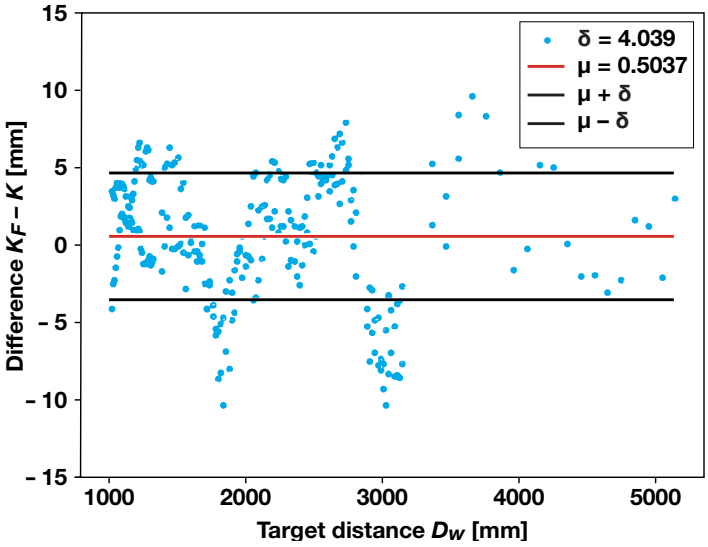
Optical distance sensors with time-of-flight technology (TOF) offer system operators practical benefits. The sensors enable fast, contactless measurement of large distances. They are also insensitive to ambient light and provide continuous distance data in real time. The sensors' operating principle: measure distances by recording the time it takes for emitted light to travel to the object and back. Laser or LED pulses are generally used for this purpose. However, time-of-flight technology also has limitations in measurement accuracy: how precise the results are depends heavily on the nature of the object surface. Dark surfaces can weaken the reflected signal. They generate narrower pulses and the echo is detected later. Bright surfaces, on the other hand, generate stronger signals with a wider pulse width that are detected earlier. This means the returning signal is detected at different times depending on whether the object's surface is light or dark. This can cause measurement errors that must be compensated for.



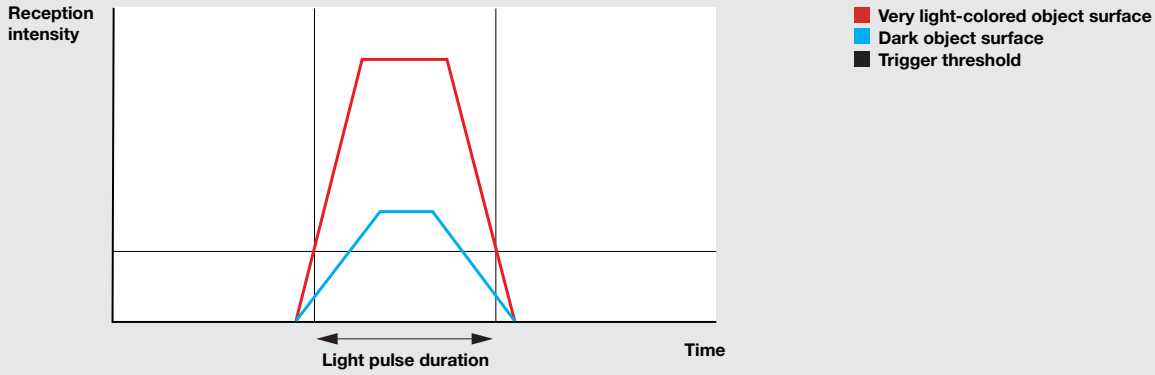
An optical distance sensor determines the distance between the sensor and the object in a detection range.

Polynomial function: limited flexibility

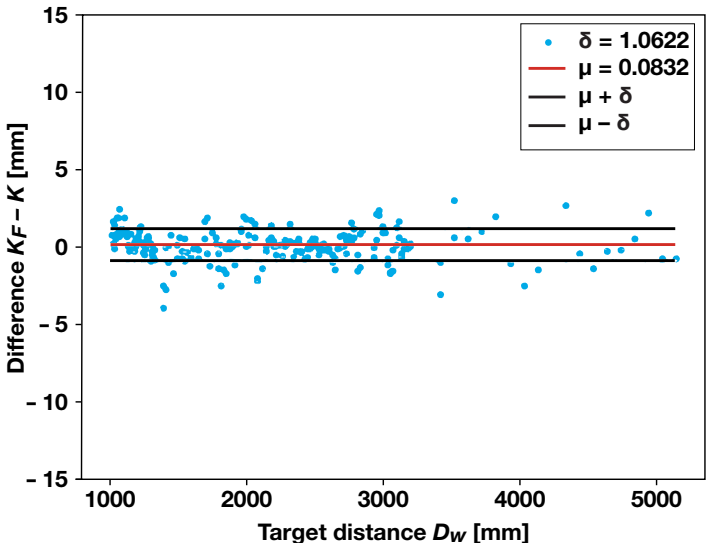
Until now, mathematical models based on defined algorithms have been used to correct these errors. A correction value is calculated for many different surfaces and distances, which is later applied automatically. This calculation is based on a so-called polynomial function. Polynomial functions offer an efficient solution for stable, continuous error curves. One disadvantage, however, is the limited imaging accuracy in the case of complex factors, such as strongly varying surface reflections. As the model parameters are fixed, the functions cannot automatically adapt to changing environmental conditions.



Comparison: correction values for the polynomial (left) and the neural network (right)



The distance values determined by the light pulse vary depending on the object surface's reflectivity, because the received signals can differ in amplitude and shape. The image shows a received impulse for a very bright object surface and a dark object surface.



The correction values can be determined much more precisely with the neural network. The standard deviation is reduced by a factor of more than 2.

Neural network for correction value calculations

Sensors from Leuze use a much more precise and flexible solution. Instead of working with rigid formulas, Leuze uses a neural network to determine the correction value. A neural network is a form of artificial intelligence that is modeled on the human brain. It consists of nodes (neurons) in three types of layers: the input layer, hidden layers and the output layer. The neural network processes information by passing input data step through these one layer at a time. The neurons weigh their results, summarize them and convert them using functions so that a precise result is produced at the end. A so-called activation function decides how strongly a neuron becomes 'active', i.e. what value it passes on to the next layer. This activation function enables the network to learn even complex, non-linear relationships and is not limited to simple calculation patterns.

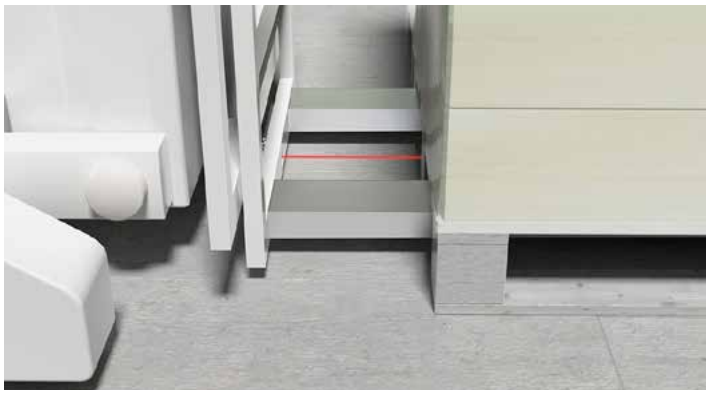
Learning from real data

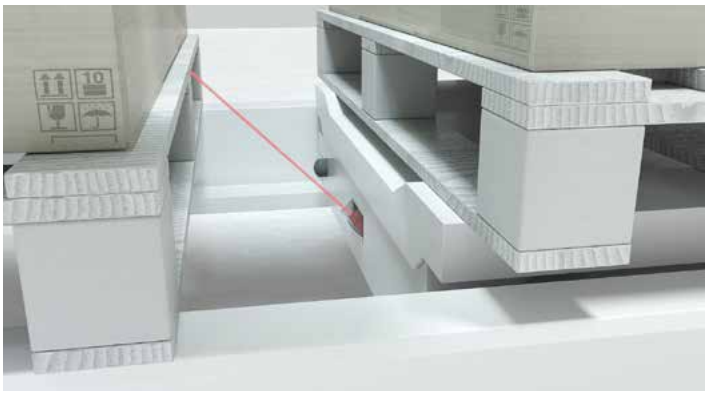
The AI solution developed by Leuze uses sample data to learn how brightness and surface texture affect the optical distance sensor's measurements. This makes it much easier to correct the measured values. The neural network is trained with data consisting of raw distance values and pulse widths as input parameters as well as the corresponding standardized correction values at the output. The training data can be generated from the production process, in which many measured values are collected: for light, dark and differently textured surfaces as well as for different distances. These measured values are communicated to the production facility's control system. From this, the production facility's neural network calculates the correction values for the sensor. The sensor then requires no additional computing power during operation – the AI has already 'learned' everything.

Five steps for precise values

The Leuze neural network consists of five layers. In each layer, all neurons are fully connected to each other. This means that all information flows into the calculation. What is known as a ReLU activation function is used: ReLU stands for 'Rectified Linear Unit'. This ensures that the network sets negative counters to zero and only processes positive values – similar to a filter that only lets positive signals through, making the learning process stable and reliable. This has two advantages: firstly, the network works faster, and secondly, it avoids the computing problems that can occur with other methods. The last layer of the network – the output layer – determines the final correction value. Here, 'tanh' (hyperbolic tangent) is used as the activation function. This ensures that the calculated correction value is always within a defined range between -1 and +1. The system then converts this value so that it directly indicates how much the sensor must correct the measured distance in order to deliver precise results.

With its AI-based calibration, the method reduces systematic measurement errors by more than half.





Artificial intelligence can raise the precision of optical distance sensors to a new level, for example, when used in intralogistics.

Calibrated to Leuze sensors

Time-of-flight distance sensors with AI-based correction are particularly useful in industrial automation where precise measurement results are essential.

