



**Innovative
Sensor Technology**

physical. chemical. biological.



Anniversary magazine

Special edition



More than you expect.

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Wir arbeiten schon heute an den Herausforderungen von morgen und halten innovative Lösungen bereit.

Würth Elektronik ist führender Leiterplattenhersteller in Europa und steht mit seinen rund 1.000 Mitarbeitern für eine starke Innovationskultur. Wir legen den Fokus auf die Förderung technischer Neuerungen, Forschung & Entwicklung. Denn unser Ziel ist es, erster Ansprechpartner für Elektronikentwicklungen zu sein.

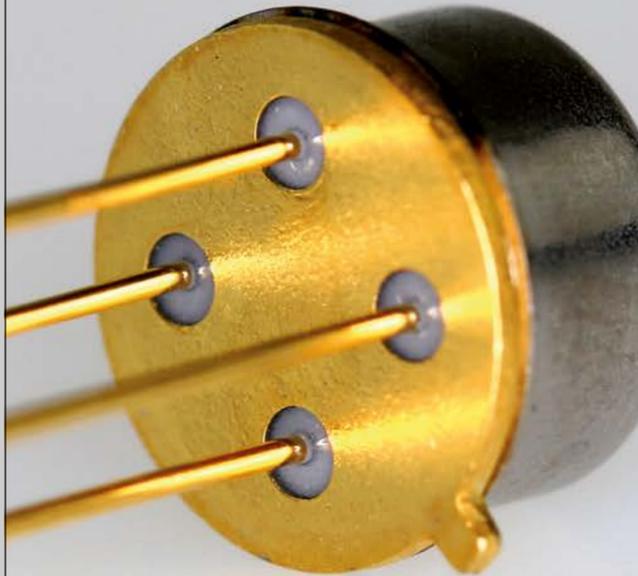
Durch dieses Verfahren ist es möglich, Integrated Circuits platzsparend auf Substrate aufzubringen. Dabei können wir Erfahrungen mit allen gängigen Oberflächen vorzeigen. In Kombination mit unseren Leiterplatten erhalten Sie alles aus einer Hand: Entwicklung, Bestückung, Drahtbonds, Verguss, manuelle Bauteilmontage, Qualitätskontrolle. Wir freuen uns auf Sie!

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Ist der Platz für einen Chip auf Ihrer Leiterplatte begrenzt? Dann haben wir die Lösung für Sie: Drahtbonds – eine hervorragende Verbindung von Chip und Leiterplattensubstrat.

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Wir gratulieren als langjähriger Partner der Innovative Sensor Technology IST AG zum Jubiläum!



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We have over 30 years of expertise in the automation, precise measurement, sorting and testing of electronic components and sensors

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Jörg Lützen, CEO

„We focus on the needs of our customers. We don't insist on our existing solutions, but use the full range of technical possibilities.“

DEAR CUSTOMERS, PARTNERS AND EMPLOYEES

30 years have passed since Innovative Sensor Technology IST AG developed its first nickel temperature sensor. What started as a team of four today counts a workforce of over 450 employees worldwide.

ISTAG can look back on a steady and successful growth since its foundation. We owe this above all to the trust of our customers and the willingness of our employees to constantly try out new things and keep their finger on the pulse of time. In Endress+Hauser, we also have a parent company that trusts us and supports us in breaking new ground.

This is reflected, among other things, in our product portfolio, which has been expanded to include physical, chemical and biological sensors in the areas of temperature, flow, humidity, conductivity and bio. With the microfluidic pumps produced by our subsidiary Jobst Technologies and the nucleic acid extraction kits manufactured by IST Innuscreen in Berlin, we can now also offer products for medical and biotechnology.

At our sites in Ebnat-Kappel, Switzerland, and Roznov, Czech Republic, we not only produce close to 100 million sensors per year, but also develop more than 200 new products for customer-specific needs.

Due to the Corona situation, we were not able to celebrate this milestone with our customers. But we are pleased to offer you a slightly different insight into the IST world with the publication of this anniversary magazine. Look back with us, get to know us better and look into the future with us. The QR code will take you to the online version of this brochure with animated content.

Thank you for your trust in our team and our products!

