SMART IS TO SHOW PERSONALITY
With this edition, we will also be starting a new chapter in our communication. We “the sensor people” have for years formed close ties with our customers with the promise of Smart Sensor Business. We stress time and again that it is not an advertising slogan for us — Smart Sensor Business is the DNA of each and every one of the sensor people and is a specific promise to our customers worldwide.

Once again, we hope to demonstrate this by letting our employees have their say. Brief emotive stories about straightforward thinking, the sharing of experience, the proximity to our customers and the innovative way in which we shape the future all demonstrate what makes us so special. Find out more on pages 8, 14, 24 and 32 of this magazine.

Come visit us from November 28 to 30, 2017 at SPS IPC Drives in Nuremberg. In Hall 7A, Booth 230, you will feel the spirit of the sensor people. Experience Smart Sensor Business up close. A fresh and new corporate appearance awaits you. The sensor people look forward to your visit! We’ll see you in Nuremberg.

Kind regards,
Ulrich Balbach, Managing Director
THE COMPANY

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LEUZE ELECTRONIC ASSEMBLY TURNS 40

Our subsidiary, Leuze electronic assembly GmbH in Unterstadion, has reached age of wisdom — the schwabenalter — and celebrates its 40th birthday.

Leuze electronic assembly GmbH, our subsidiary founded in Unterstadion in 1977, had reason to celebrate in June. For 40 years, Leuze electronic assembly GmbH has been manufacturing printed circuit boards as well as integrated systems built upon the PCBs for both Leuze electronic and third party customers.

“Our high level of innovation, the good price/performance ratio and our individually oriented customer support are recognized in the market of EMS service providers,” says Sebastian Raible, operations manager of Leuze electronic assembly for one year. An advanced logistics concept facilitates the combination of a large spectrum of lot sizes with a wide range of variants. The extensive palette of technological services makes Leuze electronic assembly a competent and reliable partner for the mounting of THT and SMT components on flexible or rigid PCBs. The core competence lies in connection technology on flexible base material as well as in the mounting of fine pitch BGAs, including “Package on Package” (PoP) solutions.

LEUZE ELECTRONIC USA CELEBRATES ITS 10TH BIRTHDAY

Joerg Woerner—head of the Identifications Systems product area and responsible for image processing—and his team are not only celebrating the 10th anniversary of the location’s founding in Rochester but also the anniversaries of two individuals who have been with the company since day one.

In 2007, what is now Technical Hub Americas was established by Leuze electronic in Rochester, New York — the birthplace of digital image processing and the center of optics development in the Americas. The initial task of the subsidiary was the development of software algorithms for the own image processing sensors.

Today, the tasks of the now ten-person team are much more diverse. They support the Leuze electronic Group worldwide in the development of products for medical technology as well as the point of contact and competence center for questions on American fieldbus interfaces. In the Americas, Rochester performs pre and post-sales support and drives the development of specific features, such as fieldbus interfaces for US-based controls from Rockwell and Allen Bradley. Joerg Woerner is proud of his team: “Our strength lies above all in the fact that we listen to the customer, understand their problem and can present an individual solution.” It was possible to win numerous large projects, such as data code detection and the line scan camera for the manufacturer TNA as well as a module for blood type detection for Ortho Clinical Diagnostics. Also honored during the company’s 10th anniversary Will Schaffer (Head of Laboratory Automation) and Richard Geisler (project manager) both of whom have worked on-site as sensor people since the beginning.

Our proud team in Rochester
Leuze electronic was awarded the German Brand Award in Gold in the category “Industry Excellence in Branding — Connectivity”.

The goal of the German Brand Institute is to strengthen the meaning of the brand as a decisive success factor of companies in national and international competitive environments. The German Design Council and the German Brand Institute present the German Brand Award for successful brands, for a consistent brand management and sustainable brand communication. The winners were honored for a second time in the German Historical Museum in Berlin on 29th of June 2017 at a ceremonial gala. Leuze electronic was among the evening’s winners. The optical sensor manufacturer and solution provider in electrical automation was awarded with a German Brand Award in Gold in the category “Industry Excellence in Branding — Connectivity”.

The German Brand Award was initiated by the German Brand Institute, which was brought into being by the German Parliament in 1953 and endowed by the Federation of German Industries. The German Brand Institute, which was founded in order to boost activities in the brand management area, is commissioned to carry out the competition.

“Focusing, clear differentiation from the competition, the involvement of employees, and understanding and implementing the brand in an integrated way are and remain the most important success factors of powerful brands — something which Leuze electronic has understood and successfully implemented,” explains Andrej Kupetz, managing director of the German Brand Institute.

WHAT THE JURY HAD TO SAY

- Leuze electronic has a consistent message throughout all communication, including the trade show booth.
- The brand values and the products are communicated in a clear and comprehensive way.
- The modern and friendly corporate design is extremely eye-catching, and was neatly interpreted in all media and communications.
- A great example of good handling of the brand and an example to other companies who are not quite there yet.
More than 50 years of experience made Leuze electronic a real expert in innovative and efficient sensor solutions for industrial automation. With our wide sales- and service-network, our competent consulting and reliable customer service, we are always close to you — worldwide.
Technology must serve people. Complex and technically sophisticated products should be as easy and intuitive to use as possible by our customers. This is both an aspiration and a development maxim — to the benefit of our customers.

More than 50 years of experience and close relationship with our customers have made us true experts in specific industries. This is how we develop individual sensor solutions for and with our customers.

Think global, act local — this characterizes the sensor people. Customer proximity means not only being there for our customers 24/7, providing them with competent advice, and supporting them with an extensive range of services, but also responding to their individual desires and needs worldwide.

Sensors are the basis for all automation and for Industry 4.0 or IIoT. Together with our customers and strategic partners, we are working on future-oriented technologies in order to make data and information available worldwide.
“Our development motto is quite simple — all products must be easy and intuitive to operate for our customers — easier than the previous models and similar devices on the market.”

Dr. Marie-Theres Heine, Product Manager — Binary Switching Sensors
COMPLEX TECHNOLOGY — EASY TO OPERATE!

We do not budge on this issue — if it is not “easy to operate,” we will not develop it!

Even in the development of new products, Leuze electronic is steadfast on keeping with its customers’ desire for simple operation. This is the company’s development maxim. It means that we only develop products that are easy to operate, preferably even easier than the previous models or comparable products on the market.

These sensors offer unlimited freedom

Our new devices of the C-generation offer complete liberty when it comes to selecting the sensor alignment. The switching thresholds can be configured by button, line, IO-Link, or the traditional potentiometer — anything is possible.

A code reader that is up and running in three minutes

Our camera-based code reader DCR 200i is setting a new standard in terms of performance and implementation. It takes no more than three minutes to parameterize the code reader via its two control buttons and start using it — it doesn’t get any easier!
THE FUTURE COULDN’T BE MORE SIMPLE!

With the world’s first data transmission photoelectric sensor, the DDLS 500, which makes location-independent remote diagnostics possible thanks to an integrated web server. Leuze electronic again sets new standards in terms of performance and transparency.

The data transmission photoelectric sensor links Ethernet networks using optical data transmission with a bandwidth of 100Mbits/s and is thus part of the central network component. The devices transmit all common Ethernet protocols such as PROFINET, Ethernet IP, EtherCAT, Ethernet TCP/IP or Ethernet UDP in real time up to a distance of 200 m. For quick and simple on-site diagnostics, the DDLS 500 has a status LED visible from afar for displaying warnings and errors. This makes simple maintenance and diagnostics possible. Through the modular basic design, the devices can be configured flexibly depending on needs and depending on needs regarding operating range, remote diagnostics options, heating as well as an integrated laser alignment aid. An integrated level and the pre-mounted mounting plate with spring-loaded adjustment elements make alignment simple and only require one person. Leuze electronic holds the patent for this single-hand adjustment process. All warning messages, which may signal an interruption of the transfer are displayed in real-time and in the DDLS 548i version, actively transferred to the control using process data as a PROFINET participant.

The system usually consists of stationary and moving devices

Integrated mounting plate for simple attachment and alignment using spring-loaded wobble elements

Typical application on a high-bay storage device together with a positioning system

An extremely common application: wear-free, wireless data transmission on gantry cranes
WHAT ACTUALLY IS MUTING?

In safety technology, according to DIN EN 61496-1:2014 muting is a temporary automatic bridging of a safety function or multiple safety functions using safety-related parts of the control system.

Muting is necessary if, for example, material has to be moved automatically into and out of a danger zone though an optical protective device (light barrier). The required muting function can be integrated into safety sensors or implemented in a separate control device. Muting is activated and deactivated by at least two independent sequence and/or time-monitored signals in accordance with IEC TS 62046.

Muting signals can be generated by suitable sensors as well as sent by suitable control systems. The arrangement of the muting sensors must ensure a reliable distinction can be made between permitted material and people who want to enter the danger zone through the protective device.

Often used are the time-monitored 2 sensor crossed beam arrangement, the sequence-monitored 4 sensor parallel beam arrangement and the sequence-monitored 2 sensor parallel beam arrangement limited to exits. Muting should only last as long as permitted material is being transported through the protective device. This is ensured by the muting signals. A time limit (muting time-out) also ensures a safe muting duration limit in the event of malfunctions.

The muting override function is used as a time-limited override of a muting path which is blocked as a result of a malfunction, for example, if the supply voltage fails during muting, a muting sensor is defective or the muting time-out has expired as a result of the conveyor being stopped for an extended period of time. Muting override can be initiated via the reset button — the entire danger zone must be visible when doing so.