Typical applications include:

— **Navigating and avoiding collisions:** on robots and mobile platforms

— **Materials handling:** controlling positions and spacing on conveyor belts

— **Quality assurance:** checking spacing on workpieces with difficult surfaces

— **Automated guided vehicles (AGVs):** precise distance control when parking and pulling out

— **Safety applications:** detecting proximity to machines and systems

Benefits at a glance

— **Fewer measurement errors** – Provides significantly more precise results
— **Flexible in use** for various sensor types and surfaces
— **Learns better from real data,** even with strongly oscillating 3D curves
— **No additional computing load** during operation
— **Future-proof** thanks to modern AI

Summary

Leuze is raising the precision of optical distance sensors to a new level with artificial intelligence. Tests have shown that the method's AI-based calibration reduces systematic measurement errors, i.e. the dependence of measurement results on surface and distance, by more than half. Customers benefit from more robust and accurate measurements without any effort during operation, even with difficult surfaces. This makes it the ideal solution for challenging industrial applications. ■

Supercaps:
Energy meets efficiency.

In industry, especially in warehouse logistics, a stable power supply is essential, as demonstrated by its importance in mobile applications like hand-held scanners. Supercapacitors (supercaps) provide energy storage solutions that intelligently complement conventional battery concepts. Leuze makes targeted use of the technology in its innovative sensor solutions.

It all depends on the application: individual scans or continuous operation

Hand-held scanners are used in different scenarios, which each place different requirements on the devices' power supply. **For individual scans,** which are often required in storage areas or during inventory taking, the hand-held scanner only requires high peak performance for a short time. The devices are often parked in charging stations and need to be fully operational again after a few seconds. Here it is particularly important that the energy storage system charges quickly so that it is immediately available when needed. A hand-held scanner that is to be operated over a long period of time has different requirements. **In shift operation** in warehouses or production environments, where the device works continuously for several hours, operating time is the decisive factor. The hand-held scanner must last the entire working day on a single charge without needing to be recharged regularly. In these scenarios, the energy storage system's energy density plays a greater role because a constant power supply is required over longer periods of time.

The energy storage technology is crucial in both cases: It not only impacts the device's performance, but also its operating time and energy efficiency. Depending on the application, a supercap or a battery in the form of a rechargeable battery may offer the best possible solution.

Supercap vs. battery – advantages and disadvantages

Supercap is short for supercapacitor, sometimes also referred to as an ultracapacitor. A supercap is an electrical energy storage device that stands out for its particularly fast charging and discharging capacity. It stores energy mainly electrostatically, i.e. by separating electrical charges at the interface between the electrode and the electrolyte. In contrast, batteries store energy electrochemically, i.e. via chemical reactions in the cell chemistry.

The main advantage of a supercap is that it can be fully charged within seconds to provide very high power at short notice. This makes the technology ideal for applications with short-term energy requirements or for bridging power outages. Although a supercap's energy density is lower than that of batteries, it can be charged more than a million times. A conventional battery only lasts up to around 2,000 charging cycles. Plus, its service life of up to 15 years is many times longer than that of a lithium-ion battery.

Supercaps thus offer a reliable, low-maintenance and environmentally friendly solution for a wide range of industrial requirements, especially where speed and availability are required.

	Supercap	Lithium-ion battery
Charging time	Seconds	Minutes to hours
Number of cycles	approx. 1,000,000 cycles	approx. 500 – 2,000 cycles
Power density	Very high	Medium
Energy density	Low	High
Charging temperature	Approx. –55°C to +90°C	Approx. –0°C to +45°C
Lifespan	Up to 15 years	3 to 7 years
Maintenance costs	Low	Medium to high

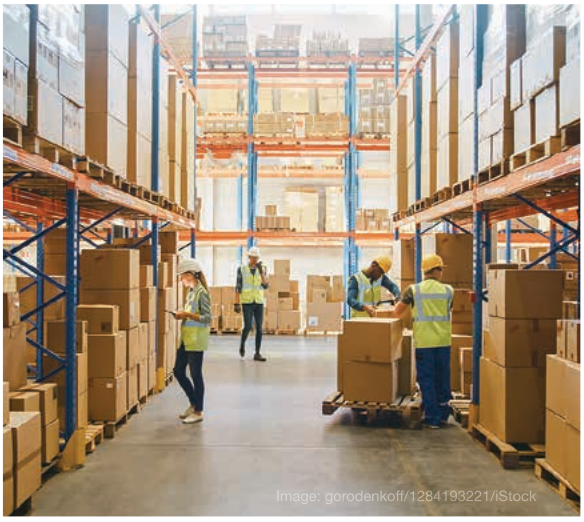


Image: gorodenkoff/1284193221/iStock

Lightweight solution, charged in a flash

Multi-purpose hand-held scanners for bar code detection are designed for short but performance-intensive applications. Supercap technology provides the scanners with sufficient energy for several seconds to a few minutes. The devices are recharged very quickly. Hand-held scanners with supercap technology are therefore particularly suitable for applications requiring regular individual scans. Leuze makes the most of the technology with its IT 1960 series' wireless supercap devices. Because no battery is required, the devices are very light: for example, a supercap hand-held scanner from the IT 1960 series weighs just 220 grams. This is a notice-able ergonomic advantage and makes handling easier in daily use. If, on the other hand, many scans are required in a short time, devices with a battery or cable are recommended. Leuze also has suitable models for this in its portfolio with the IT 1960 series.

Significantly more robust than batteries

Supercaps not only score points for their fast charging capability: they are also particularly resistant to environmental influences. Typical supercaps work reliably even at double-digit sub-zero temperatures without any noticeable drop in performance. Lithium-ion batteries, on the other hand, are much more sensitive to cold. What's more, as electrical capacitors, supercaps are not affected by the new EU Battery Regulation (2023/1542). This sets out clear requirements for the marketing, use and recycling of batteries in the EU. While batteries often have to be serviced or replaced and then disposed of properly, supercaps can usually remain in the device permanently. This is the case even with operating times of up to 15 years.

There is another reason why supercaps are attractive for companies with sustainability-oriented procurement strategies: they do not contain any critical raw materials such as lithium or cobalt.

Summary:

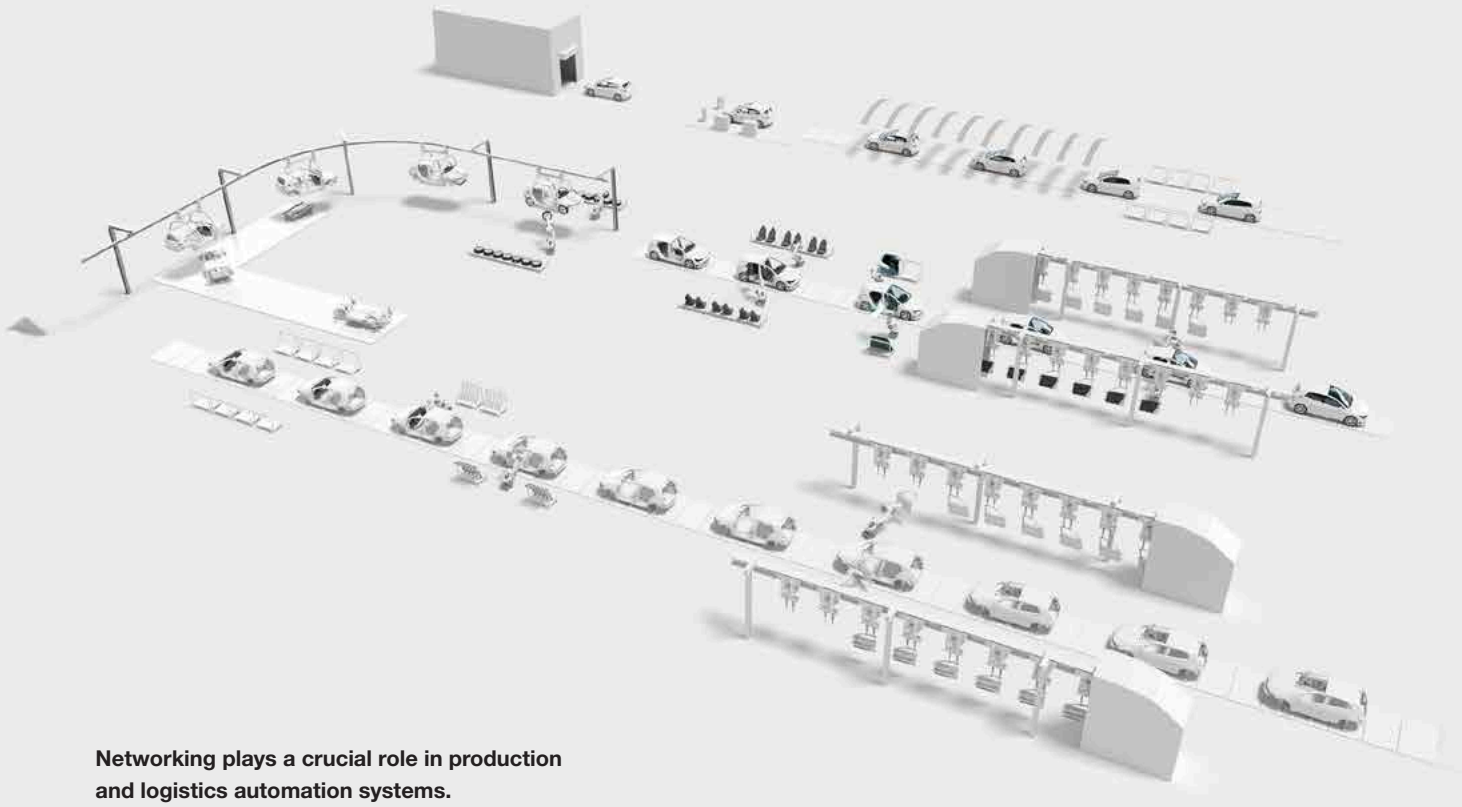
in general, supercap technology is not a replacement for batteries. However, it is a more efficient alternative for certain applications: Leuze therefore makes targeted use of this technology for solutions such as multi-purpose hand-held scanners. Extremely fast charging in just a few seconds, a significantly higher number of charging cycles, and low weight make handling easier. Last but not least, system operators benefit from cost savings compared to battery-powered devices. ■

Dieter Eßlinger
Content Manager

Leuze identCHAIN

Intelligent identification at edge level.

Maximum transparency of object and process data through intelligent, secure identification at edge level



**Networking plays a crucial role in production and logistics automation systems.
This can be designed efficiently, transparently and securely with the identCHAIN concept from Leuze.**

Oliver Pütz-Gerbig
Senior Market & Technology
Expert AutoID-Systems

Leuze identCHAIN controls a network of identification systems and sensors for track-and-trace requirements in production and the supply chain. Secure communication between 1D scanners or 2D camera systems takes place at edge level using OPC UA and full integration of the AutoID Companion Specification. The advantage: each object to be identified is not only represented by its code, but also mapped on a virtual tag in the edge system. Further process, status and sensor information can then be assigned to the virtual tag. This data is available in real time across all processes. Data exchange is even synchronized across network boundaries. This means that all information for continuous process tracking is instantly available at field level.