Jörg Lützen and the entire IST team



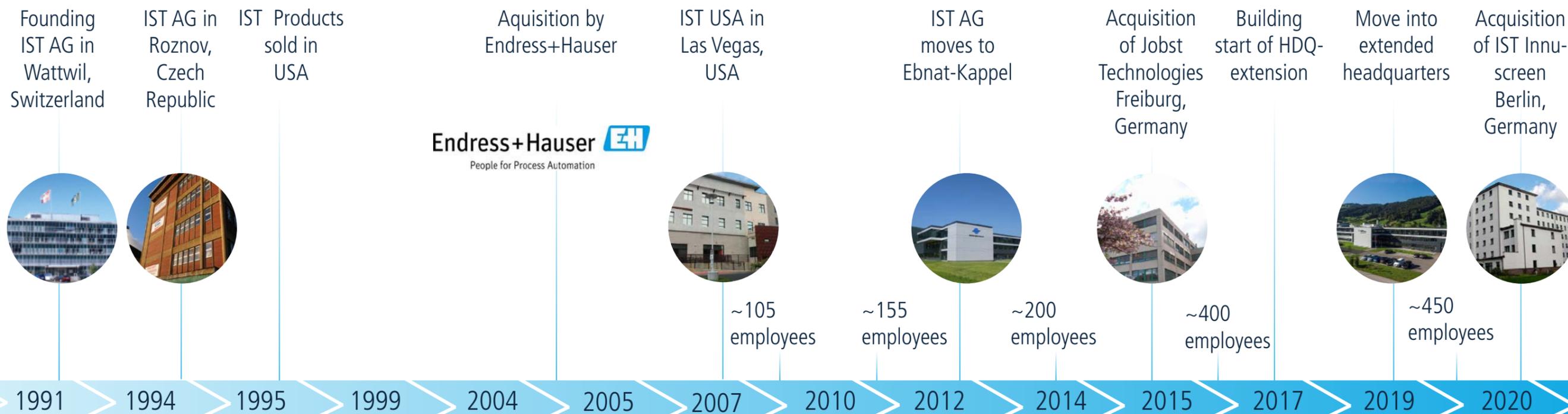
Here you can find our digital brochure.

IST Innovative Sensor Technology
physical. chemical. biological.



„One of the formulas for the success of IST AG is that we face customer challenges head on. We work collaboratively as partners with our customers because we know their success is our success.“

Jiri Polak, CBDO



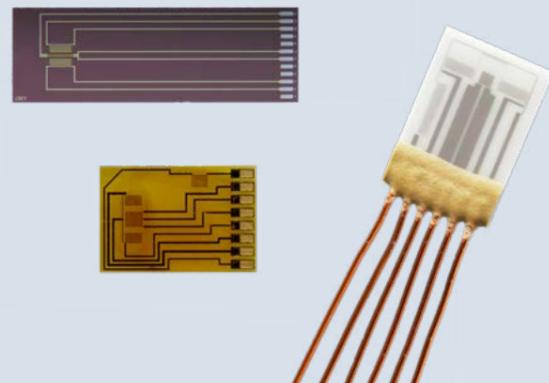


„We understand that our sensors are key components that contribute to the safe and advanced functionality of our customers' products. We are committed to being your number one trusted supplier and partner for physical, chemical and biological sensors.“

Alan Ravizza, CSO

BIOSENSORS

The IST AG LV5 sensor is a flow-through biosensor for multiparametric measurements, as it can measure up to **four** analytes simultaneously (glucose, lactate, glutamine, glutamate). The is suitable for sampling systems in laboratories or the food and pharmaceutical industry.

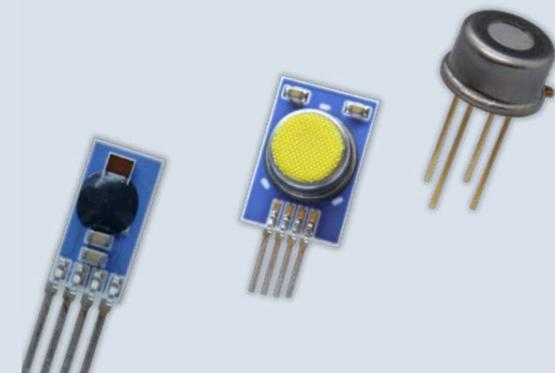


FLOW SENSORS AND MODULES

Whether the flow direction and quantity of liquids and gases must be measured, or if an ultra-fast response time is desired, we have the ideal flow sensor for a wide variety of applications. We can also provide the appropriate sensor or module for aggressive fluids. Our standard solutions with associated evaluation kits are ideally suited for use in diverse flow applications and can also be adapted to customer-specific requirements if necessary.

HUMIDITY SENSORS AND HUMIDITY MODULES

High accuracy and stability, low drift, fast response times characterize our humidity sensors. Our humidity modules can be modularly adapted to customer requirements and are also suitable for dew point measurements in the low humidity range. The different module types can be equipped with various sensors and calibrated exactly to suit the application.



CONDUCTIVITY SENSORS

A planar 4-electrode design with biocompatible materials makes our conductivity sensors, **such as the LFS1305**, ideal for a variety of biomedical device applications where biofilm and clogging problems are a risk. Electrical conductivity measurement is a fast and easy method of monitoring membrane processes for the separation of ionic compounds dissolved in liquids.