A sensorless alternative for muting is the sequence/time-monitored function Smart Process Gating (SPG) in MLC light curtains from Leuze electronic. For more information, read our application report starting on page 19.
IDEAL FOR PRESSES

Optimally tailored function blocks for efficient control of eccentric and hydraulic presses.

The new MSI 400 safety controls have a compact design and have been specially designed for use on eccentric and hydraulic presses. They fulfill requirements in accordance with the EN 692 standard for mechanical presses and the EN 693 standard for hydraulic presses.

The new models contain tailored and certified function blocks for press control and protection, and are particularly suitable for use on small and medium-sized presses. The predefined press function blocks, simulation function and log generator make programming and configuration quick and easy. They enable monitoring of the press procedure and easily implement different operating modes (single stroke, automatic, cyclic, setup mode). Operating units such as two-hand, foot, EMERGENCY STOP and operating mode selector switches and safety sensors can be flexibly integrated.
Leuze electronic is expanding the portfolio of optoelectronic and inductive switches with capacitive proximity switches, making it possible for users to obtain complete solutions for all detection requirements from a single source.

Leuze electronic is introducing contactless, wear-free switches which are resistant to electromagnetic influences, interference and contaminants in the air such as dust with its new range of capacitive products. The capacitive switches are available in a cylindrical or cubic design, as well as embedded or non-embedded versions for a wide range of mounting options. Due to their semiconductor technology, they have a long life expectancy, regardless of the detection and switching frequency. The new variants make contactless detection of many different objects and media possible, regardless of the shape. They are particularly suitable for detecting objects in harsh and dirty environments due to their IP67 housing. Because of their ability to “see through” certain materials, they are predestined for use in the packaging industry. They detect products in outer packaging and behind container walls, check fill levels and monitor these for completeness.
“Many years of industrial experience has made us a top expert in various industries. Together with our customers, we develop efficient sensor solutions that are made specifically for their requirements.”

Jörg Beintner, Industry Manager — Machine Tools
INDUSTRY ORIENTATION IS KEY TO SUSTAINABLE SUCCESS

Our experience in the industry is a true treasure trove that we don’t mind sharing with our customers

To be real specialists and have expert knowledge requires focus. We are experts in intralogistics, the packaging industry, tool manufacturing, the automotive industry, and medical technology. In these industries, we offer our customers solid know-how based on many years of experience as well as the support of our industry experts who are familiar with all the unique requirements and peculiarities of these industries. This enables us to offer tailor-made solutions for a large variety of complex customer requirements, no matter how challenging they are.

Precision and reliability matter for machine tools

Today more than ever, characteristics such as accuracy and reliability are demanded of machine tools and of the sensors used on those tools. As a result of increasing digitization, the networking of systems is becoming more and more important as well. Many of our solutions are providing the corresponding functionalities already today.

When efficient intralogistics are a matter of competition

System manufacturer Bürkert Fluid Control Systems from Ingelfingen (Germany) has significantly increased its level of automation at the “Campus Criesbach” location in order to serve its customers even faster and more efficiently. Intelligent sensor solutions from Leuze electronic make it possible.
The Bavarian dairy products and fruit juice producer Gropper is committed to quality—not only of the products that they produce and bottle themselves. When selecting their partners and suppliers the company also sets high quality requirements. Thus, Gropper relies on Leuze electronic for the secure monitoring of dangerous processes. The used safety solution is not only extremely space-saving and economical, it also complies with all standards and legal requirements.
Quality without compromise

Gropper is synonymous with top quality — and this is guaranteed by the company, as it makes no compromises with its products and processes in the cold chain. The result: Highest standards and continuous monitoring, which are based on one hand on the food industry’s hygiene requirements - but on the other hand are imposed by Gropper itself, especially regarding the selection of its suppliers. In this instance Gropper relies on quality and years of experience. “In addition to the quality of the products and components used, the most important criteria when choosing a partner are the high level of system availability, high degree of flexibility, and qualitative sound advice with a large problem-solving expertise, should a problem arise,” states Stefan Malechowsky, manager for bottling and packaging system configuration, for Gropper in Bissingen, Bavaria.

Individual solutions for versatile requirements

Gropper produces milk and direct fruit juice products, which are distributed by a wide range of different European trading companies. Gropper also mixes milk, fruit juice products and smoothies according to different recipes and bottles them at plants in Bissingen and Stockach. “The greater the requirements and recipes vary in the mixing and bottling processes, the more they differ with regard to packaging, film wrapping and storage”, says Stefan Malechowsky. Individual plies or even whole euro pallets of different products are left an average of 24 to 28 hours in high-bay warehouses, which are cooled to six degrees, before they can be loaded onto freight trucks.

From filling to palletizing

Numerous conveyor belts guide the freshly filled yoghurts, puddings, shakes and smoothies in the direction of the palletizer system. The products have diverse shapes and sizes, are packaged individually in plastic or paper cups, smaller or larger bottles. The conveyor belts are illuminated in red — Leuze electronic sensors monitor the position and the sequence of the approaching products.

The situation becomes more critical at the palletizer, which groups the individual products and puts them into position. Due to the risk of crushing, each of the four machines enclosed within hard guards is safeguarded by two MLC protective sensors. In this way, the employees working in this area are protected against hazardous movements of the machine. “Personnel protection has to be guaranteed at all times. Nevertheless, safety technology has to be economical enough so that it does not slow down or even restrict the production processes — the workflow should only be interrupted and consequently the system brought to a standstill in case of emergency,” says Stefan Dicker, project manager for Industrie-automation Dirk Hähner (IDH). He has a detailed knowledge of the system and recently put the new film wrapper from TOSA 124 into operation.

From palletizing to pallet safeguarding

Gropper had a positive experience in its plant in Stockach with the pallet wrapping machine TOSA 126 from the Italian manufacturer of the same name, which only requires 30 seconds for the film wrapping procedure including transit time for in and outflow. As the freshly packed products are colder than the ambient temperature and would consequently “sweat” the euro pallet is not completely wrapped, either only the upper layer is partly wrapped in film or a banderole is laid over the entire pallet. In this way the unstable load can be stabilized and secured on the pallet, and at the same time, the products have enough air to breathe. The objective is to achieve a high level of transport stability while keeping the costs for load securing as low as possible. A fully automated lacing device ensures that the pallet is highly stable by connecting the pallet with the products. The outer packaging is applied to the entire euro pallet in a second step, shortly before the products leave the high-bay warehouse and are loaded onto the truck.
Twofold problem for safety technology

The film wrapper and the subsequent outflow are secured using protective sensors from Leuze electronic. The special feature of this application is that only half of the actual specified minimum in and outflow of 2.20 m before and after the wrapper is available. In addition, immediately afterwards it is necessary to secure a turning movement in the conveying belt. Both of these aspects place specific demands on the safety technology to be used at Gropper and IDH’s safety concept. However, CE conformity is still attained using the photoelectric sensors from Leuze electronic with a resolution of 14 mm at simultaneous machine speed reduction and enclosure extension when crossing the conveyor belt. Together with IDH, Leuze electronic has addressed the problem of low space availability, flexibly and creatively. “We were able to solve the problem using a compact muting solution with just two instead of four photoelectric sensors,” explains Frank Wüster, technical sales manager at Leuze electronic. An efficient solution was also found for the scissor movement of the conveyor belt: The turning movement is monitored by the binary switching sensors from the PRK 46B series, ensuring that the pallets can run smoothly directly into the refrigerated shelf warehouse or are transported directly to dispatch, where the truck is waiting to be loaded.

On the way to the refrigerated warehouse and to direct dispatch

Another film wrapper was recently installed directly in front of the entrance to the refrigerated warehouse or direct dispatch. This wrapper also provides Gropper with the highest level of availability and flexibility. Banderoles and partial wrapping of the storage products can be attached to the load at every height and selectable width, in addition to the products being wrapped as an entire pallet for dispatch. Even before entering the high-bay warehouse (cooled to six degrees) there is another challenge for Gropper: the filling area and the refrigerated warehouse are not on the same level, that means: a height difference needs to be overcome. For each partially film-wrapped pallet a height difference of approximately one meter has to be compensated.

In addition to the quality and a long life expectancy of the sensors, Stefan Malechowsky specifically prioritized the flexibility and creativity in the solution of the concrete safety-related application requirements. “And if a problem should arise and the system comes to a standstill, Leuze electronic is only roughly a one-hour drive away with quick and flexible help is at hand.” With its Smart Sensor Business, Leuze electronic promises its clients simple use and in-depth application expertise, and in particular: smart customer service, 24 hours a day, 7 days a week, worldwide. With a reliable Partner like IDH, who proficiently put the system into operation and maintain it on site, this is a safe solution for all involved in the project.
Accepting responsibility — this is the philosophy of Hamburg-based company Dr. Weigert, the developer and manufacturer of cleaning and disinfecting agents. Not only does this include responsibility for hygiene and protecting the environment, but also protecting the company’s employees from dangerous manufacturing and logistics processes.