Networking plays a crucial role in today's automation systems in production and logistics. The goal here is to be able to call up the production processes' exact status at any time and to keep a complete overview of the production-relevant data at field level. This involves key questions such as: how can users efficiently achieve maximum transparency in their production processes? And how secure is the communication between the network participants?

Multiple requirements for efficient identification

Modern automation systems in production or intralogistics have a number of control systems, sensors and actuators. These are networked with each other via Ethernet-based communication or fieldbus systems and can exchange data. Sensors generate event-based signals to activate production processes or provide measurement values to monitor correct production processes and quality requirements. AutoID systems such as 2D camera systems and RFID readers identify objects, load carriers and containers in production and in the material flow.

Modern identification systems typically need to be able to handle variable amounts of data and different code systems, depending on the object to be identified. With classic 1D/2D codes, however, these possibilities are limited because standardized bar codes such as a Global Trade Item Number (GTIN) only provide a defined, unchangeable and rather small amount of data. Furthermore, a bar code always requires access to a higher-level IT system such as MES or ERP, where the complete data record that the bar code represents is stored. RFID benefits from the flexibility of the data carriers ('tags') used, in addition to the physical principle's other advantages. These usually have a freely programmable electronic memory – this means that product and process data required for specific situations can be stored directly on the object. For economic or technical reasons, however, it is not always practical or possible to use RFID. Frequent changes of media from bar code to RFID are also undesirable in continuous production processes because they result in increased effort in automation processes and data handling.

identCHAIN: using data more intelligently

This is where the identCHAIN concept from Leuze comes in. It uses standardized RFID mechanisms to process and store identification data while retaining the classic optical bar code technology. This is achieved by linking RFID data structures and command sets with standard bar code scanners and camera-based scanners using OPC UA as the data exchange standard and a fully integrated AutoID Companion specification. Each physical bar code is assigned a virtual RFID tag, which is stored in a database on an edge server. Data is exchanged at field level exclusively between the bar code devices and the edge server. The system's control system, for example a PLC, has no access to the edge server – the PLC can only access the bar code identification systems, although these behave like RFID systems.

This opens up unprecedented possibilities for enriching data when identifying objects in the production process: in addition to the unique object ID, status information about the identification system as well as reading quality and other process and status data can be stored in a data record. This data record can be accessed directly in real time at field level. Queries to MES and ERP systems are no longer necessary, which relieves data traffic in the networks and frees up system resources at the IT level. Multiple local sensor and AutoID networks can be synchronized via distributed edge servers. This means that all identification events are available throughout the network at all times. Linking these local events with the associated information stored in the edge database over the entire production lifecycle thus provides the basis

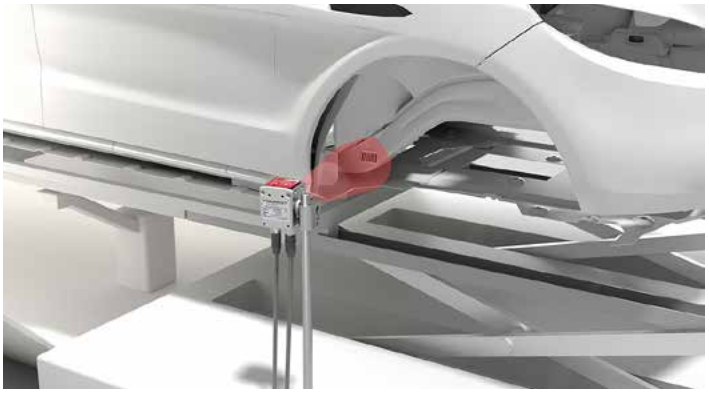
for the digital twin. This can even be achieved within a supply chain with different suppliers and plants by expanding the edge server with an API and cloud connection. This allows logistics to work more efficiently, eliminates manual data entry and avoids complex system transitions in business software (ERP).

Maximum security

Measures for secure communication are essential for trouble-free, smooth use of networked systems. Here, the identCHAIN solution offers several integrated security mechanisms. Modern automation components and identification systems with communication via Ethernet-based interfaces or fieldbuses such as ProfiNet, Ethernet/IP or EtherCAT have integrated web servers. The web servers allow convenient access to the devices in the local network. To meet the high requirements for adaptability, precision and performance, any necessary updates to the device firmware must be fast, reliable and secure. Recognized functional improvements can thus be implemented without replacing the device and new functions can be implemented automatically. At the same time, it must be ensured that only authorized firmware is loaded into the device and that the data transfer cannot be manipulated. These requirements for secure data transmission are becoming fundamental cornerstones of modern automation systems that communicate locally in networks and via cloud systems, not least due to the EU's Cyber Resilience Act.

OPC UA provides an interoperable, Ethernet-based communication platform that features integrated end-to-end encryption. In addition, the OPC UA Device Interface Specification Part 100 defines a vendor-independent procedure for performing and managing software updates. The direct loading procedure is recommended for devices with limited hardware resources. The new software is transferred as a file archive, whereby each file is checked by its specific header and installed immediately after unzipping. After a final check, the device is restarted. All communication via OPC UA and thus also the software download are secured by exchanging certificates between client and server. Automated certificate exchange via an external Global Discovery Server (GDS) ensures central management of applications and certificates in the entire OPC UA network. Communication between the network participants therefore meets the highest security requirements: data cannot be manipulated. This ensures that each device is always operated with the latest, exclusively original firmware. ■

The identCHAIN solution from Leuze offers several integrated security mechanisms, including integrated end-to-end encryption via OPC UA.



Camera-based code readers using identCHAIN not only provide individual object identification, but also device and status information for each production step.

Taking the tried-and-tested another step further.

Durable sensor and safety solutions are the basis for efficient, stable processes in industrial automation. Products that have been used successfully for many years signal quality and reliability – and this creates safety when it comes to planning, both for our customers and for us as partners.

Technological development, however, means progress. Requirements change, new applications emerge and innovative technology opens up new possibilities. And so at some point, the time comes when a product has to make way for the next generation: even more powerful, more compact and more intelligent.

This is exactly what we have achieved with the **ROD 300**. It is the successor to our tried-and-tested **ROD 4** laser scanner, which has been outstandingly precise for contour and volume measurement to date. The ROD 300 continues this success story – with higher resolution, faster switching frequency and a more compact design.

To make the changeover easy for our customers, Leuze has a practical solution on offer: the flexible **media converter**. This compact unit transmits data from the new ROD 300 so that it can be processed as usual – without having to adapt control software, just plug and play. The changeover is done in a few simple steps. Downtimes are minimized and a long-term supply of spare parts is ensured.

The media converter also supplies power to the new scanner and has a robust design. Its IP65 protection class guarantees that it can be used reliably – even under challenging conditions such as demanding ambient temperatures from –30 °C to +60 °C.

Leuze has combined progress with continuity in this solution, creating technological innovation that integrates seamlessly into existing systems and thus offers real added value. ■

Stephan Ogroske
Director Product Center
Measuring Sensors

“Sensors from Leuze communicate with machines so naturally that our customers can concentrate fully on their own processes. The data is simply there.”

ROD 4 in use

Serial transmission

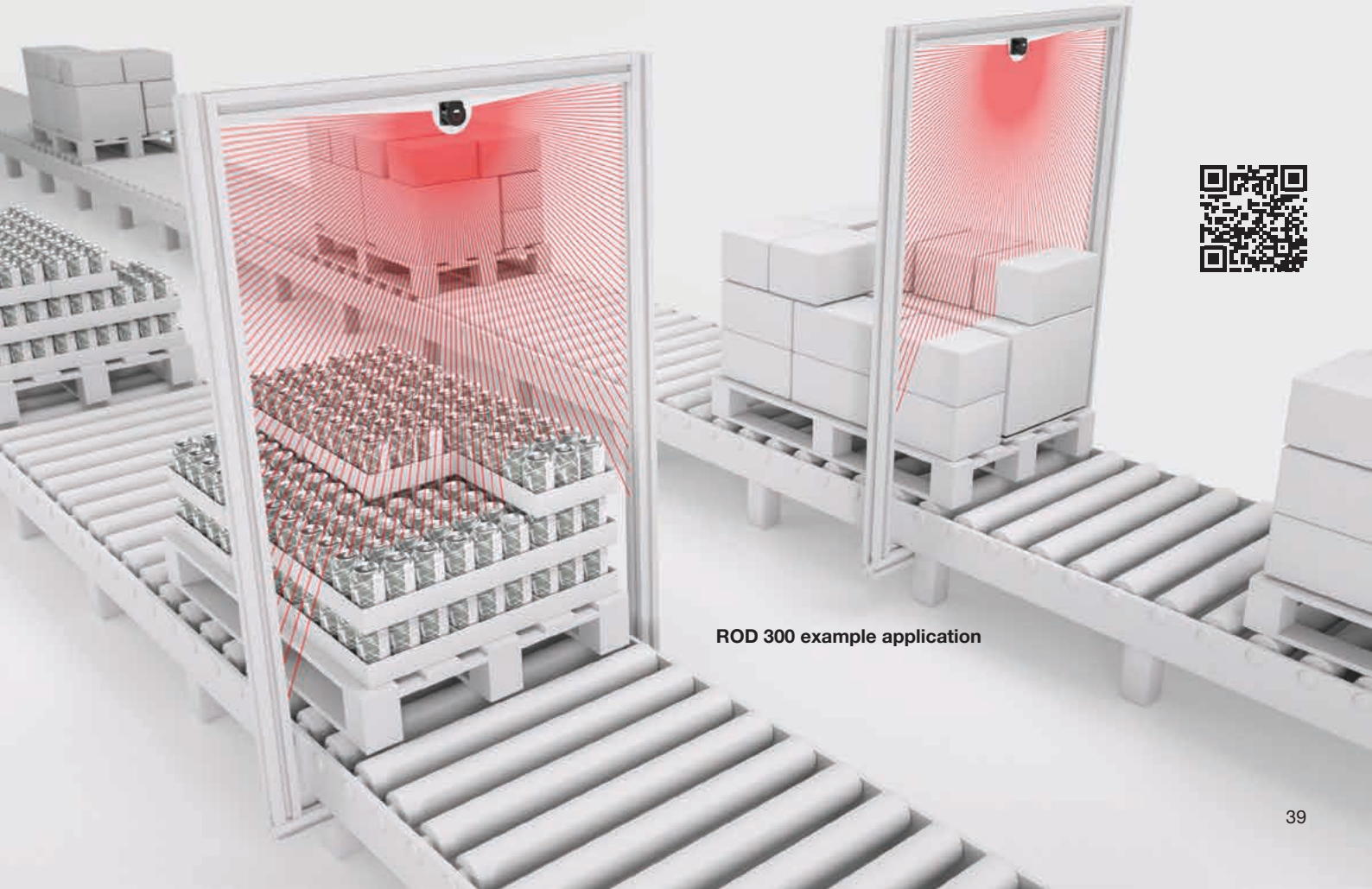
SPS

An easy changeover to ROD 300

Ethernet

Serial transmission

The media converter converts signals, replicates the interfaces of the ROD 4 and provides power to the ROD 300. Plug-and-play and Ethernet-ready.