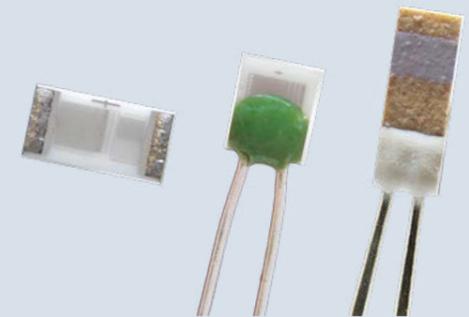


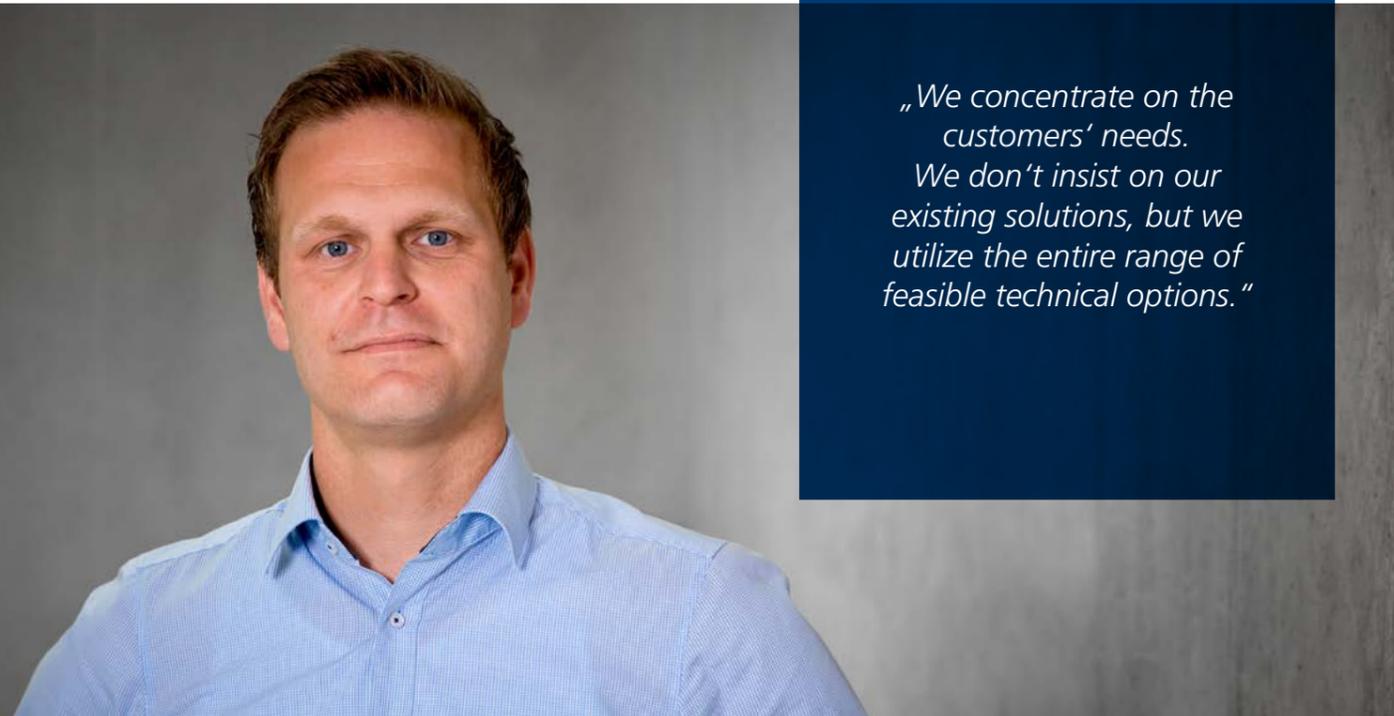
PASSIVE AND ACTIVE TEMPERATURE SENSORS

IST AG temperature sensors can be found in all imaginable applications, such as household appliances, air conditioners, production plants, laser modules, electric motors up to satellites and space missions. Whether SMD or with wires, thick or thin film technology, nickel or platinum, our temperature sensors are produced with the highest quality materials and cover a temperature range from -200 °C to +1000 °C depending on the material. In addition to more than a thousand standard sensors, we develop around 200 new sensors each year just for customer-specific applications. Our TSic calibrated temperature sensors with an integrated signal converter for an analog or digital output are ideally suited for mobile applications thanks to their low energy consumption.

MICROHEATER

Our micro heaters are used in a wide variety of applications, from medical devices to humidifiers, side mirror heaters to de-icers, to name a few. Each IST microheater has its own form and function, and is designed and manufactured to customer specific needs.





„We concentrate on the customers' needs. We don't insist on our existing solutions, but we utilize the entire range of feasible technical options.“