Accepting responsibility starts with partner selection

“Protecting man and machine from dangerous processes in manufacturing and logistics is a top priority at Dr. Weigert, as well as being responsible for hygiene and protecting the environment,” says Dirk Böttger, who has been working at the company for 16 years. The qualified process technology engineer and current deputy operations manager knows about the safety risks involved in quick, automated processes such as those in the film wrapper and rolling gate areas. Choosing reliable partners is essential as far as he is concerned. On the one hand it applies for its implementation partner Industrie-automation Dirk Hähner, for whom he greatly appreciates the competent project support from planning and installation to commissioning. On the other hand, it applies to Leuze electronic, the manufacturer of MLD and MLC safety-related protective devices used to safeguard material infeed and outfeed as well as the area around rolling gates. The safety technology they use operates reliably, thereby ensuring a high level of system availability.
System modernization pose new safety-related requirements

Dr. Weigert mixes cleaning and disinfecting agents in accordance with the company’s own recipes for professional use in laboratory techniques and medical technology, the large-scale kitchen sector and the pharmaceutical, cosmetics and food industry. After mixing, the products are poured into plastic canisters with different volumes and designs, among other things, and then stacked on pallets by robots, each of which has its own affectionate nickname and history. For example, one robot is called Antje, after a Dutch advertising figure, and another has the name of a former HSV (Hamburg Football Club) manager, Huub Stevens. Driverless transportation systems take the products stacked on europallets to the area in which the goods receive an outer packaging through the new TOSA 126 E film wrapper.

From primary to secondary packaging

The entire material flow process, from the film wrapper’s in and outflow to passing through the rolling gate on the way to the warehouse, has been secured by Leuze electronic using a holistic system solution concept. “As well as the reliable quality of the safety technology, we particularly appreciate the company’s competent advice, quick support and efficiency — we are therefore delighted to incorporate Leuze electronic safety components into our safety concepts,” says Dirk Hähner, Managing Director of IDH. Particularly when a tricky task has to be carried out in a special application, Leuze electronic often has flexible and smart solutions at the ready which stand out from conventional safety concepts. “We promise our customers Smart Sensor Business — which is not a simple advertising slogan but a real promise to the customer by us, the sensor people,” says Frank Bröcker, who has been the Hamburg area Sales Manager for 10 years. What we mean by this is providing customers with simple usability of the products, and based on in-depth expert knowledge from many years of experience in the industry, develop new, creative solutions together that are specially adapted to the requirements.

The specific requirement: Rolling gate safeguarding

When the new TOSA film wrapper was commissioned, the rolling gate at the exit of the material flow in the direction of the warehouse was also replaced with a new one. The previous door was not safeguarded by any safety technology whatsoever. New additions to the machinery directive now stipulate that safety-related monitoring is mandatory. “Rolling gate protection is not that simple, since muting with sensors was hardly feasible due to lack of space — and without a consistent, holistic safety concept we would not have been given the order”, says Dirk Hähner. A specific safety-related require-
ment was that transportation of material into and out of this danger area, which is safeguarded from unauthorized access, would take place safely in the future. Due to the constrained space in the rolling gate area, a space-saving safety solution was sought which detected the approach of the wrapped europallet on the conveyor belt, temporarily bypassed the protective field and therefore ensured that the transported material could pass through without problems. However, it was important that the protective field is only bypassed when the transported material is approaching, and that access by persons is still prevented. Until now, additional sensors were required for detecting the transport material — and therefore also for identifying persons.

The solution: Smart Process Gating (SPG)

Dirk Hähner put his faith in Smart Process Gating, the new sensorless muting process from Leuze electronic, and succeeded in winning over his customers. This is a new muting process developed by Leuze electronic, which does not require additional muting sensors to protect danger zones which have to be safeguarded against unauthorized entry. The process is based on type 4 safety light curtains of the MLC series and integrated in the MLC 530 SPG model. The integration of an SPG application into a system is considered to be a system solution as far as safety technology is concerned. This results from the interaction of the safety light curtain, the system control and, if necessary, mechanical elements. “In order to do this, the system manufacturer requires competence and experience in safety design as well as knowledge of the relevant safety-related, international standards,” elaborates Dirk Hähner. “For example, the gating sequence must be programmed in the PLC and the safety system solution itself has to be created.”

Advantages of Smart Process Gating

Dirk Böttger is also extremely pleased with the decision to use the Smart Process Gating application: “The pallets are transported without problem — even pallets with a gap between the load. The safety device operates in an extremely reliable way. The installation and service costs are kept within limits, since the omission of additional muting sensors also means that they do not need to be installed and adjusted.” Overall, the system can be designed to be very compact and space-saving, because no room is necessary in front of or behind the light curtain for muting sensors. The operators are protected, and the risk of tampering is also reduced. And something that is extremely important compared to the past: The specification of the MLC 530 SPG safety light curtains is designed in accordance with the safety-related, international standards.
Experience, tradition and passion — these values ensure the top quality at the five-brother company Bühler Bedachungen & Bauspenglerei from Romanshorn in Switzerland, a business specializing in roofing and architectural sheet metal. Quality is the top priority for the family business — particularly when it comes to selecting its partners and suppliers.

Its partners include the Swiss firm Jorns AG, which supplied the sheet-metal working company with the new double swivel bending machine along with its safety concept. Also, the manufacturer of optical sensors which ensure the required level of work safety for both people and machines — Leuze electronic.

Safety for people and machines

Safety for man and machine is required not only by safety-relevant, international standards. Protecting man and machine from dangerous processes is also a matter of course for the 35-person company. “If a new machine is used, it must satisfy the latest requirements on safety technology,” says trained sheet metal worker Bruno Bühler. When selecting the safety concept, he relied on the consulting expertise of the manufacturer of this machine, Jorns AG from Lotzwil. Thanks to positive experiences, Jorns here used the RSL 430 safety laser scanner from Leuze electronic, which optoelectronically safeguards access to the long, front side of the machine. The RSL 430 is centrally positioned under the bending basin, ensuring that the maximum radial range of the sensor can be used. The area in front of the machine can thereby be safeguarded with just one sensor.

Fully automated work process

TwinMatic-Pro 150 is the name of the newly used bending machine from Jorns AG, which replaced a nearly 20-year-old machine with similar functionalities in the architectural sheet metal area of the company. The new machine enables the bending of a very wide range of types and thicknesses of sheet metals in a fully automated process: whether aluminum, zinc, copper or steel. Only when loading and removing the metal sheets does the machine need to be handled manually. As soon as the machine operator crosses the red line on the floor located approximately 80 cm, thereby entering the danger zone of the machine, his movement is detected by the RSL 430 safety laser scanner and the machine comes to an immediate standstill. Should this safety monitor fail, there is a “safety net” in the form of a step bar. If this bar is actuated by the operator’s foot, it presses against an EMERGENCY-OFF command switch that brings the machine to a standstill in a fraction of a second. “It’s good to have a double safety net — fortunately, we’ve never had to make use of it. The RSL 430 safety laser scanner works reliably and fault-free, making it the optimum solution for us”, says Bruno Bühler, who usually operates the machine himself.
Bruno Bühler (Bühler Bedachungen & Bauspenglerei) and Tobias Wüst (Managing Director of Leuze electronic Switzerland) are convinced of the safety concept implemented at Bühler.

Chäserrug is just one of the many renowned projects of Bühler Bedachungen & Bauspenglerei.

The functionalities of the new safety laser scanner convince

Owing to its technical innovations, it was decided to use the RSL 400 safety laser scanner, which is available in different variants. Since being launched on the market at the end of 2015 it convinced not only end users such as Bühler, but also juries of experts, claiming multiple awards in 2016 — including the GIT Safety Award, the Industriepreis as well as the Handling Award.

The safety laser scanner transmits periodic light pulses via a rotating deflection unit. These are scattered in all directions by obstacles, such as persons entering the danger zone. A part of the light pulses is received again by the safety laser scanner and evaluated. The scanner calculates the precise position of the machine operator from the propagation time of the radiated light and the current angle of the deflection unit at that time. If this is located within the previously defined protective field, the safety laser scanner executes a safe switching function.

“One in our case, this happens as soon as the operator crosses the safety line marked on the floor with red signal color at the long, front side of the machine,” says Pascal Guyot, director of control engineering at Jorns AG. Should this occur, the safety-related switching outputs are switched off. The required safety distance is calculated on the basis of safety-related standard DIN EN 999. Playing a role here are factors such as the approach speed relevant to safety and height of the protective field above the ground, among others. Furthermore, the stopping time of the machine as well as additional distances, e.g., for system-related measurement errors, must also be taken into account.

Monitoring from a bird’s eye view

All-round protection from all machine sides is, however, not provided by a single safety laser scanner positioned centrally. Depending on how they are attached, at least two safety sensors would be needed to achieve this. With just one safety laser scanner, cutting in automatic mode would only be possible in inching mode. Obstructions could also occur if the sheet was to protrude far outside of the machine when bending sheet metal top-down. Bühler therefore decided to mount a second RSL 430 safety laser scanner to monitor the machine room from above, thereby reducing the depth of the danger field to 80 cm. The second scanner is attached to the ceiling with an iron chain and has an operating range of 8.25 m with a resolution of 70 mm and a detection range of 270°.

The position of the safety laser scanner is always based on the sensor that monitors the bending line. Note that the control panel is also detected as an object and must therefore be located outside of the danger zone while in automatic operation. “If the area of the control panel were to be removed from monitoring, blind zones would arise within the danger zone due to shadowing. In addition, blind spots would occur between the stands and behind the machine, which must absolutely be safeguarded.”

A comprehensive safety concept

With the positioning of two RSL 430 safety laser scanners, Jorns AG recommended to Bühler an integrated, comprehensive safety concept for all-round machine protection that has been proven in practical use and that convinces. Tobias Wüst, managing director of the Swiss subsidiary of Leuze electronic in Flurlingen, emphasizes the competence of the manufacturer and innovation leader in the area of optical sensors: “Safety sensors have a great deal to offer. Reliable safety laser scanners require many years of experience. With the RSL 400 safety laser scanner series, Leuze electronic has succeeded with a development that combines maximum reliability and performance with simple operation.”