ROD 300 example application

Better positioned for the future.

Automation is becoming increasingly important across the globe – be it in production machines, transportation or distribution. As a result, the demand for sensor and safety solutions, as well as automation components, is constantly increasing. Our both wide-reaching and in-depth application expertise in mechanical and plant engineering has enabled us to broaden our range of services and make us a competent, flexible partner for customers with a wide variety of industrial requirements.

On our website, you can find information on other sensor and safety solutions for a wide range of industries.

Flexible and automated: solutions for modern material flows in the field of mobile and stationary robotics

If you want to move material efficiently, you need solutions that can be quickly adapted to new requirements. Automated guided vehicles (AGVs) are increasingly taking over the route through production, warehousing and order picking – flexibly, reliably and saving on time too. Robot-assisted work steps, like precisely assembling individual parts, are also becoming increasingly important.
Whether mobile or stationary: every task requires the right sensors that make automation possible in the first place. Leuze offers a wide portfolio of solutions that effectively support material flows and robotics. This not only makes processes smarter, but also more flexible and future-proof – for more freedom in daily workflows.


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Image: IM Imagery/2478720091/shutterstock

Efficient airport management: solutions for modern internal airport logistics


Image: William Perugini/1028090509/shutterstock

A whole host of things have to run like clockwork at an airport. This is made possible thanks to automation and intelligent sensor technology. From luggage that needs to be reliably checked in, sorted and transported on time, to passenger boarding bridges that need to automatically adjust in terms of height and load, clever technology lies behind these smooth processes. Leuze offers a wide range of solutions in this area: sensors and automation components that make processes efficient, flexible and reliable so that everything runs smoothly and on time. ■

Leuze Engineering, Czech Republic

Innovation meets precision.

Pavel Housar, Managing Director Leuze Engineering, Czech Republic

With state-of-the-art technology, an experienced team and innovative spirit, Leuze Engineering Pilsen delivers test results, as well as one thing above all: trust. And it is precisely this trust that we pass on to our customers.

A success story in numbers

— **Founded:** 2017

— **Started:** with a team of 10 employees, with 4 offices on the 2nd floor of the office building in Pilsen

— **Today:** 60 employees, in a complete building with 4 floors

— **Locations:** Pilsen, Ostrava and Ceske Budejovice

Leuze Engineering in Pilsen, Czech Republic, has become the Leuze Group's central test center in recent years. A dedicated team now made up of 60 sensor people and specialists ensures that our products and solutions are functional, reliable and high in quality before they reach the market. This way, our customers can know for sure that our sensor and safety solutions work reliably even under challenging everyday conditions. And if a problem does occur, we simulate the situation in the laboratory as it would be at the customer's premises and specifically work to find a solution.

Two laboratories, one goal: perfect testing

Two highly specialized laboratories – one fully and the other semi automated – form the beating heart of our test center, where quality comes to life. The automated laboratory runs around the clock, 24/7, and handles it all – from simple processes to complex test scenarios with a high degree of autonomy. Our engineers can use remote access to intervene at any time and emergency power systems guarantee that even long-term tests can continue without interruption. The semi-automated laboratory acts as a complement when flexibility is required or human intervention makes a difference. Modular in design and equipped for industrial communication buses such as Ethernet/IP, PROFINET or EtherCAT, we put a wide variety of device types through their paces – for maximum compatibility and durability.

Quality you can rely on.

Practice meets precision: our RSL 200 safety laser scanner

A prime example in support of our test strategy is the RSL 200 safety laser scanner. We have significantly expanded test coverage and massively increased the level of automation. The result: higher product quality, faster firmware releases and smooth certification from the German Technical Inspection Association TÜV. Thanks to automated testing, we were able to identify potential problems at an early stage – before the new firmware reached our customers. In this way, we can ensure that our products function reliably right from the start, while shortening development cycles at the same time.

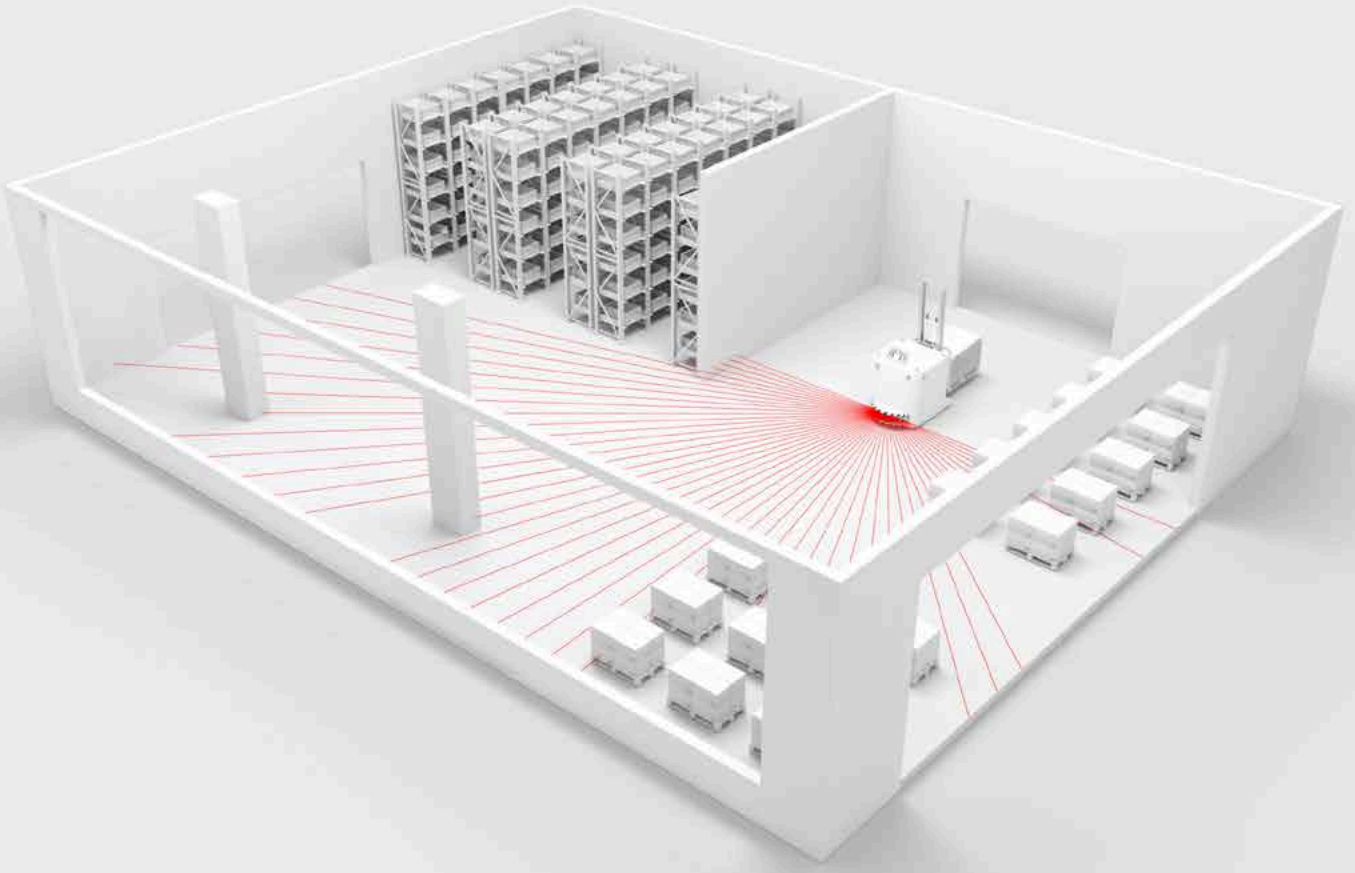
People who make the difference

As modern as our laboratories are – the real key to success is our team. 60 specialists bring valuable expertise from the industrial automation and automotive sectors, where the highest quality and safety standards apply. Experience from projects for customers such as Audi or Daimler flows directly into our test strategies – and ensures reliable products for our customers right from the start. Knowledge gets actively shared at the test center in Pilsen. Results from laboratory tests flow directly into product development, while new customer requirements are quickly integrated into our test processes. This means that our products not only remain up-to-date, but always meet the highest standards too.

A look into the future

There is no standing still at Leuze Engineering. We have visions aplenty and a whole host of ideas on how to achieve them. Artificial intelligence will soon support automatic test result validation. Firmware problems get detected even faster, feedback reaches developers more quickly and product quality is continuously improved. ■

From an idea to safe operation.



Laser navigation is impressively precise and flexible. Safety laser scanners make this technology easy to implement.

When it comes to safeguarding automated processes, precision is required. From the initial idea to final commissioning, every safety solution at Leuze goes through a clearly structured development and testing process – from planning and programming to comprehensive validation and verification.

From customer request to solution

It all starts with the customer's requirements: automated operation should be reliable and safe. Following a detailed safety analysis, an experienced safety architect designs a solution, determines the hardware required and selects the appropriate sensors. It is often not enough to simply combine standard components – instead, specific safety functions are developed, precisely tailored to the intended use.