Florian Krogmann, Chief R&D Officer

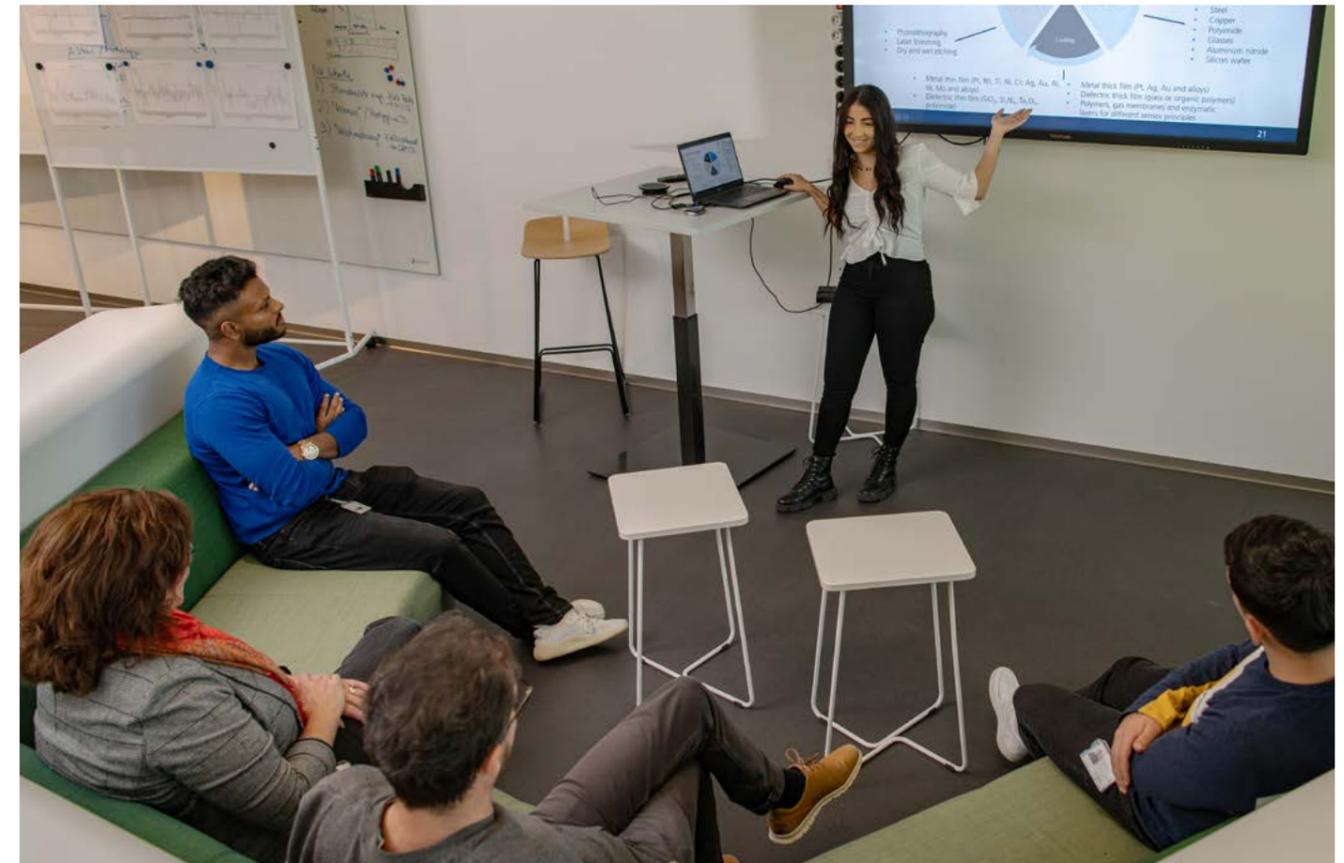
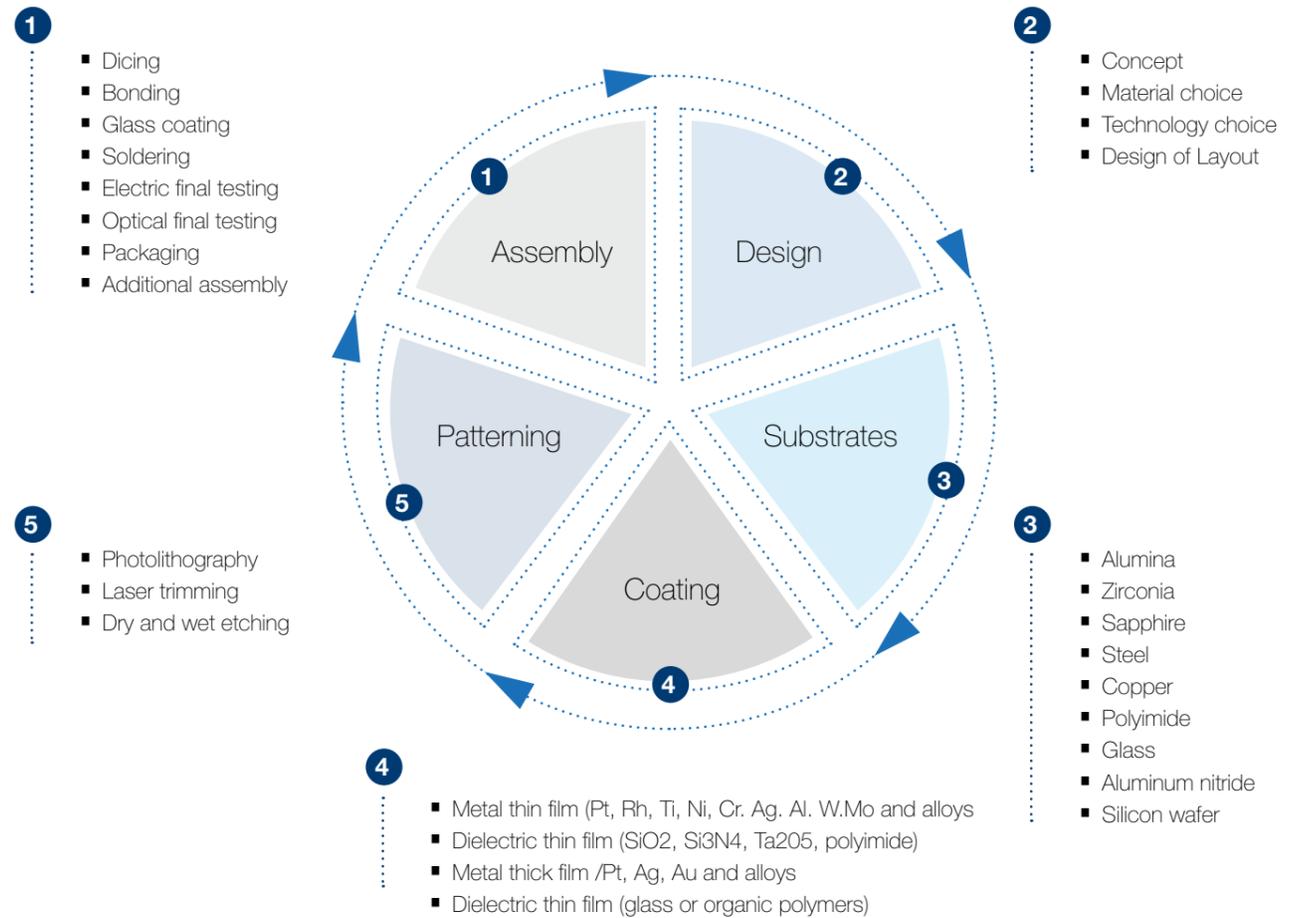
DEVELOPMENT & TECHNOLOGY PARTNER