Chäserrug is just one of the many renowned projects of Bühler Bedachungen & Bauspenglerei.
“To us, being close to our customers means treating them as guests. We make every effort to ensure that they feel at home with us and are happy to come back.”

Junghee Lee,
Customer Service Manager —
Leuze electronic South Korea
TOP CUSTOMER SERVICE IS A NATURAL PART OF OUR ACTIVITIES

Our customers are guests who love to come back

If our customers feel at home with us, they are also sure to return. Junghee Lee’s job is to make every effort to ensure that her customers feel right at home with Leuze electronic. This is precisely the aim of our continuously expanding and customized services. The 24/7 service hotline and the customer proximity with our 22 branches and 42 sales partners around the globe are just some of the very real examples of our commitment to service and customer orientation.

The right service, every time

We accompany our customers during the entire life cycle of their machines or systems by providing competent advice and offering our comprehensive support and services. Our 24/7 service hotline for technical questions offers worldwide support for customer inquiries.

Always here for you, no matter when or where—worldwide

In our service center we are in touch with our customers around the clock, worldwide, ready to address their questions and wishes. We make sure that our customers’ machines and systems run reliably. With our presence in five continents, we are also physically close to our customers.
Continental Safety Engineering International in Alzenau obtained the support of the safety experts from Leuze electronic for the implementation of a suitable safety concept for a crash simulation system and the required CE certification.

The crash simulation system at Continental Safety Engineering in Alzenau, a subsidiary of the international automotive supplier Continental, is part of a complete test infrastructure based on the state of the art. In addition to the test track — the Continental Safety Park — a vehicle crash system and a crash simulation system are at the center of the facilities.

While the vehicle crash system accelerates or drives vehicles or vehicle prototypes against a crash block, moving barriers or other vehicles; the crash simulation system, in the form of a servo-hydraulic, controlled sled system, is used to perform tests without destroying expensive vehicles. “We realistically recreate deceleration processes from complete vehicle tests, basically as an inversion function by accelerating a sled with the appropriate test structure,” explains Martin Kahlert, the team leader responsible for the sled system.

Life-threatening danger with no time to respond

An acceleration distance of 1,700 mm suffices in the sled system. At this distance, a nominal force of 2,500 kN is available which is used to catapult a maximum test weight of 3,000 kg plus the weights of the sled and piston — 1,500 kg — at 60 times the acceleration due to gravity. In this short time, sled speeds of up to 90 km/h are reached. The acceleration of the enormous masses for the simulation tests occurs in just milliseconds, from zero to a maximum value. Even in the area near the tracks at the end of the system, on which the sleds are braked within 1 to 1.5 seconds, an employee present in this area would not have any opportunity to react. He would not even notice the danger to life headed towards him. That is precisely the reason for the high classification of the system according to Performance Level d.

Well-advised with Safety Consulting

For this reason, all employees must exit the hall prior to every crash simulation. Moreover, it must be ensured that absolutely no one can enter for the duration of the test. Due to the size of the hall, which includes some difficult-to-see areas, and various doors and gates, a sophisticated safety concept is necessary. This was realized with support as well as safety components from Leuze electronic. At its center is the so-called “clearing of the hall” — a precisely defined routine, according to which the system operator in charge personally locks all entrances from the inside in sequence and within specific time windows. Focus of the Safety Consulting project was on the development and implementation of a suitable safety concept. This also involved the implementation of a safety controller, including the neces-
sary components, such as safety locking devices for the doors, additional magnetically coded sensors and safety relays — everything from Leuze electronic. Here, the SISTEMA and Safexpert software programs were used to efficiently perform the CE certification.

Serving as the basis for the entire safety concept was an on-site, joint assessment of the current, individual safety situation. “For us, one of the main components was the training for programming the MSI safety controller with the MSIsafesoft programming software. The safety experts from Leuze electronic could give helpful tips here that are necessary for a project of this magnitude,” adds Kahlert.

Concerning the hardware, it is mainly the MSI safety relays which contribute to a simple implementation of the safety application through its combination of innovative connection technology, compact designs and well-arranged housing design. They function as monitoring and integration components for the L200 safety locking devices used on the doors and gates to securely lock all safety doors and thereby prevent the unauthorized entry of persons during a crash simulation. In addition to this, all doors are also monitored by MC 300 magnetically coded sensors as specified due to the high Performance Level.

“With Leuze electronic, we have found a partner who has accompanied us with a great deal of application experience over the entire CE certification and risk assessment process in the integration of a best-possible safety concept that offers optimum safety, taking into account the relevant standards and regulations,” Kahlert sums up satisfied.
THINK GLOBAL — ACT LOCAL

As a globally active, constantly and strongly growing sensor manufacturer, we are subjected to continual changes in the markets. Apart from the restructuring of processes, this also requires changes in the whole sales organization so that we can be even closer to our customers. Thus, sales structures have been redefined and continental competence centers have been established. Three Vice Presidents Sales assume continental responsibility for Asia, Europe and the Americas.

In this edition, we would like to introduce the three Vice Presidents Sales together and present their goals, tasks and the ideas behind the new concept.

sensor people magazine // Mr Keller, since round about one year you have been the Vice President Sales for America. Were you able to adapt well to your new task?

Uwe Keller // Yes, it didn’t take very long at all. Owing to my extensive international experience in the establishment and in the control of sales organizations with emphasis on the USA, this field of activity isn’t completely new to me. Furthermore, I have had many conversations at the headquarters and in several subsidiaries both to get to know the sensor people and to get a general idea of the local circumstances.

spm // Mr. Giba, you are the most recent Vice President Sales of the trio and are responsible for sales in Europe. You only joined the sensor people this summer. How have your first months been? What is your general impression?

Denis Giba // As the most recent member of the trio, I feel great — in my first few months here, I have met lots of motivated sensor people who all know exactly what they want to achieve with and for Leuze electronic. Working with such enthusiastic people is always a pleasure. This made starting my job here very easy — I felt welcome and immediately at home.

spm // Exactly which topics will you address and drive forward?

D. G. // In particular I would like to further expand the above-average growth throughout Europe and focus more strongly on our core sectors, i.e. intralogistics, packaging systems, machine tools, the automotive industry and medical technology.

spm // Mr Keller, what demands and developments do you see in the American market in particular, and how do they differ from those in the European market?

U. K. // The biggest difference compared to the European market is the size of the country. This is accompanied by a wide variety of geographical markets which each have their own set of requirements. The sales channels continue to be a fundamental difference: Approx. 80% of revenue is generated by distributors and partners.
That means you need a good network of partners?

That’s right. The establishment of a solid partner structure is currently one of my top priorities. There is enormous potential in cooperation with our distributors and integrators. We see great opportunities for sales through this channel, especially in the area of safety. The USA is the world’s second largest safety market. Given our current position on the market and the new safety products in our product range, we expect above-average growth in this segment.

Leuze electronic has two locations in the USA …

Yes, a production and sales location in New Hudson, MI and a technical competence center in Rochester, NY. At the production location, we mainly produce safety light barriers.

One last question concerning the Americas: What’s the current situation in Brazil, Mexico and Canada?

We have had a subsidiary in Brazil for several years. Despite the difficult political situation and a weak economy, this production and sales location is developing very positively. The foundation of new sales companies in the Americas is part of our “Growth Strategy 2020”.

From America to the other side of the world… Mr. Höhl, you were already featured in the sensor people magazine in 2016 when our largest subsidiary in China celebrated its 10th anniversary. What, in your opinion, are the special features of the Asian market?

As is the case in the other markets, our key focus is proximity to our customers — this is why we took the decision to continue our course toward the development of a continental sales structure with its own sales companies in the principal markets. Only then can we adapt to the circumstances and requirements of the local markets and, therefore, to our customers.

How does this development look in practice?

We have, for example, established a technological competence center on a continental level in Singapore so that we can provide fast technical support locally.

True to the motto: think global, act local?

Yes, that’s right. Internationalization, but at the same time concentration and specialization, is becoming increasingly important in rapidly changing markets.

Back to Europe: Which challenges do you face, Mr. Giba?

The European market is in many respects a leading technological market. But, in my opinion, there are more opportunities than challenges. Many countries have high labor costs, and our customers are permanently on the lookout for optimization possibilities which will allow them to achieve a higher level of automation. I am impressed how innovative and wide awake our European customers are. It is therefore good that our head office in Owen (Teck), southern Germany, is located at the center of Europe and that, at the same time, we have a large number of national subsidiaries to ensure that we are extremely close to our customers and present at a local level.

Many thanks to all three Vice Presidents Sales for the interview. We wish you every success in your respective areas of responsibility and in mastering the challenges that they bring!
THE SENSOR PEOPLE ON TOUR
IN CHINA, MEXICO, RUSSIA ... 

We the sensor people can be found wherever our customers are. At the heart of our industry and close to our markets, at many trade shows and events all over the world. Start a conversation with us at one of our trade show booths and experience up close what we have to offer. As drivers of technology, we of course get involved in current discussions in the industry and do our part to contribute to the technologies of tomorrow with lectures.
LEUZE ELECTRONIC SHOWS ITS COLORS AT SPS IPC DRIVES 2017

Leuze electronic will also be demonstrating its expertise in the sensor business at SPS IPC Drives, the international trade show for electric automation, from November 28 to 30, 2017 in Nuremberg. The sensor people with its new look will be in Hall 7A, Booth 230.