Precise integration and programming

The Pilsen engineering team assembles the selected hardware into a functional unit and tests it. Engineers and safety architects work closely together so control options and interfaces can be aligned as well as possible. Based on a detailed specification (SRS), experts then program the software and set parameters for the hardware. Dual control ensures that all requirements are implemented precisely.

Comprehensive testing for maximum safety

Before a safety solution gets installed at the customer's premises, it has to prove itself in the laboratory. Tests are carried out on several special systems. The primary test system, based on NI technology, enables high-precision measurements and control with signal processing in the nanosecond range and parallel calculations. This platform is used to test the core functions of the laser scanner. In addition, special systems are used for long-term tests (e.g. repeated start cycles) as well as for compatibility tests and other application-specific scenarios.
A complete demo system is being set up in the Pilsen laboratory for this purpose, and this reproduces all safety and standard functions. The tests follow a clearly defined specification – if the team discovers potential for optimization, software gets iteratively adapted. Validation then takes place under real conditions, either in the Pilsen warehouse or together with a pilot customer on site. Only when all tests have been passed does final commissioning at the customer's premises begin.

Documentation and handover

Finally, all results are carefully documented and archived. This provides the customer with complete, transparent documentation that makes the entire development and testing process traceable – for a safety solution that can be relied on in the long term. ■

Jan Kidora
Head of Projects Safety Solutions

Rethinking safety distances.

At the end of 2024, the new version of ISO 13855 on the arrangement of protective devices on machines was published. The revised version contains amendments and additions to reflect the developments of recent years and the current state of the art. Markus Erdorf, Senior Safety Consultant at Leuze, explains what system operators now need to know about the updated standard.

Markus Erdorf
Senior Safety Consultant

Mr. Erdorf, ISO 13855 has been a proven reference for the design of protective devices for more than a decade. Why was the revision necessary?

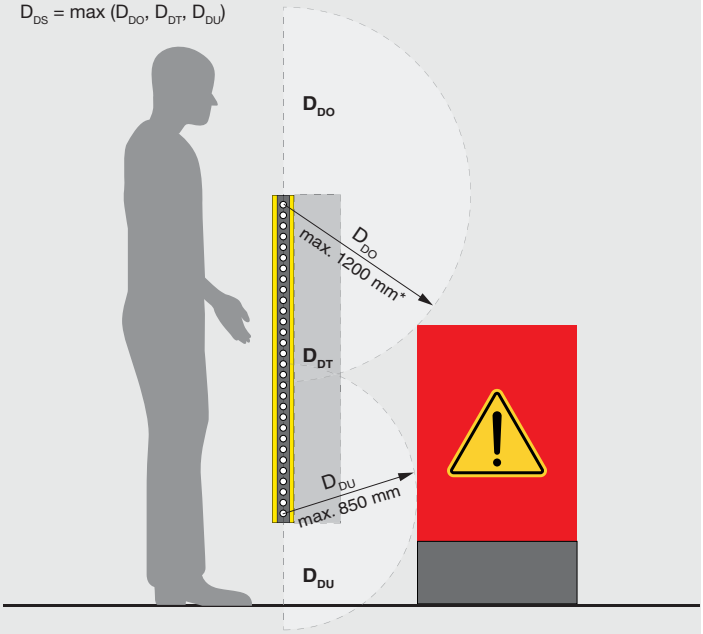
The last valid version was published in 2010, around 15 years ago. That's a long time in industrial automation, and a lot has changed in the meantime: today, we are dealing with more flexible production systems, more mobile robots and new operating concepts. The previous standard could only reflect this to a limited extent. We also looked at the incidence of accidents at work and derived normative consequences from this. ISO 13855:2024 is better suited to current technologies because it provides manufacturers and system operators with more precise specifications for the calculation of safety distances and, accordingly, for the positioning of protective devices. It also addresses topics that were missing from the previous standard and adjusts existing values.

What are the most important new features of ISO 13855:2024?

The calculation of the safety distance, previously referred to as the minimum distance, has been revised and extended for the orthogonal, i.e. right-angled, approach of a person. This allows the safety distance to be determined more precisely. Specifically, the operating range D_{DS} – previously referred to as penetration distance C – is now determined on the basis of three criteria: reaching over, reaching through and reaching under the protective field. The D_{DU} undergrip has been added and the D_{DT} throughgrip has been extended by a formula. For the parallel approximation of a person, the calculation has been simplified by the use of flat-rate values. In return, the exceeding of parallel protective fields by specific values will be prevented in future. The Z surcharges, which result, for example, from the measurement inaccuracy of safety laser scanners or brake wear on vehicles, have also been newly included. Another very interesting topic is "distances to acknowledgement buttons" – referred to as SRMCDs in the standards, safety-related manual control devices. The distances must now be calculated to enable installation in a safe position.

The introduction of the dynamic safety distance is intended for the future. This makes it possible, for example, to dynamically adjust the safety distance during robot movements depending on external conditions such as speed, braking distance and direction of movement. It has therefore become somewhat more complex to calculate the safety distance. On the one hand, this means more accuracy, but on the other hand it also means more responsibility for the users of the standard.

D_{DO}: Reaching over the protective field
D_{DT}: Reaching through the protective field
D_{DU}: Reaching under a protective field
D_{DS} = max (D_{DO}, D_{DT}, D_{DU})



The value for D_{DO} is a maximum of 1,200 mm and results from the ratio of the "upper edge of the protective field" to the "height of the hazard area". The values in the associated "Reaching over" table in ISO 13855 are unchanged from the previous version.

What impact does the updated standard have for machine manufacturers?

The Machinery Directive (MD) applies to manufacturers of machinery. This states that only safe machines may be placed on the market. Standards or harmonized standards exist to make this easier to prove. Even though the new EN ISO 13855 has not yet been harmonized, it reflects the state of the art and thus states how machines are correctly secured today. It is therefore advisable to apply the new requirements immediately, regardless of harmonization, as the MRL also references the state of the art.

Where, for example, are the changes in the systems specifically noticeable?

Let's think about a classic in industrial plants: vertical safety light grids for access protection. In the previous version of the standards, double-beam safety light grids were only permitted with a corresponding justification in the risk assessment. The use of these devices is now ruled out, as the distance between two beams has been limited to a maximum of 400 millimeters in order to prevent climbing through. In addition, the value to prevent the light grid from creeping underneath has been reduced from 300 to 200 millimeters. The value against climbing over remains unchanged at 900 millimeters, but this constellation means that at least three-beam safety light grids must be used in future. Manufacturers and operators must pay attention to this when selecting the required safety technology – Leuze offers suitable solutions here with its multiple light beam safety devices in up to four-beam versions.

The undercutting of vertical protective fields has been included in the standard. Does this increase system safety?

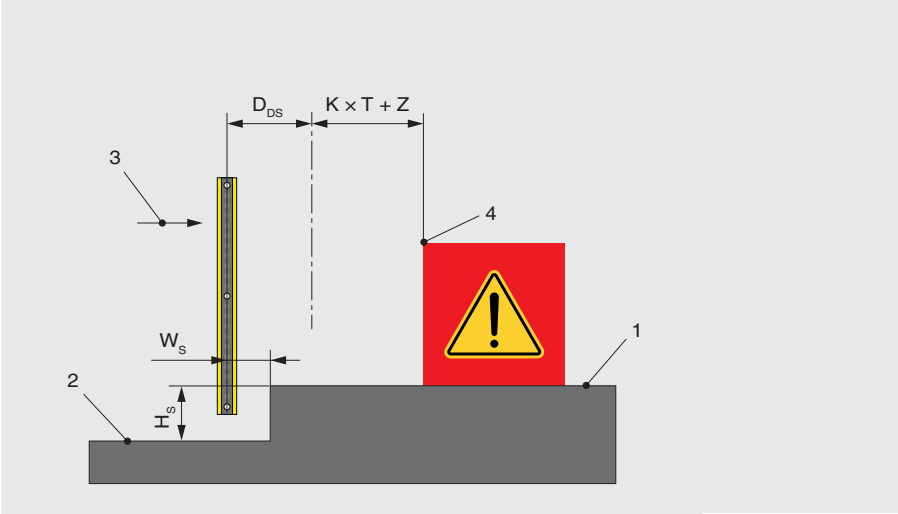
Definitely. The previous version of the standard did not actually take under-gripping into account, only the value of a maximum of 300 millimeters of the lowest beam above the reference plane to prevent under-gripping. In this respect, you could easily reach under a protective field with one hand or arm. From now on, the operating range for reaching underneath must be determined so that the safety light curtain, for example, can be installed correctly. The now reduced value against crawling under also increases safety.

You also mentioned the subject of acknowledgement buttons, which is now covered comprehensively in the standard.

Correct, ISO 13855:2024 now explicitly addresses safety-related manual control devices – i.e. SRMCDs. The term is defined more broadly in the standard, but mainly relates to the installation situation of acknowledgement buttons. In the past, it simply stated "The reset device must not be accessible from the danger zone". The distance to an SRMCD, and thus in particular for acknowledgement buttons, must now be calculated. The calculated values may also end the previous discussion as to whether something is unachievable.

The current standard also introduces requirements for safety distances in connection with steps. What is behind this?

All values in the standard for calculating the safety distance refer to a reference plane. This is often the floor on which the person is standing, but it does not necessarily have to be. If there are steps, accessible machine frames or platforms on a machine, this always leads to the question of which of the two levels is the correct reference level. This is now clarified in detail in the standard using several examples. The standard distinguishes between ascent and descent, step height and width and then uses a table to directly specify which surface is the reference level in order to avoid misjudgements.



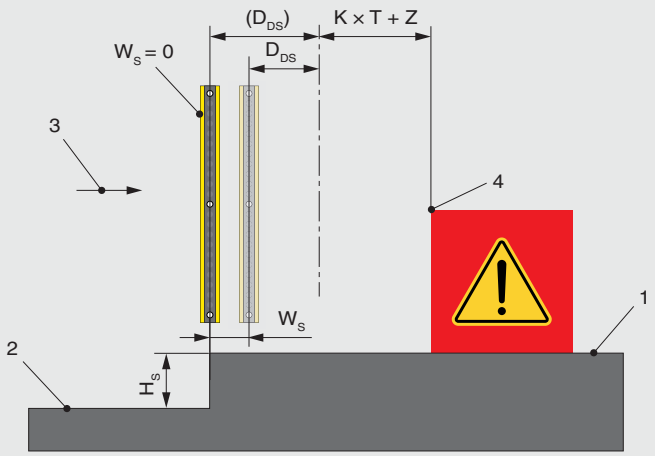
ISO 13855:2024 "Safety of machinery – Positioning of safeguards with respect to the approach of the human body" introduces some new requirements. As such, reference planes of steps must be determined.