Innovative Sensor Technology IST AG is not just a manufacturer of sensors - we are a global team of experts in sensor technology, offering our customers skills and experience as a development & technology partner. Our customers benefit from a comprehensive service for challenging application requirements or when developing a new technology.

IST AG has **more than 25** years of experience in developing new technologies or customized solutions. We work closely with a broad network of partners, universities and technical institutes. In this way we overcome limitations of existing technology and create innovations that meet the increasing demands of our customers in diverse industries. This is our competence, through which our customers gain a competitive advantage.

IST AG brand sensors have proven to be reliable and cost-effective, which is reinforced by our long-standing customer relationships. Our versatile technological capabilities allow us to use different substrate materials, to apply thin film technology and various patterning technologies as well as to use diverse test and integration processes.

As a development & technology partner for customer-specific solutions, we look forward to discussing your individual requirements together with you.



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„Customer satisfaction and product quality are our biggest goals. We achieve these thanks to our qualified and committed employees, who provide our customers with the right solution for their applications.“

Thomas Bürgler, COO

**FROM SUBSTRATE TO SENSOR
A TOUR OF OUR PRODUCTION**



COATING OF THE SUBSTRATE

The first production step is coating, where the substrates are completely covered with a thin layer by means of sputtering. Depending on the type of sensor, different materials, thicknesses and qualities can be used for the coating.



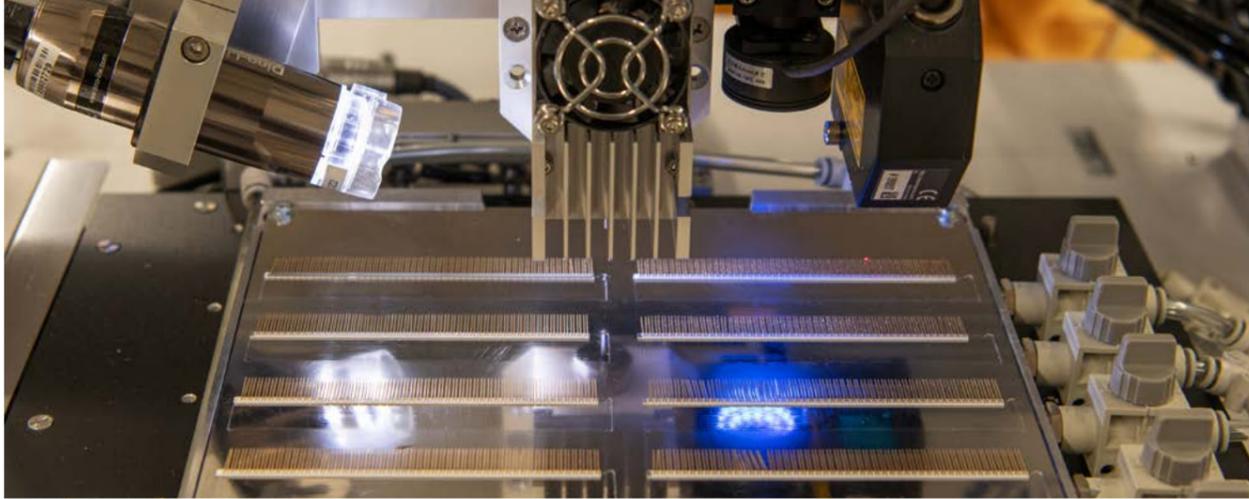
ETCH

During the etching process, the parts of the coating that are not needed are removed by etching. Two different processes are used for this: ion etching and wet chemical etching.