Come visit us!

Hall 7A, Booth 230
Stop by and get to know the sensor people.

EASY, EXPERIENCE, PROXIMITY and FUTURE — these are the core messages that Leuze electronic is presenting to its visitors with a new look & feel at this year’s SPS IPC drives under the motto of Smart Sensor Business. “Anybody can exhibit products — as far as we are concerned, it is a case of turning the visitor’s trade fair visit to Leuze electronic into a real experience”, says Salvatore Buccheri, new operations manager for Germany at Leuze electronic. “At our trade show booth, our visitors can remember and experience the fact that we do not consider Smart Sensor Business to be an advertising slogan, but a demonstrable customer promise that we all live for on a day-to-day basis.”

Thinking in an EASY, creative and smart way starts with the development of new products at Leuze electronic — it is one of our development credos.

Under the key word EXPERIENCE, we will be presenting our extensive expertise in intralogistics, packaging systems, machine tools and the automotive industry.

The company currently offers PROXIMITY with an extensive service from 22 subsidiaries and 42 sales partners worldwide. “Dealing with the individual needs of the customer and guaranteeing 24/7 availability worldwide is something that not everyone is capable of,” says Denis Giba, new Vice President Sales Europe.

The fact that Leuze electronic is shaping the FUTURE with the development of new technologies is shown by its pioneering role with regard to Industry 4.0 — the company has been collaborating with Microsoft and the OPC Foundation for more than a year and therefore playing an active role in shaping the technological standards of tomorrow. A number of products from Leuze electronic already have Microsoft Azure certification.

As well as the innovative sensor solutions, it is particularly important for trade show visitors to get to know who the sensor people are, what they are about and which specific benefits they offer, because business in B2B is ultimately made between people.
"We are developing the technological standards of the future. Together with our customers and international technology partners, we are working on viable concepts for tomorrow’s industrial automation."

Moritz Mullis,
Development Engineer —
Competence Center Electronics
INTELLIGENT SENSORS PROVIDE THE FOUNDATION FOR INDUSTRY 4.0 AND IIOT

We have a very clear idea of what the future will look like, and we develop suitable sensor concepts for it.

Together with international technology partners such as Microsoft and the OPC Foundation, among others, we are designing the technological standards of tomorrow and are already optimally preparing our products for this today. For example, already today some of our sensors, such as bar code readers or optical data transceivers, are sending their data directly to the cloud where they can be used for further analysis or services. Interfaces such as IO-Link or EtherNet also aim to facilitate the communication and networking of sensors and make the information available worldwide.

Condition monitoring with DDLS 500

Our DDLS 500 data transmission photoelectric sensor is the world’s first device to provide external access and remote error diagnostics via EtherNet using its integrated web server. Here Leuze electronic is a pioneer and sets the standard for the future.

Into the future with bar code reader BCL 348i

In cooperation with Microsoft, we are developing a sensor solution with Industry 4.0 capability which is based on the BCL 348i bar code reader and transfers the data directly to the Azure Cloud via OPC UA and back to the sensor. The bar code reader can also be controlled directly via the app.
INDUSTRY 4.0
GLOBAL AVAILABILITY OF DATA

The Industry 4.0 is to make information available from diverse sources and to link this information. Initially the origin of the information should be differentiated. This can be achieved by applying the automation pyramid or the RAMI model 4.0 as orientation: On the one hand this provides information, which has been generated on the field or control level. On the other hand it supplies information, which is managed centrally, e.g. in ERP systems.

The added value and business models, which are discussed in the context of Industry 4.0, primarily stem from the fact that information is “collected” from different sources to the field level and is linked to centrally available information, to acquire new knowledge.

The classic flow of data in the automation pyramid takes place from one level to the next — for example from the component level to the control level. Therefore, the central aim has to be to eliminate these system transitions and data filters to make data and information available fast and universally. It is only possible to devote oneself to the actual target — the linking of information from different sources — when data availability is given.

These hurdles, however, cannot be eliminated using conventional processes. Instead a central pool is formed, parallel to the existing transfer processes, which can be addressed directly from different sources. The term “Cloud” is currently being used synonymously for this purpose. The individual companies set up a “private Cloud” in their own tenant as a basis. If it becomes necessary as part of a new business idea to make individual information available to other companies or clouds, it can be accessible from different tenants. The scalability of the cloud capacities allows for the recording of data, which is as yet unknown to the user and could give rise to additional knowledge or generate business cases in the future as applicable.

Metaphorically speaking, we are currently constructing a highway for transporting goods, to which we then attach business cases. At the moment no one knows exactly where this highway will lead.
Networking replaces hierarchical automation

The classic data flow of an automation pyramid is completely permeated by the OPC UA protocol.
In the past, point-to-point connections between the control unit and the respective device — sensor or actuator — have dominated industrial automation. Today the master/slave communication model dominates between the levels of the automation pyramid. Thus, a transition to a netlike communication architecture is created, which we already know from the IT sector. This enables data transfer between all levels in arbitrary directions. It is essential for the networking and assessment of the data that the data is up-to-date and has a specific, for example geographical, reference. For this reason we, “the sensor people” at Leuze electronic, have committed ourselves to the subject of data availability and for the first time have brought data directly from the sensor into the cloud, across all systems. This involves the integration of an OPC UA server in our sensor and docking onto the Microsoft Azure Cloud. The IoT proxy from Microsoft enables client-server communication from the cloud similar to local shopfloor concepts.

The advantage of these solutions is that structured information is available globally. Therefore, the data can also be networked across systems and company borders for interpretation and evaluation purposes.

This global availability immediately raises the question of data integrity. OPC UA is tested in line with the federal institute for security and information technology and offers all basic safety features for secure communication. In this way, tested methods and procedures from the world of information technology (IT) are transferred into the world of automation technology (OT — Operations Technology). For Leuze electronic, this can be subsumed under the key word “OT2IT” (or “OTgoesIT”). In the future, sensors will therefore be equipped with a unique safety certificate in addition to the identification data to date such as their serial number.

To make data in the cloud easily usable, the aim is to provide information from related data sources in a standardized structure. Different attempts and approaches have already been undertaken in this direction. An application-specific companion standard from the “Advancing identification matters user organization” has also been specifically defined for sensors in the auto ID sector, for example bar code scanner”. Leuze electronic will implement this standard in its Ident products. Thus, seamless integration of information from Leuze electronic bar code readers into the ZVEI management shell is possible. Seamless means that the information can be transferred from the sensors via OPC UA directly into the data model.

Secure data exchange using authentication and certificate exchange
TAKING A LOOK INSIDE THE SENSOR WITH HOLOLENS

Intelligent networking completely changes automation. Why smart, communicative sensors play an essential role here and what the HoloLens has to do with it is explained by Ulrich Balbach, Managing Director of Leuze electronic.
sensor people magazine // Mr Balbach, what exactly makes a sensor smart and what makes it fit for Industry 4.0?

Ulrich Balbach // Most of our sensors have been smart for a very long time. Even a tiny photoelectric cell has a certain amount of intelligence on board. The whole thing becomes smart in terms of Industry 4.0 when we combine sensory intelligence with connectivity intelligence. The objective is to be able to transfer the intelligently generated information simply and in a standardized format to an evaluation unit at a different location where superordinate intelligence is then created by merging many items of information.

spm // How, in concrete terms, is this extremely abstract definition implemented in practice?

U. B. // For example, we have integrated a web server structure in one of our bar code readers — this alone would not be enough for the “4.0” stamp. But in combination with UPC UA, this opens up new possibilities — even the possibility of direct communication with the Microsoft Azure cloud.

spm // The key aspect is the provision and evaluation of data. What exactly is transferred?

U. B. // For about eight years now, we have equipped the sensor interface on bar code readers in such a way that not only the pure measurement value is transferred via the interface — by classic means via PROFIBUS/PROFINET — but that the control system can actually communicate with the device. In this way, the devices can be configured and adapted to the application. Furthermore, the device sends feedback with regard to maintenance, e.g. “How is the sensor?”. With the integrated web server and OPC UA, this functionality has now been raised to the level of Industry 4.0.

spm // What exactly is so fundamentally different at Industry 4.0 level?

U. B. // To understand that, you must first take a look at the classic automation pyramid: At the bottom is the field level, then comes control, above that is the manufacturing execution system and right at the top of the pyramid is the ERP system. How to make the sensor accessible from the upper levels has been the topic of discussion for a long time. Previously this was usually done by integrating bus topologies — however, this always involved the control which is already busy doing other tasks. What we now do with our devices is set up a parallel connection from the sensor directly to a cloud which, of course, can then also communicate with the ERP or MES system. This is our interpretation of 4.0 and, together with Microsoft, we are the first to have followed this path outside the control.

spm // Will this one day replace the classic architecture?

U. B. // There may one day be a real-time-capable cloud; this is feasible from a technical viewpoint. But at present the latencies are still too long to be able to implement a cloud-based control. However, there are enough cases where not every millisecond counts, but maybe where just 50 or 500 milliseconds are critical — I can then very elegantly bypass the control and transfer this information directly into the cloud.

spm // What do customers say to this? What are the business models behind this concept?

U. B. // The business models will not emerge until much later, right at the end of the process. I think here we are not internet-minded enough. In this industrial sector, it was for a long time customary to first define the business case and calculate the ROI. We deliberately want to approach the matter in a different way: We are building a road on which the truck can then drive.
spm // For sure a wonderful allegory, but what does it mean in concrete terms?