These are just some of the changes resulting from ISO 13855:2024. Do existing systems now have to be adapted? Or is there grandfathering?

At this point, it is important to distinguish between the manufacturer and the operator. In accordance with the Machinery Directive, the time of placing on the market always applies to the manufacturer. This means that old systems are not relevant for the manufacturer, but all newly built machines are. And this applies equally to special machines and series machines. The operator is subject to the Ordinance on Industrial Safety and Health. This requires a risk assessment to be reviewed regularly. The state of the art must be taken into account and, where necessary, the safety technology must be adapted. The new version of the standard is state of the art and therefore also relevant for existing systems. And as you can see here: blanket grandfathering is excluded by law!

What can manufacturers and operators do to know the current state of the art? Can you provide support here?

Experience has shown that it is difficult to always know the current state of the art given the large number of standards and directives and their regular revision. And then also to evaluate the machines according to the state of the art. That is why we offer a wide range of services to provide both manufacturers and operators with the best possible support. From simple safety inspections and stopping time measurements, the complete safety-related assessment of a machine park to the implementation of the safeguarding of a machine or system, including services and engineering, everything is included. We also recommend our practical online seminars, especially on the new ISO 13855:2024. Another tip for manufacturers and operators: the calculation tools at www.leuze.com. These are extremely practical for determining the safety distances in accordance with standards. And for more complex applications, the Sensor People from Leuze are happy to provide individual advice and additional support in the selection of suitable sensor technology and safety solutions. ■



1 Higher level
2 Lower level
3 Approach direction
4 Nearest point of the hazard area

H_S Step height
W_S Step width between step edge and protective field
D_{DS} Constant additional distance depending on detection capacity and mounting situation [mm]
K Approach speed 1600 [mm/s] or 2000 [mm/s], depending on application
T: Overall system response time [s]
Z Additional distance factor, e.g. due to inaccurate measurements or brake wear [mm]

One of the changes: constant additional distance depending on the detection capacity and mounting situation [mm]

Clever, convenient, cold:
New deep-freeze warehouse in operation.

Image: Liudmila Chernetska/1381475431/iStock

Martina Schili
Manager Corporate Communications

Früchte Jork GmbH from Baden-Württemberg, Germany – a family-run fresh food wholesaler – has reached an important milestone: its new, fully automated deep-freeze warehouse is in operation. What may look like 'just' another high-bay warehouse to outsiders is a quantum leap for the company: faster order picking, optimized processes and significantly improved working conditions for employees. The project was implemented by the intralogistics experts at Klinkhammer Intralogistics GmbH.

Why the new warehouse was necessary

As one of the leading food wholesalers in the region, Früchte Jork supplies over 13,000 items to around 600 restaurants and hotels within a radius of 180 kilometers. The company's steady growth brought the previous manual deep-freeze warehouse, in which order picking was carried out with forklifts at minus 22 degrees, to its limits. Together with Klinkhammer, the owner family therefore developed a concept that takes storage capacity, picking performance, and energy efficiency to the next level. "In recent years, we have evolved from a traditional fruit and vegetable wholesaler to a fresh produce service provider. The automated logistics center is another milestone in our growth strategy," says Maximilian Jork, Managing Director of Früchte Jork GmbH.

Five lanes at full power

The new, automated deep-freeze warehouse has 26,280 tray storage positions. The goods are stored efficiently in terms of both space and energy – and leave the warehouse just as automatically as they came in. Goods-to-person picking delivers the trays directly to the workstation at an ergonomic height. This means less bending, less lifting, and less time in the frosty storage area.

Smart technology for perfect processes

An integrated sequence buffer ensures that orders are processed in exactly the right order. Flexible tray systems allow various sizes of cartons to be stored. State-of-the-art stacker cranes with camera technology ensure precise control and reduce energy consumption by recovering power during braking. The result: greater precision, shorter distances and reduced electricity consumption.

Image: Früchte Jork

Automated deep-freeze warehouse with over 26,280 tray storage locations

Precise and safe – even at minus 30 degrees

The Leuze FBPS 607i bar code positioning system increases efficiency and reduces costs in automated warehouse operations. Klinkhammer has been using the FBPS 607i from Leuze for positioning its stacker cranes since 2022. The first safe bar code positioning system with redundant SSI interface and integrated heating enables use even at temperatures as low as –30°C. Connected directly to the drive's frequency converter, the system reacts in just 10 milliseconds. At the same time, the FBPS meets the stricter requirements of the new machinery directive: where two separate devices were once needed to achieve the required performance level, today a single FBPS does the job. This saves time during installation and integration and also makes the solution economically attractive.

Further expansion

The new deep-freeze warehouse is just the beginning. In the second expansion phase, automatic shuttle warehouses for chilled and dry goods were put into operation, which automatically combine orders. This makes the entire logistics process even more efficient. With this investment, Früchte Jork is not only boosting its competitiveness but also making a clear statement: modern automation can increase productivity and save energy – all while ensuring better working conditions. ■

Leuze bar code positioning system FBPS 607i

Sponsored by
Leuze

The poplar-lined avenue in Owen, Germany.

A landmark with a history and a future

Owen/Teck at the foot of the Swabian mountains

Preserving tradition

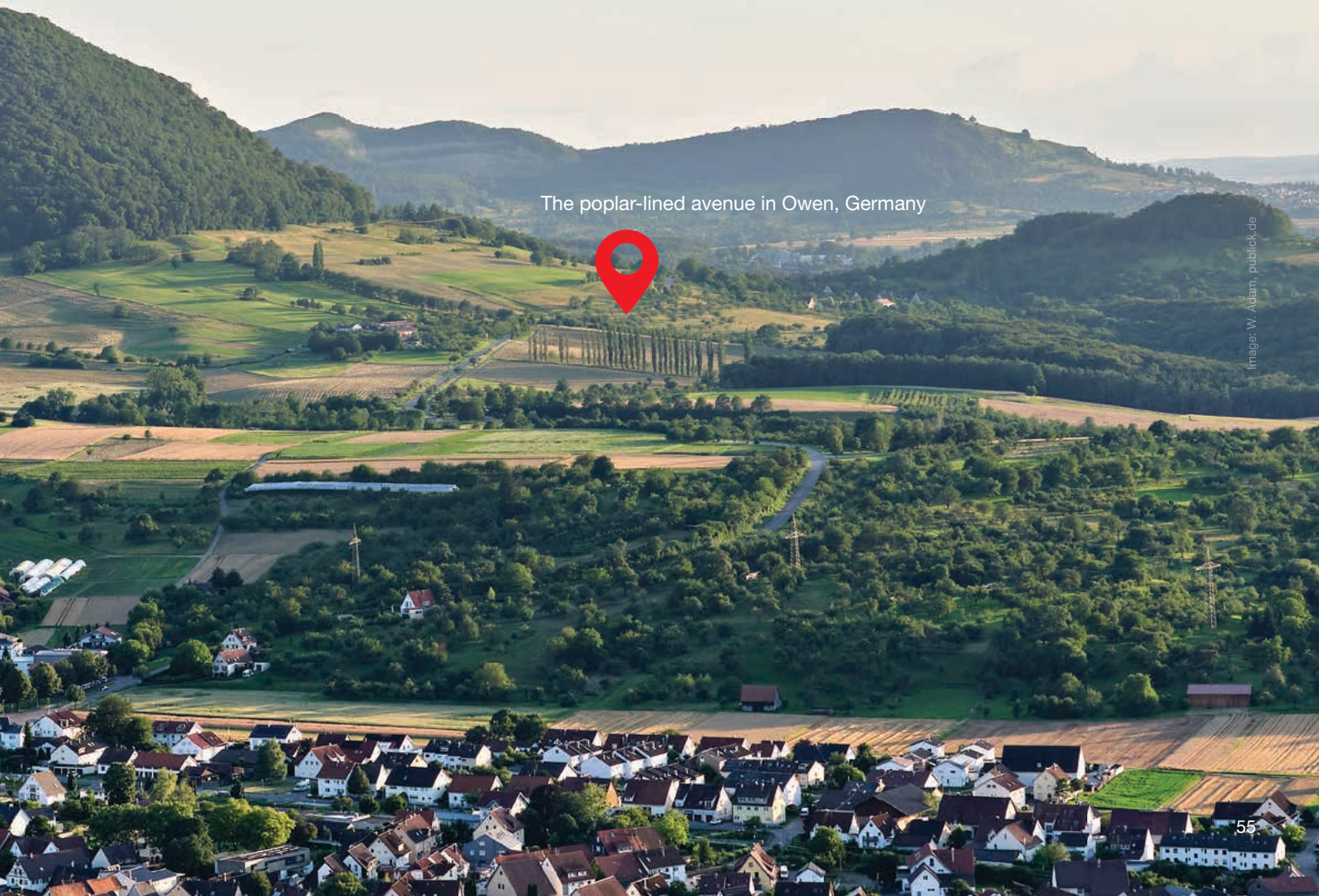
The poplar-lined avenue in Owen has been a defining landmark of the town near Stuttgart for over 90 years. Over a length of around 200 meters, the Lombardy poplars have been around for generations of Owen residents to enjoy, and not least for the traditional May Day, when branches get decorated and carried in the procession. Over the past few years, many trees became rotten and had to be felled one by one, but the avenue is now being gradually replanted to preserve the town's characteristic image and continue tradition for generations to come.

Conserving nature

This replanting project also makes an important contribution to nature conservation: the avenue forms the habitat of the rare spotted poplar leaf beetle, a species protected under the German Federal Species Protection Ordinance. Gradual replanting ensures that this endangered beetle can continue to survive in the long term. The trees are getting planted over the course of several stages, and the first two have already taken place.

Thanks to the supporters

The project is being supported by the Leuze Group,the Adolf-Leuze Foundation, the Obst- und Gartenbauverein Owen e. V. (registered fruit growing and horticultural association in Owen) and the Alt-Owen-Förderkreis e. V. (registered society for the promotion of Owen's old town). What's more, numerous Owen residents have also chosen to sponsor a tree. This preserves the historical significance of the poplar-lined avenue and gives the traditional Owen landmark a future. ■



The poplar-lined avenue in Owen, Germany

Image: W. Adam, publick.de

Sponsored by
Leuze

Enjoying time together under the stars.