PHOTOLITHOGRAPHY

In this step, the substrates are coated with a light-sensitive photoresist by means of a centrifuge. All our sensor structures are recorded on so-called masks - through exposure, light passes through the mask onto the photoresist. The areas covered by the mask are not reached by the light and therefore remain unexposed. During the subsequent development of the substrates, the coating is washed away in the exposed areas, while the unexposed areas remain on the substrate.



LASER TRIMMING

We use laser trimming or laser calibration as a procedure for the adjustment (trimming) of components by laser beam-induced material changes. In this process, the resistance value is increased by cutting short circuits of a meander structure until the desired target value is reached.



WELDING

During the welding process wires are attached to the sensor chip. IST AG offers various materials, lengths and diameters of the wires. Furthermore, we distinguish between bare and insulated wires.

To reinforce the weld and protect it from mechanical damage, a paste is applied to the connection point. This gives the wires excellent adhesive strength.

SAWING

During sawing, the substrates are cut into individual strips so that the wires can then be welded to the sensors.

SCREEN PRINT

In the screen printing process, the contact points of the sensor are reinforced with a conductive paste. This enables a better connection between the contact points and the electrical contacts. In addition, the substrate is covered with a non-conductive paste. This process prevents the sensors from being scratched or damaged by mechanical or chemical influences.



MEASUREMENTS

During the final electrical measurement, all sensors are tested by means of a 2-point calibration. According to their accuracy, they are sorted into different classes.

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JOBST TECHNOLOGIES

Jobst Technologies has been part of IST AG since 2015. The technology-oriented company specializes in customized solutions in microsystems technology and electrochemical analytics.

Its product portfolio includes chemical sensors for methanol, ethanol and oxygen, biosensors for glucose and lactate, microfluidic systems such as static micromixers, complete monitoring solutions consisting of sensor arrays, microfluidics, electronics and software as well as robotic dispensing systems and micropumps for the smallest volumes.

With the move to a larger building, Jobst Technologies will expand its development and production capacity in the coming year.



IST INNUSCREEN

The life science company, founded in 2005, was acquired by IST AG in 2020. IST Innuscreen GmbH specializes in the field of nucleic acid isolation and purification, molecular diagnostics including molecular biology reagents. The company offers a broad product portfolio of kits, assays and reagents - including kits and assays for PCR and qPCR/real-time PCR.

The business units are based on several unique technology platforms for the isolation and purification of nucleic acids, the extraction of high molecular weight DNA for NGS applications, and the enrichment of biomolecules such as cell-free nucleic acids, viruses, phages or subcellular particles. These platforms are protected by 38 patents and patent applications.

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Markus Landtwing (44) is married to Jenny and has two children, Selina (10) and Silvan (8). In his free time he enjoys playing tennis and badminton. With Jenny, he took part in standard and Latin dance tournaments before the birth of his children - a hobby they plan to resume when the children take up less of their time.



INTERVIEW WITH MARKUS LANDTWING, PRODUCTION MANAGER

Since when have you been working at IST AG and in which position did you start at IST AG?

I started my career at IST in November 2002 as the person responsible for the laser trimming department in the clean room. At that time we had one machine, and over time we added 4 more. In the meantime we have 8 systems, which are supervised around the clock by 3-4 people.

What are your main tasks as production manager?

What does a typical working day look like for you?

No day is like the other. However, every day starts the same, namely with the „Shop Floor Meeting“. This is when all team and group leaders from production meet and analyze the current production. Any personnel or equipment failures are discussed, and whether reschedu-

ling is necessary or priorities need to be redefined. The main focus is on the desired delivery dates of our customers.

Another important task is the support of our subsidiary in Roznov, Czech Republic. With about 160 employees, the production plant is also an important part of IST AG. I travel to the Czech Republic several times every two months to discuss capacity planning, equipment procurement, calculations with the local managers.

Furthermore, I am involved in the special product release (SPA), i.e. which development products are to be set up and how, so that they can be produced in high quantities.

I was also heavily involved in the conversion of our ERP to SAP. We are constantly making improvements and improving processes, i.e. driving up yields in process technology and thus optimizing the cost side and delivery dates.

After almost 20 years at IST, what still excites you about working for IST after so long? What do you enjoy the most?

The variety of my work, from internal projects in cooperation with development and process technology to customer projects or new large-scale projects - or SAP projects or KAIZEN, CIP, 5S etc. - is what excites me most.

Also taking responsibility for Roznov, constantly working on improvements. New challenges which need to be addressed. I love my job because no day is like the other. My exciting challenges drive me every day to come to work motivated.

What were the biggest challenges back then in Wattwil and how do they differ from today?

The work back then in the „Glass Palace“ in Wattwil can hardly be compared with today's situation. When I started, we had around 50 employees working on different floors throughout the building. With the strong growth in order volume, we were spread over five floors and the annex hall before the move to Ebnat in 2012. This was of course a logistical challenge. The material path and lack of space were constant issues.