U. B. // First comes the technology. It is not quite ready yet, but still advanced enough to allow us to drive at speed along the road. Unlike some roads in the real world, our “road” will always be toll-free! (Laughs) We know our customers pretty well — if this becomes expensive later on, they will not like it one bit ...

spm // But what do customers say to your enthusiasm for this road?

U. B. // There is indeed a wide range of reactions. Some, like machine builders, are interested because they already have a concrete application in mind, such as predictive maintenance. But they are still rather cautious when it comes to use under real conditions. The topic isn’t yet a priority for them. At the other end of the spectrum are end customers who operate large machine parks spread all over the world. Here, they are much more active with respect to cumulating their data and generating added value through its analysis. There are many different opinions and degrees of maturity. This is why I use the road construction allegory: How can a machine builder enable his machine to communicate data in the first place?

spm // Now let’s be honest. You don’t build a road without knowing where it’s going to?

U. B. // Actually, that’s exactly what we’re doing: We’re building a road without knowing where it’s going. And quite deliberately. Only after creating certain possibilities does one think about how to use them. Then, however — and I’m convinced of this — no stone will be left unturned.

spm // Can this already be broken down to a concrete technology?

U. B. // A sensor can capture much more data than can currently be written to the bus. Let’s take our laser measurement systems as an example. In addition to the actual measurement value, we also record the temperature at four or five points in the device for diagnostic purposes. We can write this information — though not yet in real-time — to the cloud and thus make it available for additional use by the user. New business models emerge there via the application structures.

spm // What types of application would be conceivable?

U. B. // They could be logistics applications or accounting models. A machine builder who we are working closely together with is considering a distributive application for a large number of networked machines. This would mean communication between the machines along the lines of “Do you have material that you don’t need at the moment? Then send it to me ...” The huge leap with regard to Business 4.0 won’t be made by providing a little bit more condition monitoring in a machine ...

spm // ... this wouldn’t require a cloud anyway, would it?

U. B. // Talks with customers often result in ideas on how to use the data which today is still “stuck” in the control, from where it first needs to be painstakingly extracted. Using the cloud, I suddenly have the possibility of accessing this data in an extremely simple way. It is then frequently the case that customers begin to intellectually leave the confines of their own factory hall and think in terms of international or even global applications. For us, global networkability plays a crucial role in such considerations.
From practice for practice ...

This year, Leuze electronic invited its customers to a so-called Industry 4.0 practical workshops at its head office in Owen. “For us it was important to offer our customers a practice-oriented event where they could present specific practical examples and discuss them with other participants,” says Ingo Baumgardt, Head of Sensor Communication. Apart from connected sensors, other topics covered at the workshops included security + discovery and predictive maintenance. The workshop began with brief keynote speeches given by speakers from theory and practice. They included Stefan Hoppe, Europe President of the OPC Foundation, and Erich Barnstedt, Principal Software Engineering Lead MSC of the Microsoft Corporation. For over a year now, both speakers and us have been connected through a partnership which seeks to develop Industry-4.0-compatible data communication.

Photo below, from left to right: Stefan Hoppe, Lenhart Leuze, Christof Leuze, Erich Barnstedt
COSMOS, INDUSTRY OR PRIVATE LIFE!

What do they all have in common? The key word is “retro-reflection”.

The Zeiss planetarium in Laupheim, which was founded in 1990 and completely modernized in 2012, is currently one of the most modern observatories in the world. This makes it a popular destination for young and old—and also for the sensor people from the optics development department.

Tens of thousands of white and colored LEDs and the ability to provide a 360° multimedia show ensure an out-of-this-world atmosphere. A “normal” visitor show was of course not enough for the optical sensor specialists who deal with optics on a daily basis—they needed a special tour! And this led to even more: on the one hand, the opportunity of Leuze electronic presenting itself as a manufacturer of optical sensors at the planetarium in the coming months. On the other hand, the idea of showing colleagues as well as users the connection between optical sensors in the cosmos, in industry and in private life—because, essentially, the optical laws which apply in the cosmos also apply for industrial light and in a private environment.
What is the task of a retro-reflector?

Thomas Kölle // A retro-reflector reflects incident light back in the direction from where it came. This allows many tasks to be solved, both in day-to-day life and in sensor systems. The direction of light can be reversed e.g. using a prism structure where three surfaces are arranged at right angles to each other and loss-free total reflection is implemented. Alternatively, there are retro-reflectors in panel or film form which have extremely small balls and use a similar effect.

In which specific areas are such retro-reflectors used?

T. K. // The first important field of application is distance measurement. Devices such as our AMS 300 measuring sensor use the propagation time of the radiated light and have a retro-reflector to measure the distance to an object up to a maximum distance of 300 m with an absolute accuracy of 5 mm. Here, the object can be moving at a speed of up to 10 m per second.

Are there other fields of application?

T. K. // Another area of application for retro-reflectors are polarized retro-reflective photoelectric sensors. The combination of retro-reflection and polarized light also allows the reliable detection of objects which are strongly reflective and cannot be detected using other sensors. These polarized retro-reflective photoelectric sensors are used for distances up to 26 m and can determine whether an object is present and whether specific dimensions are observed.

I still find the connection between cosmos, industry and private life a little abstract… can you help me better understand it with a few practical examples?

T. K. // The distance to the moon is measured using retro-reflectors which are permanently installed there. In sensor systems, retro-reflectors essentially have two different uses, e.g. to connect two applications to each other.

Can you also give an example from everyday life?

T. K. // You are familiar with the retro-reflectors in road traffic. For example, they are used on bicycles, posts at the side of roads, construction site markings and protective clothing to improve visibility.
TRAINING AT LEUZE ELECTRONIC

We offer young and motivated people from different sectors the chance to enter the workforce and be part of our successful and international team. Leuze electronic provides the ideal basis for diverse vocational and further training. Plus flexible working times, varied tasks and interesting development opportunities.

Our apprenticeships:

**Electrical engineers (m/f)**

An electrical engineer (m/f) first learns about the various products offered by Leuze electronic. When he has familiarized himself with the products and understands them from a technical viewpoint, he will be the contact person for assembly personnel in daily production. If problems occur during the production process, an electrical engineer rectifies these production outages. In addition, he is responsible for repairing defective products.

**Professionals for warehouse logistics (m/w)**

These professionals ensure that ordered merchandise arrives at the customer as quickly as possible. They also make sure that a product is packed and transported properly.

For this apprenticeship, you should enjoy practical tasks, be able to think logically and have basic computing skills. Furthermore, you should have a good understanding of figures and show skill in handling small parts.

**Industrial clerks (m/f) with additional qualification in international business management including foreign languages**

They are employed in commercial and business management fields. Typically, these include commercial departments such as the sales, marketing and human resources departments. However, these are just a few of the areas that trainees pass through at Leuze electronic.

We also offer dual courses.
“In the photo you can see me on the phone inviting a customer to a safety seminar. The seminars and workshops from Leuze electronic with small groups of participants offer an ideal framework for your further training: gain expertise, take part in technical discussions, get to know interesting people and network.”

“In this photo you can see me sitting at optical test apparatus used to check the transmit and receive free-form mirror of the RSL 400 safety laser scanner for geometrical deviations. I find it fascinating that the test apparatus is able to detect minute deviations and indicate where these deviations are.”

“One of the main tasks in the assembly of our products is soldering. Essential requirements here are dexterity and practice. What I particularly like is that we trainees are given the opportunity to take on small tasks in large projects.”

“I have ‘balanced’ the RSL 400. You have to make sure that the optical unit, which rotates, is running smoothly and does not wobble — this ensures that there are no vibrations. The machine indicates where a lead weight needs to be attached.”

“Here you can see me creating a visual circuit diagram on a PC. The advantage of working on a PC is that you can make changes to the circuit quickly and easily and, unlike in a practical assembly, you don’t have to unsolder and resolder components and so on. It also saves material costs. What I like about the training program is that we electrical engineers also have the chance of working in different areas, e.g. the service department and the technical helpline.”

These pages were put together by the trainees themselves.
FROM COMPULSORY INTERN TO SOFTWARE DEVELOPER

One of our sensor people Felix Heil writes about his career at Leuze electronic. Today he is a development engineer for embedded software used in sensor communication.

“It all began with a compulsory internship at Leuze electronic which I did as part of my technical computer science course”, recounts Felix Heil, graduate of Esslingen University of Applied Sciences. Felix’s sensor people colleague Roland Haag, who today also works as a development engineer at Leuze electronic, was to “blame”. Roland used to be Felix’s lab mentor at university and it was he who opened Felix’s eyes to the world of the red sensor. Felix enjoyed his compulsory internship at Leuze electronic so much that he decided to become a student trainee. As often as his timetable would allow, the technophile hobby photographer drove from Esslingen to Owen. He even wrote his bachelor thesis on the synchronous serial interface monitor (also referred to as the SSI monitor) at Leuze electronic. The Bachelor of Engineering was supported by other colleagues from R&D and his professor, Reinhard Keller, who also used to be one of our Esslingen sensor people before he began his career at the university.

“I’m also a “techie” in my private life”, admits Felix Heil. He goes on to tell us that he even used to develop his own digital effect devices, which are connected between a musical instrument and amplifier, for example to distort the sound of his guitar. “I’ve always had a weakness for programming. It’s great to be able to solve technical problems by yourself, to develop something new, and use it to create technology that serves people, and not vice versa”. This is the same fundamental development maxim practiced at Leuze electronic and corresponds to his own personal attitude toward technology. This is why the young and extremely dedicated development engineer for embedded software feels so at home at Leuze electronic. Here he has the opportunity to do things at work that also mean a lot to him privately.
478,400 METERS FOR A GOOD CAUSE

“The sensor people” from Leuze electronic put on a good show at this year’s AKB sponsored fun run which took place in Kirchheim/Teck on July 4, 2017.