Leuze is a sponsor of the Kirchheim Summer Night Cinema

Image: Cinex Entertainment, Borkowski, Fischer, Grethen GbR

When the Martinskirchplatz square in Kirchheim unter Teck gets transformed into a cozy open-air cinema in summer, it means it's movie time again.

Leuze has been sponsoring this popular cultural event for several years now, helping to make open-air cinema experiences possible for young and old alike. The Summer Night Cinema program offers an exciting mix of current releases, timeless classics and family-friendly movies. Whether exciting thrillers, compelling comedies or touching stories – there's something for everyone. A relaxed atmosphere in the middle of the city combined with shared laughter and astonishment under the stars make for a special summer experience.

For Leuze, the commitment is about much more than just sponsoring: it is a contribution to cultural life in the region and an opportunity to bring people together. ■

Sponsored by
Leuze

Between the school desk and the starting line.

Linn Kazmaier is studying for her final high school exams in 2026. She's also training to compete at the Paralympics in Milan at the same time.

Studying for high school graduation and training for the Paralympics – two challenges that are extraordinary alone, never mind doing both together. For 19-year-old para-biathlon athlete and long-distance runner Linn Kazmaier, that's exactly what she's doing on a daily basis. She wants to compete in the Paralympic Winter Games in Milan in 2026, and then take her high school graduation exams in April right afterwards. In this interview, she tells SENSOR how she prepares for this double challenge, what drives her and how her team supports her.

Linn, the next few months will be particularly exciting for you – the Paralympics are coming up in March and your high school graduation exams in April. How does this double challenge feel?

I'm really looking forward to the Paralympics – that's obviously a big goal of mine. At the same time, I'll honestly be glad when I have my written exams behind me in May. At the moment, I sometimes wonder how I'm going to manage it all. The workload is really high and there is hardly any time for things outside of school and sport. But I try to go step by step and not drive myself crazy.

What does your everyday life look like at the moment? Between training, school and studying – how do you manage it all?

It really is a constant juggling act. I usually have two hours of school in the morning, then I use free periods for training, then go back to class and then two days a week I train again in the afternoon. I often incorporate studying in between somehow – for example on journeys to the biathlon facility. So I try to use my time as efficiently as possible.

You have already shown that you can hold your own on big international stages with impressive consistency. What are your sporting goals for Milan 2026?

My goal is to perform really well in Milan and to show how much I love cross-country skiing and biathlon. I want to challenge myself, give my best and see what's possible.

What motivates you when things get tough or you have doubts?

It's at times like these that I remember why I started doing sport in the first place – because I simply enjoy it so much. This joy also carries me through the difficult phases. It also helps me to think that I might be able to inspire others through the path I'm taking. That gives me additional strength.

Like many young people, you're faced with the decision of what to do after your high school graduation. Do you already have any concrete plans?

Not yet really. All I know is that I want to do something that gives me purpose and fulfills me. But what exactly that is, I don't know yet. I don't want to stress about it – it's an important process and I want to take the time to find out what really suits me.
I can definitely see myself going to university, and in the long term, I would like to work with people – perhaps as a mentor or coach.

What are your hopes for the time until the games – in both your sporting and personal life?

I hope that the time won't be too stressful and that I can manage to do everything that is important to me – school, sport, but also a bit of time for myself.

We wish you the same from the bottom of our hearts. You can do it! ■

Sponsored by
Leuze

It’s all about showing team spirit, having fun and coming together.

HOBBY Leuze Pokal TURNIER

Amateur handball players compete for the Leuze Cup.

Cheering from the sidelines, butting heads on the pitch and celebrating together after the final whistle: the SV Cup has been bringing together handball enthusiasts from the Teck region for over three decades now. The Cup is much more than just a tournament – it is a celebration of handball and the community in our region. And of course Leuze, as sponsor of the popular amateur tournament in Owen/Teck, was there once again to present the winning team with the Leuze trophy, as is tradition. What counts here is not the league table, but the team spirit: colleagues, friends, neighbors and club members go head to head as part of mixed amateur teams, showcasing their passion, fair play and fun. As a company rooted in the region, we really value such events to connect people, create space for encounters and strengthen the sense of community – both on and off the pitch. ■

The Sensor People defy the heat.

Leuze runs 257 kilometers for a good cause.

At the 10th AKB sponsored run in Kirchheim unter Teck (AKB is an action group for people with and without disabilities), the Sensor People from Leuze showed what they are made of once again: just short of 30 employees took to the starting line despite hot temperatures of over 35 degrees and took turns running a total of 257 laps, adding up to around 257 kilometers, all for a good cause. On the hottest day of the year so far, this was anything but easy. But team spirit, motivation and knowing it was all for a good cause made the run a real highlight. ■

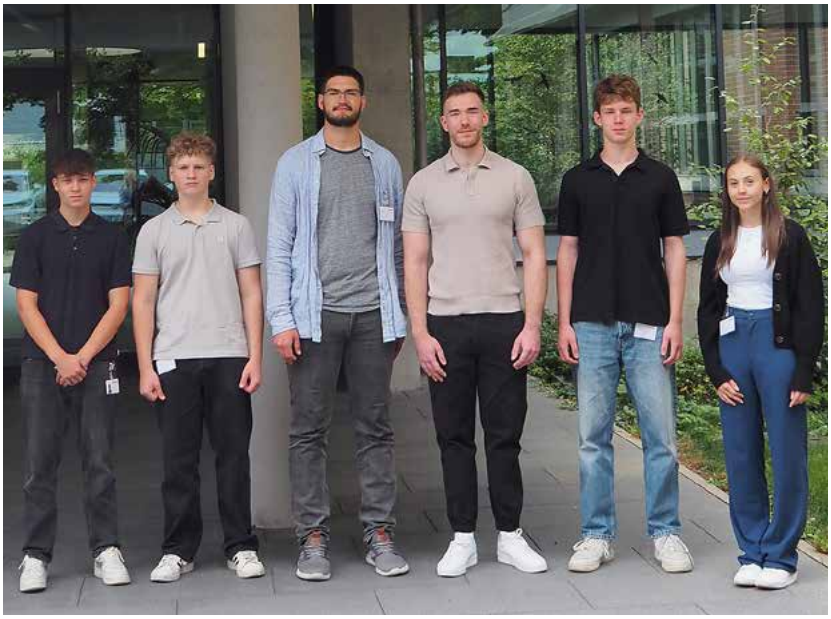
Good career prep: young talent gets off to a flying start at Leuze.

A total of 30 trainees and cooperative students are currently completing their training at Leuze. At the beginning of September, 6 young people took their first steps into their working life here: 3 trainees in electronics and mechatronics and 3 cooperative students studying business administration and industrial engineering.

Training manager Carina Maier led the new starters through a varied induction week full of exciting insights into the company. The talented young individuals visited various company locations, got to know their points of contact in the individual areas and received valuable tips for everyday working life as part of a health seminar. We also took a joint trip to the Adventure Minigolf Park in Obermarchtal for some fun, good mood and team spirit. ■

A total of 30 trainees and cooperative students are currently completing their training at Leuze.

Adventure Mini Golf Park in Obermarchtal



The talented young individuals visited various company locations.

Clever testing – faster development.

At Leuze, we think in terms of intelligent processes! When it comes to industrial engineering, this means faster testing, minimizing sources of error and bringing new functions safely into production. This was precisely the aim of an exciting student project.

The challenge: multiple modules, high effort for testing

An array of software modules perform central control functions in our production lines: they communicate with motor controllers, control I/O cards and ensure that everything runs smoothly. As these modules are regularly expanded and improved, they must be intensively tested before they are used. Previously, this was done manually, which could sometimes be quite time-consuming and error-prone. In addition, requirements vary depending on the line, which made standardized test procedures difficult until now.

Philipp Röhlke, Alexander Kärner, Michael Schuck

The solution: a mobile test trolley – modular, automated, smart

Modular in design, easy to expand and tailored precisely to our requirements. In close cooperation with our IE teams, we created a functioning prototype, equipped with an industrial PC, switch cabinet, power distribution unit and network technology. The two hardware modules, a dual code reader and a digital I/O card, were integrated into the test environment by way of example. In future, test processes will run fully automatically via a connected CI/CD pipeline (Continuous Integration/Continuous Deployment) – including error analysis. This allows new software functions to be integrated more quickly and safely into ongoing production, without risks or manual workarounds. Not only does the new mobile test trolley support our developers in their day-to-day work, but it also makes for a quicker development process and the highest software quality, as well as enabling automated night tests. And the best part: the system is open for change in the future. Additional modules and tests can be easily added at any time. This is how a student idea made a real contribution to digitalization and process optimization at Leuze. ■

Industry 4.0 at your fingertips

High-tech up close – future technology put to the test.

With brand new laboratory experiments, students at Esslingen University of Applied Sciences are immersing themselves in the world of Industry 4.0.