With the construction of our facility, we were able to plan the building exactly to our needs from the ground up. This was a huge advantage, as we were already able to put our new and modern equipment into operation in an optimized way, taking into account our manufacturing processes and material flow. It is impressive to see the level of automation we have achieved over the last 10 years thanks to our new infrastructure. The temperature control results in process stability, which is a huge advantage compared to the past, especially in the clean room with its delicate processes. We have all the tools and aids to run a stable

process, which in turn has a positive effect on our product quality. Another important point is data analysis. After implementing SAP, we can now collect and analyze data, learn and further optimize processes.

Describe IST in 3 words.

Respect: we always treat each other respectfully even in hectic situations or disagreements. The focus is always on finding solutions, not on assigning blame - I really appreciate that about our company.

Familiar: When I started, everyone knew each other personally. Now there are over 400 of us worldwide, so you meet someone in the hallway and no longer know exactly which department to assign them to. And although I no longer know all my colleagues very well, the atmosphere has remained very familiar. For me, IST AG is and remains a big family.

Flexibility: One of IST's great strengths is the way we can respond spontaneously to changing situations and react quickly and flexibly when customer needs or product requirements change. Also in internal projects we are able to adapt process requirements extremely quickly and react flexibly.

What did you laugh about the most at IST?

I can't think of anything off the top of my head, but it's always exciting when you talk to employees who have been working at IST since the first years, such as Jiri Holoubek and Jiri Polak and hear them talk about the early days, a few anecdotes come to light that make you smile. This was 10 years before I started at IST, and they were a 3-man shop with comparatively simple tools. It's fascinating to hear how the company and processes have built and evolved, how more customers have been added, and how the company has grown steadily.

LINTEC congratulates Innovative Sensor Technology IST AG on its **30-year anniversary!**

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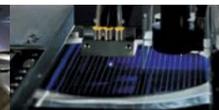
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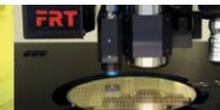
LASER DICING



AUTOMATIC OPTICAL INSPECTION



METROLOGY





IST offers apprenticeships in various professional disciplines. We currently employ 5 apprentices in the commercial direction (KV EFZ profile E and M), 4 prospective physics laboratory assistants, 4 plant operators and one in operational maintenance. From summer 2022 the first design engineer will start her apprenticeship at IST AG.

INTERVIEW WITH APPRENTICES

IST AG offers various apprenticeships and currently employs 14 apprentices. Sarusan Shanmuganathan, Igor Stojcic and Simone Sanginiti give us an insight into their everyday work.

How long have you been working at IST AG and what training are you doing?

Simone: I'm training to be a maintenance specialist and have just started the second year of my apprenticeship.

Igor: I am in the last of the 4 years of my apprenticeship as a physics lab technician.

Saru: I successfully completed my KV apprenticeship in July.

Why did you choose this apprenticeship and why at IST AG?

Simone: My older brother had done the same apprenticeship. He sometimes took me to work with him and I always enjoyed helping

him. That sparked my interest in the profession.

Igor: I was always good at physics and math. I became aware of the apprenticeship at an information day at EMPA. I had a look at several places, but I liked it best at IST. I just had a good feeling.

Saru: What I liked most was the diversity of my training. I was able to gain experience in a wide variety of departments. At IST, I especially like the positive atmosphere.

What are your main tasks and what does a typical working day for you?

Simone: I am responsible for making sure that our company makes a good impression on visitors. I take care of the outside facilities and clean the inside of the company. I am also responsible for waste separation and management. I also help the technical service prepare the infrastructure for events and generally lend a hand in the technical service. Because of Corona, I also had a lot to do with disinfecting the

building last year.

Igor: As a physics lab technician, I am involved in various lab work such as measuring, soldering and setting up new experiments. I work in the lab and also in the workshop. I work closely with scientists and help perform experiments or create evaluation electronics and build circuits. I am involved in measuring sensors, quality control, can build a circuit, evaluate and assess intermediate and final results, create micrographs and calibrate measuring equipment. It is fun to work with the electron microscope. Another highlight was my workshop internship, which I was able to complete at the Huber & Suhner company.

Saru: It was very different depending on the department. From organizing translations in marketing to entering quotations and sending order confirmations in sales to entering accounts payable and receivable in accounting. In the purchasing department, I did all the purchasing processing - from obtaining quotes to placing orders to invoicing. In the human resources department I was in charge of the absence reports, time recording and control and I was responsible for the organization and planning of the annual service anniversary event. I was surprised that logistics was also a department that had to be run through. But there you get to see how incoming and outgoing goods work, including packaging and the creation of shipping documents.

What do you like to do most?

Simone: I'm a very neat guy myself and also like my surroundings to be clean. I love to remove dirt and enjoy the before and after result. This applies to indoors as well as outdoors. I love the outdoors, so I especially enjoy it when I can work outside and, for example, zoom around on the lawn mower and cut the grass around our company.

Igor: A difficult question for me, because my job is so varied. It never gets boring. I'm always busy doing something I enjoy, from drawing to designing to measuring or manufacturing - I like what I do.

Saru: I would have to say purchasing: I had the whole order process with me, and contact with suppliers was really fun.

Do you already know what you would like to do after your apprenticeship?

Simone: I haven't decided yet. I think I will continue to work in my profession or go into the military or do something completely different.