Nearly 60 sensor people wearing Leuze electronic’s company jersey showed that they are a strong team not just in the sensor business. They were the largest company team at the event and ran 598 laps of 800 m, raising 598 euros for charity.

The total proceeds will be shared equally between the AKB (action group for people with and without disability) and the KIZ (communication center for intercultural collaboration) in Kirchheim/Teck. This will allow the AKB to fund a wide variety of leisure activities for people of all age groups with and without disability, e.g. holiday camps, trips and regular evening activities. The KIZ will use the donation to support young people in their transition from school to career, as well as voluntary youth work. The sensor people’s proceeds from the sponsored fun run has been rounded up to 1,000 euros by Leuze electronic.

“The sensor people” from Leuze electronic running for a good cause.
AUTONOMOUS DRIVING — SENSOR SYSTEMS MAKE IT POSSIBLE!

Hotly contested—the Carolo Cup at the technical university in Braunschweig. For 10 years now, 15 teams of students from different European universities have taken part in the annual competition there to find out who has the best autonomous model vehicle—disciplines include a round circuit, an extended obstacle course and parking. Team Spatzenhirm (Engl. “Team Sparrow Brain”) from the University of Ulm, sponsored by Leuze electronic, have proudly notched up a number of successes and have come first on several occasions—as was the case in 2017!

Ulm’s Team Spatzenhirm is proud of its awards, trophies and especially of its “Sparrow”, as they affectionately call the autonomous model vehicle that they developed themselves. Where did the name come from? “The answer’s easy”, explains Alex Grathwohl. The electrical engineer, who is currently in the 2nd semester of his Masters degree, has been a regular team member for several years. “The Ulm Sparrow is the emblem of the city of Ulm and has become the nickname for people who live there, and also for our model.”

Grip is the decisive factor

“Just like handball players are constantly cleaning the soles of their shoes during a match, the Sparrow’s tires receive similar attention”, explains the student as he brushes off one of the tires. According to Alex Grathwohl, this makes a huge difference to tire grip, particularly after the critical test phase prior to the Cup on a specially created course in a large building on the university campus. During the year, full-size test vehicles are parked in the building and used by budding design engineers to prepare for the requirements of automotive industry. Every millisecond is important in the Carolo Cup and the competition never sleeps — just like in real life. “We might have a test race beforehand with another team to give us an idea of where we stand.”

There is a great team spirit among the members. The team has even designed its own Spatzenhirm T-shirt. Those wearing the T-shirts are predominantly students of electrical engineering, information systems technology, computer sciences, media sciences and physics. Every team member has their own specific task. The software team is responsible for e.g. image processing for detecting traffic signs, traffic lanes, keepout areas, crosswalks, stop lines and other road markings. Trajectory planning based on the detected lane, the development of a control system to stay in the lane, the programming of an interface for communication with the hardware, the evaluation of sensor systems (such as laser distance sensor, gyroscope, accelerometer and depth camera), the detection of obstacles, decision-making on the obstacle course, mapping and tracking of the driven route and detected objects are also elementary tasks of the software team. The software has been completely reprogrammed for the Carolo Cup 2017.

The tasks are just as diverse and fascinating when it comes to the hardware. Here, the most important aspects are board development, board assembly, testing and repair, firmware programming for STM32-based hardware controllers as well as the construction and improvement of the chassis. Ulm’s Team Spatzenhirm usually works in teams of two. These mini teams and all details do not come together until the critical phase,
shortly before the Cup. “Every spare moment is then used for optimization and testing”, says the student. “You definitely don’t want to see the state of the student lab after we’ve been working long night shifts in there — car parts scattered among the piles of energy drink cans and empty pizza boxes”, says the student with a smile.

The cradle of autonomous driving

“The requirements of the Carolo Cup are getting higher every year. Numerous regulations have to be fulfilled, and you don’t know the exact course until the actual competition”, says Alex Grathwohl. However, on the day of the Cup, all participating teams are allowed to practice in Braunschweig’s town hall, in order to get used to conditions at the venue, e.g. the lighting and reflective plastic mats. And then, two hours before the Cup, it is time to hand over the submitted autonomous model vehicle. Only then is the approximately 100 m long round circuit, on which the race is to take place, rebuilt ready for the competition. The excitement continues: Which team will perform best on the track? Which autonomous vehicle has the optimum configuration and is ahead in the 2 minute time trial on the round circuit? Driving errors and intervention by remote control are penalized on the round circuit by deducting penalty meters from the total distance driven. The parking element of the competition is different: Intervention by remote control is not permitted. Like a biathlon, penalty seconds are added if the parking car makes contact with other objects, it crosses limit lines or it opts to park in larger parking spaces as long as smaller parking spaces are available. Furthermore, the teams cannot afford to make any mistakes during the two possible parking attempts — both attempts are scored together because the parking maneuver should be reproducible and not a “fluke”. It was in this event in particular that Team Spatzenhirn were able to greatly improve their performance in 2017.

The distance sensors from Leuze electronic with red light detection are a huge help here. For example, the ODSL8 mounted at the front right of the “Sparrow” is ideal for detecting parking spaces. Its large measurement range, the reflection-independent distance information and its increased indifference to ambient light are impressive features. On the other hand, the HRTR 25B mounted at the rear right recognizes objects extremely accurately when overtaking, and is able to detect when an obstacle is no longer present. The sensors from Leuze electronic, in addition to the newly programmed software and the many minor technical modifications, enabled Team Spatzenhirn to win the Carolo Cup 2017.

Once the Cup has been won in the regular competition, the winning team then automatically qualifies for the next, more difficult stage. Here, the vehicle not only has to avoid obstacles and stop at stop lines, it also has to recognize and observe speed restrictions, detect crosswalks and pedestrians, drive around keepout areas, deal with height differences and solve many other tasks. Every year the organizers comes up with new tricky challenges which the vehicles need to master. This keeps the Cup fresh and exciting.

“The sensor people” as technology sponsor

Leuze electronic has sponsored the research activities of the Ulm team for a number of years and is keeping its fingers tightly crossed for 2018 — in particular Dr. Marie-Theres Heine, post-doctoral physicist at the university in Ulm and former board member of the econophysics alumni association of the University of Ulm. Since 2012, she has worked with great passion and dedication as a product manager for switching sensors at Leuze electronic in Owen.
THREE PILLARS OF A MODERN HR STRATEGY

Since January 2017, Hannes Horlacher has been the new Director Human Resources Global at Leuze electronic. Today, you will get to know him a little better.

sensor people magazine // Mr Horlacher, would you like to tell our readers a little bit about yourself and your life?

Hannes Horlacher // Certainly — I’m 55 years old, married and have an 18-year-old daughter. I was born in Swabia, grew up in Franconia, which you can tell from my accent, but have lived in the Allgäu for 15 years.

spm // It’s plain to see that you’re a passionate HR man. Normally, you ask applicants this question — today it’s my turn to ask you: Why did you decide on Leuze electronic?

H. H. // That’s right. I’ve been active in Human Resources for over 25 years. They have ranged from Internet start-ups to major international companies. However, most of the time I was employed in medium-sized family-owned companies with a strong focus on technology. Like Leuze electronic, these companies also experienced a dramatic transformation as a result of technological changes and saw an above-average growth, which brought with it many new demands. The challenge of supporting this development appeals to me. And this is the reason why I decided on Leuze electronic.

spm // How exactly would you like to address these challenges?

H. H. // Our HR strategy, which is derived from the company strategy and corporate objectives, is essentially based on 3 pillars: 1. Professionalization, 2. Automation, 3. Internationalization.

spm // What exactly do you mean by “professionalization”?

H. H. // Professionalization is the further development of processes and personnel-related instruments in order to adapt them to the changing needs. For example recruitment, employer branding, the promotion of young talent, training as well as remuneration structures. There are also many other topics that we will need and have to address in the future.

spm // A quick word about “automation”?

H. H. // Automation relates in particular to the processes within HR. We want to automate and simplify these processes and make them quicker and more efficient. Furthermore, automation concerns processes in the interaction between employees, management and HR — processes that lend themselves to automation in this age of digitization. This will allow the HR team to focus more on the needs of the employees. One example of this is the vacation application and approval process, which we intend to replicate electronically in the near future.

spm // What does the 3rd pillar “internationalization” mean?

H. H. // About 40% of our employees currently work abroad. Our increase in growth will also mean an increase in international cooperation. As a result, we will need to create harmonized structures and standards and apply them uniformly all over the world. Of course, this does not only affect HR but other areas too. The objective is to provide our foreign subsidiaries with greater support in personnel matters. There are already a number of projects where we are working together with the subsidiaries. For example, we are intensively exchanging information with our two HR colleagues in China in order to harmonize processes and procedures.

spm // The 3 pillars will present huge challenges for HR… how will you solve them?