When the sorting system starts working, Leuze sensors flash in time while data flows through the network via the OPC UA standard: industry 4.0 at your fingertips. This is exactly what IT students can now experience in the Communication Technology Laboratory at Esslingen University of Applied Sciences. The new experiment makes state-of-the-art net-working technology tangible and shows how closely theory and practice belong together. The OPC UA experiment is used in the Cyber-Physical Networks and Embedded Systems Communication lectures for the Computer Engineering and IT Safety degree programs. In this way, young engineers work directly with the technology that they will later use as part of their everyday work in industry – practical, future -oriented and from the heart of the region from key actors like Leuze. “In our laboratories, students can try out the latest technology for themselves – with support from real industry experts,” says Prof. Dr.-Ing. Michael Scharf, Communication Technology Laboratory Manager holding a degree in engineering. The result? Enthusiasm, expertise and the perfect connection between education and business. ■

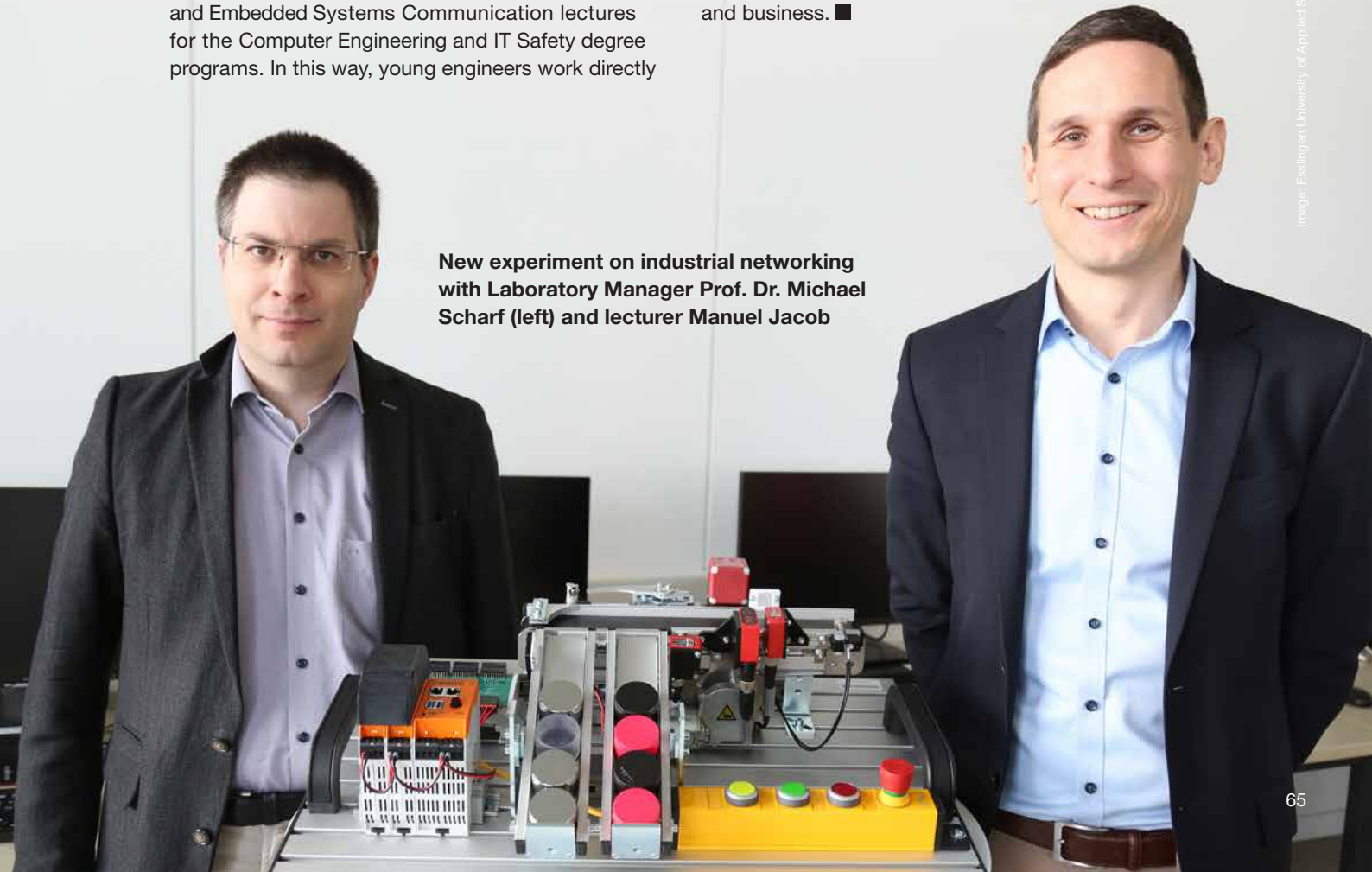


Image: Esslingen University of Applied Sciences

New experiment on industrial networking with Laboratory Manager Prof. Dr. Michael Scharf (left) and lecturer Manuel Jacob

Leadership means taking responsibility.

Our new leadership guidelines provide our managers with clear principles: they provide orientation, promote the freedom to decide and encourage enterprising action in line with our common goals. These guidelines are not just printed on paper at Leuze, but are a reality put into practice in the daily work we do together on an international scale.

Mr. Wörter, today we are talking about "Leadership at Leuze". What does this look like?

Our working world is changing rapidly and with it, the expectations of leadership are too. We have to tackle questions such as "What does good leadership mean at Leuze?" and "How can we create orientation in an increasingly complex world?". We regularly refine our leadership guidelines and adapt them accordingly, using them to signpost and guide us and lay down principles for a modern understanding of leadership. They cover responsibility, the freedom to decide, and thinking and acting with a business mindset.

What are they?

We have defined four leadership guidelines that are important for us in our day-to-day work:

– Think business

– Take responsibility

– Foster relationships for working well together

– Further develop the Sensor People

Think business

Take responsibility

Foster relationships for working well together

Further develop the Sensor People

Think business.
What does that mean in concrete terms?

Managers should not only think in terms of their own area, but beyond it. They should align their actions with the company's overarching goals, think globally, act with foresight and create added value – for our customers and for Leuze as a whole. For us, thinking business also means recognizing opportunities, weighing up risks and making decisions, always with the aim of making the company successful in the long term.

How does working well together manifest itself in day-to-day management?

Successful leadership is a two-way street.
It manifests itself in cooperation, trust, open communication and reliability. These are the values we live by and how we want to work together.
We want a culture that involves people listening to each other, sharing ideas, learning from each other and tackling challenges together, because strong teams are created when appreciation and dialog are the order of the day.

Leadership also means developing people.
How do you help to do this?

We are committed to developing our employees and supporting them along the way. Leadership means allowing others to grow, both professionally and personally. Our managers give constructive feedback, encourage performance and, at the same time, pay attention to the well-being of their employees. It's about striking a balance between creating challenges, providing support and uncovering potential.

How do you ensure that the guidelines are actually put into practice?

Leadership culture is not created on paper, but lives in cooperating with each other on a daily basis. This is why we are in regular contact with our international managers and, of course, they are in contact with each other. We support them with workshops and training sessions on all aspects of leadership. Our aim is for the guidelines to be put into practice by everyone and become part of our image, noticeable in the way we work, make decisions and communicate with each other.

Many thanks for the interesting insights into leadership at Leuze. ■

Boris Wörter
Senior Vice President HR

"Leadership means taking responsibility – for people, decisions and results."

Sensor People

are doers

Anna Wollschlaeger
Plant Controller

From confectioner to a woman of numbers.

Anna didn't want to study after finishing high school, she wanted to do something creative. She was inspired by a chocolatier she saw in an open-air theater where she was doing a two-year internship. She realized her dream, became a master confectioner and opened up her own small cake and pastry shop for commissions called "Süße Melange". Corona meant she had to close up shop, but Anna didn't see this as a defeat, rather an opportunity for a fresh start and some personal development. She quickly realized that she wanted to study "Sustainable Management" and in doing so, she discovered her passion for analytical thinking and working with numbers. Anna ended up at Leuze during her semester doing an internship and now works in Controlling. But she doesn't see this as the antithesis, because if you take a closer look, you'll discover creativity in many areas of her everyday life.

"Being creative and thinking analytically? For me, the two simply belong together – and make every day exciting."

Mario Penava
Teamleader Technical Customer Care Center

Reaching the top by surpassing personal limits.

Mario Penava has found himself drawn to the mountains for over a decade, whether it be for hiking, climbing or challenging alpine tours. The Große Zinne in the Italian Dolomites, Großglockner in Austria or Mont Blanc, the highest peak in the Alps: no matter which peak he's aiming for, he sees mountain sports as not only a physical challenge, but a mental one too. Specific preparation, absolute concentration and respect for nature are essential. When he's not climbing rock faces, he's lacing up his running shoes: he ran several marathons in different southern European cities last year alone, and the next one is already in the pipeline. Half-marathon training and indoor climbing and bouldering are part of his weekly routine. For him, it's not just about doing sports, but taking an active approach to life.

"Whether you're on the mountain or running a marathon, it's never just about fitness alone. It's always a battle with yourself. That's exactly what excites me."

Sensor People

are doers

Tobias Häcker
Key Account Manager

On target – in the forest and on the job.

Tobias Häcker obtained his hunting license in 2024 and has spent a lot of time in the hunting grounds ever since. Whether it's clay pigeon shooting, hours spent sitting in a raised hide overnight or managing to bring down the first boar or roebuck: hunting is far more than just a hobby for him. As a nature lover, he finds his solace here and learns a lot about nature – and himself. Discipline, concentration, perseverance and responsibility play a central role here – qualities that also characterize him at work. Together with three other hunters, he will manage a hunting ground spanning 640 hectares starting from the next hunting season.

"For me, hunting is discipline, concentration, perseverance and responsibility. And what counts in hunting is also crucial in my job."

Dr. Julia Velkova
Team Leader Industrial Engineering Technology

Pulling the strings, and not just at work.

As technical as Julia is as an engineer, she is just as creative when it comes to details. She loves bringing people together and making space for creativity. Back in 2019, she did a three-month trip with her family around England, where there are an array of small handicraft initiatives. It's here where she became inspired and then decided to develop a concept back in Reutlingen, founding a small association that focuses on the joy of creative work and doing handicraft together. Julia is not only the driving force behind the project and chair and founding member of "Werkelraum e. V.", but she also gives knitting courses herself and organizes joint felting, sewing or knitting sessions. Making jewelry and macramé are also part of her creative repertoire. And of course, the mostly female hobby artists showcase their works together at various locations and local markets.

"I love uniting people to get creative and make something unique together."

A truly wonderful celebration.

Owen unter Teck was once again the setting for a fantastic summer festival: entitled “International Leuze Games without Borders”, the Sensor People were able to enjoy fun sporting activities in summer temperatures. There was a great atmosphere at the TSV Owen sports grounds – not least thanks to the 16 teams of 8 participants who competed against each other in a wide variety of disciplines: welly throwing, “skiing” or boomerang throwing, for example. With skill, team spirit and a lot of fun, everyone mastered the challenges they faced brilliantly. The focus was not on being competitive and scoring points, but being together – across departments, locations and nationalities. Of course, there was still a winner, runner-up and third place. The teams were each delighted to receive an international food parcel. Delicious international food, refreshing drinks and live music awaited participants at the marquee and food trucks after the sporting challenges. A big thank you goes to everyone who took part, got involved in the organization and made this festival possible. It was an evening of exchange, encounters, movement and high spirits – in true Leuze style. ■

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