Igor: I still have a good year to think about my next steps. First of all, after the apprenticeship I will do RS, then I would like to study. I don't know exactly yet, but probably a technical degree, electrical engineering, math or something similar. Since I also like sports very much, I could also imagine studying sports.

Saru: I will stay at IST until December and work in sales or logistics. After that I will complete the RS. After the RS I would like to work for a bank.

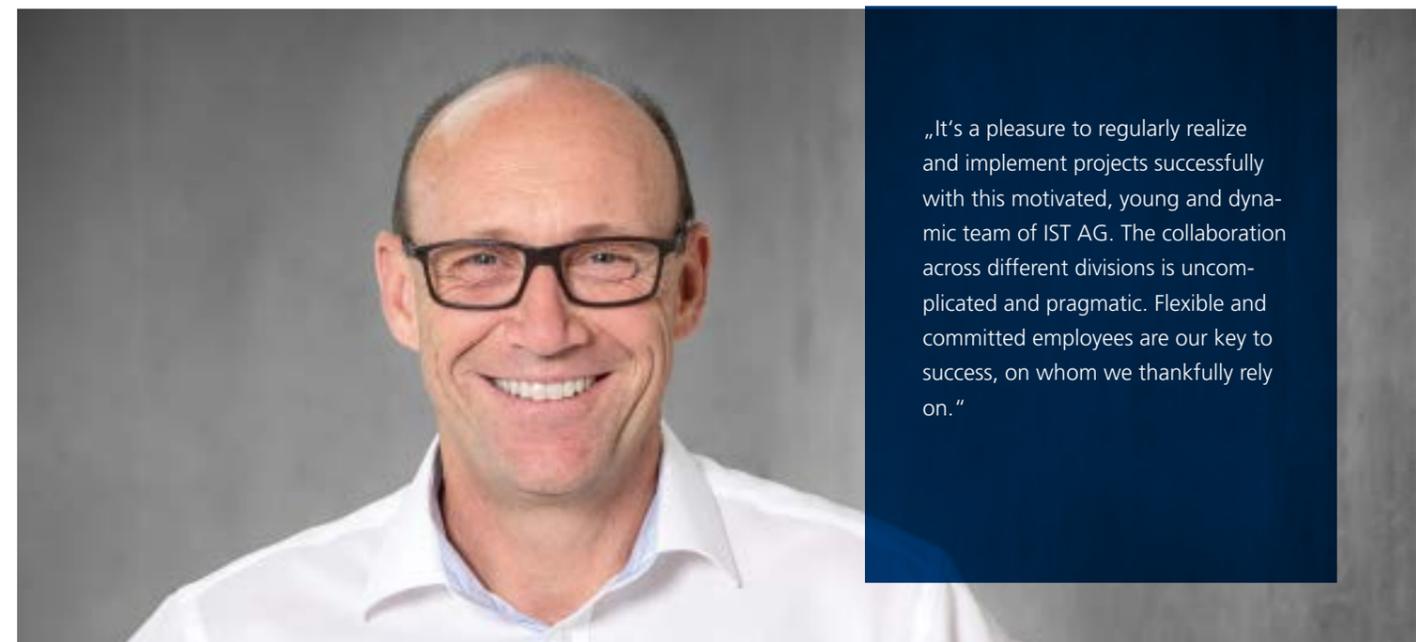
What words would you use to describe IST?

Simone, Igor, Saru: Employee-friendly, serious but relaxed, supportive, helpful, good fringe benefits like fitness room, 5.- for a 3-course meal in the canteen.

What makes IST an attractive company to teach at?

Simone, Igor, Saru: You can always come by with problems. The monthly „Lehrlingskafi“ is always fun, and you can exchange ideas with other apprentices. There are several Selekt vending machines, cheap and good lunch in the canteen, a Christmas dinner and party for all employees, departmental outings and an apprentice outing. The workplaces are modern, and there are also comfortable (sitting) corners everywhere where you can talk, as well as a pool table and „Tschüttelkasten“. We also have our own fitness room - and fairness: for example, the same coffee machine is in the management kitchen as in production. What's also cool are the regular extracurricular activities you can take part in, like hiking, skiing and biking tours or sledding with fondue.

Peter Andereg, CFO



„It's a pleasure to regularly realize and implement projects successfully with this motivated, young and dynamic team of IST AG. The collaboration across different divisions is uncomplicated and pragmatic. Flexible and committed employees are our key to success, on whom we thankfully rely on.“

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HAPPY BIRTHDAY IST AG

Whenever the entire workforce of IST AG gets together, the operations from Roznov and Ebnat-Kappel as well as the sites from „the rest of the world“ compete in soccer and volleyball before the evening festivities. In this style, the 30th anniversary was also celebrated in bright weather.

The evening program also included the farewell of Mirko Lehmann, who took over the management of Endress + Hauser Flow in spring after 14 years at the helm of IST AG. Unfortunately, he was unable to attend the event in person

due to a Covid-19 infection within his family and had to receive his honors and gifts virtually.

After the official part with dinner, the local rock band „Bollocks“ heated up the atmosphere in the IST canteen, and the DJ that followed had the staff dancing the night away into the morning hours.



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