H. H. // In the HR department, we have already made a number of initial changes and have also been able to increase the number of staff. To be able to master the new demands of the future, the profiles that we look for today need to differ greatly from those of the past.

spm // Which challenges do you face personally and which face Leuze electronic as an employer?
H. H. // Basically, structures and processes need to be shaped in such a way that they support and enable the continued growth of Leuze electronic. We are in a very dynamic growth phase in which we need to constantly scrutinize and adapt our processes and structures. The company is entering a new dimension with challenges which in the long run cannot be overcome with the previous practices and procedures. This is also evident in the various workshops concerning topics such as “Growth 2020” and the so-called “value workshops” in which we involve a large number of employees in the change management process. Constant change and constant transformation should be seen as the norm and regarded as an opportunity and not a “threat” — this is the great challenge that we all face as we continue along the current growth path.

spm // Everyone is complaining about the lack of specialist personnel — are you able to find specialist personnel who have the desired qualifications and meet the relevant requirements, or is this difficult?

H. H. // As a result of full employment and the extremely positive overall economic development in Germany and particularly in our region, it has for some time been more difficult to find qualified personnel. This means that today it takes much longer to fill a vacancy. But we’re not the only ones who have to contend with this problem. Leuze electronic has a good reputation on the recruitment market so that, in most cases, we are able to fill vacancies within a reasonable time. However, there are also cases where it takes us a long time to find a suitable candidate. This is also partly because we make no compromises when it comes to the quality of personnel, and for us it is important that the people fit in well with the company and with our company philosophy. In order to improve the situation in the medium term, we are also increasingly investing in our own training and further training schemes. We now offer additional courses for career changers wishing to enter manufacturing. Furthermore, we are working to ensure that Leuze electronic also remains an interesting employer in the future.

spm // What objectives have you set yourself personally?

H. H. // My first months were mostly spent getting to know the organization and the day-to-day business activities. Now we are able to focus on the further development of our core processes. Our plan is to make small but steady steps forward and to provide processes and instruments which are understood and in particular practiced and used both by management staff and their employees. This will ensure, on the one hand, that we can function as a “service provider” and, on the other, that our “internal customers” are not overloaded with too many new things.

spm // If I have understood you correctly, your primary goal is to ensure that our employees are successful?

H. H. // That is correct. My aim is to create an environment and atmosphere in which employees can fulfill their tasks successfully, regardless of which role or function they have in the company — assembler in production, engineer in development, manager or managing director. A good example: At the company’s summer festival, it was noticeable that, despite all of these new tasks and challenges, which are definitely not always easy, there is a very good atmosphere and a strong team spirit in the company. This is also apparent in my own department in particular. For me, this is a key success factor in a change process: change is fun!

spm // That sounds like a lot of exciting challenges … Many thanks for the in-depth interview. We wish you all the best and every success in dealing with the key challenges that lie ahead.
Double-digit growth means a growing need for qualified personnel

Smart sensor business is the DNA of over 1,000 sensor people worldwide — employees at 22 locations who are supported by many distributors, ensure that our customers are advised professionally, comprehensively and reliably. The number of employees increased from 944 in 2015 to 1045 in 2016. We are planning to increase our workforce by about 10% in 2017, with half of this increase taking place in Germany. Leuze electronic is therefore committed to its location in Germany, and is proving its sustainability in the creation of new jobs. We are looking for specialists in all areas, from skilled production workers to product managers and national and international sales managers.

More than 1,000 sensor people worldwide

Red, blue, yellow or green — the sensors available on the market are becoming harder to tell apart. The underlying technology is more or less the same and differentiation on the basis of the products alone is becoming increasingly difficult. The most important assets of Leuze electronic are therefore the employees, “the sensor people”, who embody the spirit of the company. Our 22 locations all over the world provide us with many opportunities to take on global challenges. Increasing internationalization requires, among other things, new structures, new processes and a new mindset — all this is only possible with motivated and dedicated employees. We offer our employees therefore the chance to become actively involved and to accept new tasks and challenges across the globe, to actively participate in and support development, and to assume responsibility.

Technological leadership requires a high level of competence

Also with regard to Industry 4.0, the sensor expert Leuze electronic, which deals with the exchange of data on a daily basis, is adopting an active pioneering role and driving force. Here, of course, it is important to highlight our partnership with Microsoft which has enabled us to be the very first sensor manufacturer to transfer data not only to the Microsoft Azure cloud, but to also use it for direct control of the BCL 348i bar code reader. Innovation leadership requires our employees to have a high level of competence as well as the willingness and desire to further expand and develop their own skills and knowledge. Employee development is planned on an individual basis and reviewed once a year in so-called competence dialogs. We also offer many possibilities in the areas of specialist competence, methodological competence and social competence because the success of our company is not least the result of the excellent training and continued development of our employees.

A positive working climate promotes communication and customer orientation

Apart from specialist suitability for a certain task, we also consider it important to provide our employees with an environment which enables a positive working climate and promotes a sense of community among the sensor people. They will find the ideal environment to motivate them to do their best work and develop innovative solutions. Our workplaces are well equipped and our offices are fashionably furnished and decorated. The communication channels are short and unbureaucratic so that we can act flexibly in all areas and make quick decisions in flat hierarchies, and also ensure a closeness to our customers. Many companies claim to be committed to customer orientation — Leuze electronic practices customer orientation and, with its customer promise of Smart Sensor Business, goes one step further: We offer a concrete and measurable added value in the areas of product usability, product application know-how, customer service and sustainability, thereby contributing to the success of our customers. These areas are our yardstick for new product developments, innovative service offerings and extensive market expertise.

The recruitment of skilled employees starts early

Participation at the annual Boys’ and Girls Day’, an education partnership with the secondary school in Lemmingen as well as our close cooperation with students and also with university professors and people working in R&D ensure that we remain innovative and continue to develop. Furthermore, we have a strong local presence with solid partners, such as the ASI and IO-Link consortium or the OPC Foundation. We are also a
member of the VDMA (German mechanical engineering industry association) and ZVEI (German central association of the electrical and electronics industry). We cooperate with international technology partners that also develop products, and particularly with our customers who have a keen interest in technical innovation, reliability and usability.

We offer our employees many different promotion opportunities and nurture their careers on a very individual basis. Here, the employee’s interests, skills and potential in particular play a major role in determining whether the employee will follow a specialist career or a management career.

A positive work-life balance encourages the performance of our employees

The health of our employees is also important to us. Together with the companies Heller and Index, Leuze electronic has its own company health insurance fund — the BKK Vorarl. Insured employees enjoy a range of outstanding benefits to ensure that they get well again as quickly as possible, or to help maintain their health. Together with the BKK Vorarl, we regularly organize health days to make our employees aware of certain health issues and to encourage them to take preventive measures which will help them stay healthy. We also participate in a joint annual team event, a company race, which apart from being beneficial to health also promotes the sportsmanship and team spirit of the sensor people as well as their sense of camaraderie. And anyone who wants to work well, also needs to eat well. To cover this essential need, we have a company restaurant with an attractive outdoor area for the warmer months of the year. The restaurant offers a varied selection of inexpensive meals which are partly subsidized by the company.

Working hours models with great flexibility

Many of our employees have worked at Leuze electronic for a long time and have gained considerable experience which we greatly appreciate. We have employees who first came to us as “vacation jobbers”, completed their training here, went on to study and then successfully began their career with us. For us it is important to nurture employees and to retain them over the long term by offering promotion opportunities and company activities. With our flexible working hours model without fixed core times, we offer the employees the possibility of combining work with their private life in the best way possible. As a family business, we know how important life-phase-oriented career models are.

What is so special about working as part of the sensor people family at Leuze electronic? Alexander Mielchen tells us from a very personal perspective.

www.leuze.com
“Action!” — A Hollywood-like atmosphere could be felt on set each time the director of our image films started the individual sequences. Even though the leading actors were real sensor people, the results in terms of quality and emotionality are just as impressive as any lavish movie production. A completely new experience for the sensor people — and an important milestone for corporate communication — see for yourself.
It’s well worth entering the quiz again this time! We will draw four winners from all of the correct answers submitted. Each winner will receive a Leuze electronic surprise package.

The answers to today’s questions can be found in our four Smart Sensor Business films. To watch the films, simply scan the QR codes shown opposite.

1. EASY — Where does Marie-Theres Heine’s jogging route end? …
   (D₁) In the forest  (H₁) On a bridge  (B₁) Under a tree

2. EXPERIENCE — How many tennis students does Jörg Beintner coach? …
   (U₂) One  (F₂) Two  (E₂) Three

3. PROXIMITY — What is reflected in Junghee Lee’s eyes? …
   (L₃) The castle  (S₃) The fire  (G₃) The sun

4. FUTURE — Where does Moritz Mullis drink his morning coffee? …
   (V₄) At the table  (O₄) On the balcony  (W₄) In the garden

Your answer: T₁ 2 3 4 N₁ 4 R P₁ 4 PL₁ 2

Entering the quiz is easy*
Send your answer together with your name and company to the following e-mail address by December 31, 2017:

gewinnspiel@leuze.de

We will contact the winner.

*As organizer of this quiz, our decision is final. By entering the quiz competition, you agree (if you should win a prize) to your name and your photo being published in the next edition. Leuze electronic employees are not allowed to enter.
ALWAYS CLOSE BY

22 company locations and 42 sales partners across the globe ensure that the expertise of the sensor people is never far away.

No matter where in the world you need the products and expertise of the sensor people — we are always close by. And this does not only apply to our sales teams and technological competence centers but also to our production locations which, of course, all offer the same high level of quality that you have come to expect from Leuze electronic.

Australia / New Zealand | Belgium | Brazil | China | Denmark / Sweden | France | Germany | Great Britain | Hong Kong | India | Singapore | South Korea | Spain | Switzerland | the Netherlands | Turkey | USA / Canada