

# TRUF

THE MAGAZINE FOR SHEET METAL EXPERTS

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From tangled cables  
to a global company:  
The American dream, Polish style

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VR is transforming how  
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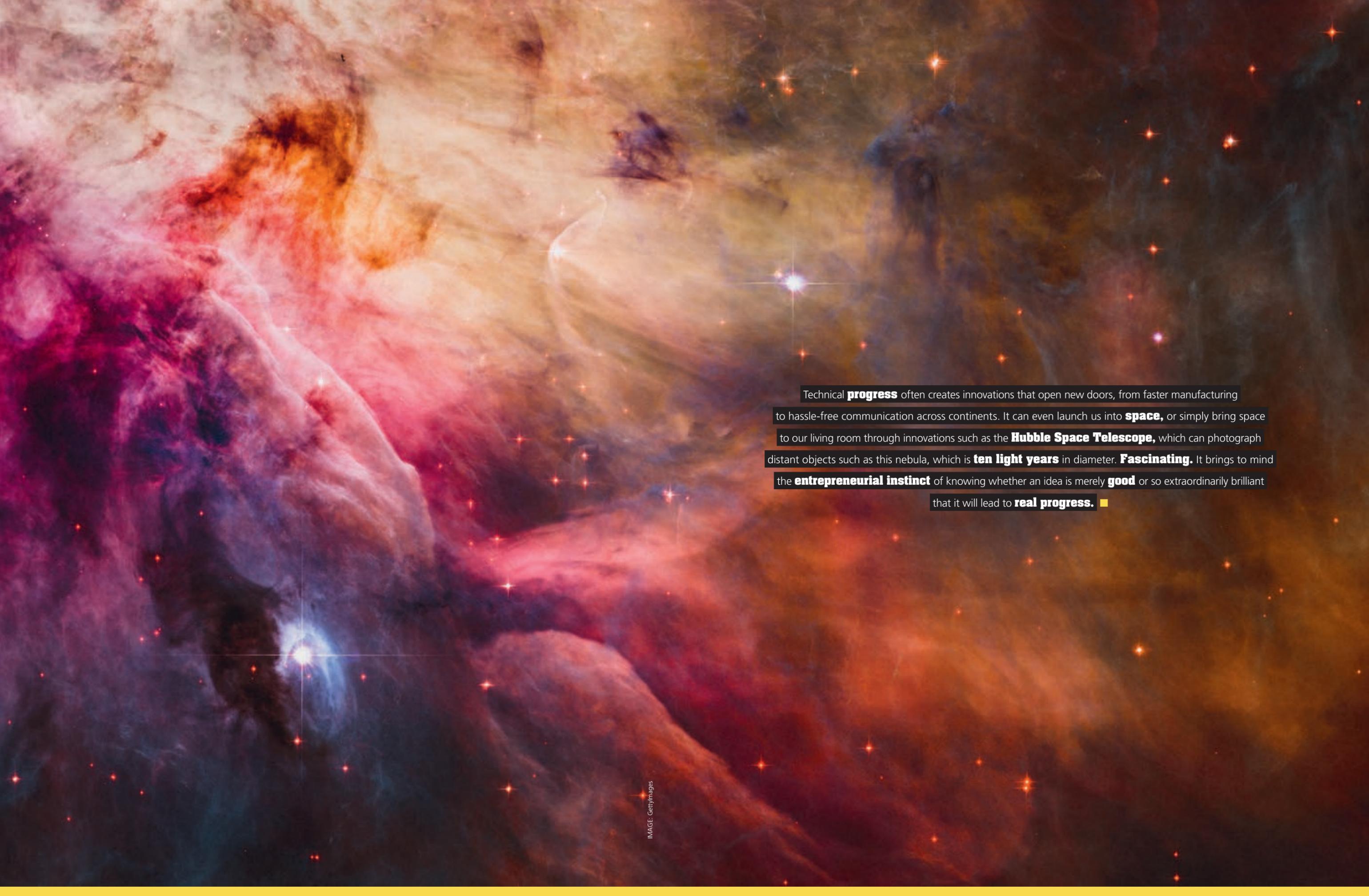
Maasai warriors in Kenya **traditionally** regarded killing a lion as the **greatest act of courage**.

Lion hunters **still enjoy great respect** – but not by killing these big cats. Instead, they work for the Lion Guardians

conservation organization, using modern GPS technology to **keep track of the lions in order to protect**

**them**. What lesson does this have for the business world? **Progress** doesn't always mean losing our traditions;

in fact, it can often be the **basis** for keeping them alive. ■



Technical **progress** often creates innovations that open new doors, from faster manufacturing to hassle-free communication across continents. It can even launch us into **space**, or simply bring space to our living room through innovations such as the **Hubble Space Telescope**, which can photograph distant objects such as this nebula, which is **ten light years** in diameter. **Fascinating.** It brings to mind the **entrepreneurial instinct** of knowing whether an idea is merely **good** or so extraordinarily brilliant that it will lead to **real progress.** ■



The **Pont du Gard** in southern France, built by the Romans in the first century, is proof that a progressive leap forward sometimes requires a healthy dose of **self-confidence**. Stretching over a total of 50 kilometers, the aqueduct between Uzès and Nîmes required an average gradient of exactly 24 centimeters per kilometer to allow the water to flow. **Nobody had ever built** anything like this before, so the Roman engineers needed the courage to **improvise** – and were rewarded for their efforts. This masterpiece of civil engineering laid the **foundations** for the kind of **progress** in classical architecture that still fascinates artists and architects to this very day. ■



IMAGE: TRUMPF

## EDITORIAL

TRUMPF has made the leap into **ultra-wideband** radio, an **advanced** technology that offers exciting potential.



In my mind, progress means continuously developing our products to ensure they always do the best job of meeting your needs. At the same time, it means identifying new technologies and incorporating them in ways that gradually bring us closer to our vision of a fully connected smart factory.

Sometimes the potential offered by connectivity can be hard to measure directly. I recently visited a company that had automated its material flow using nine automated guided vehicles. At first, it appeared that the investment hadn't paid off. But that was before I saw all the day-to-day benefits that could only be measured in terms of quality. Nowadays, for example, all the pallets are always in the right place at the right time, materials move around the facility without damage or accidents, and on-time delivery performance now stands at 99.8 percent. The company is now growing significantly faster and is very profitable.

To achieve that level of success, you need technologies that can generate a digital twin of your production process in real time. Ultra-wideband (UWB) is one such technology. UWB forms the basis of our Track&Trace system. This provides continuous updates on exactly where your jobs are currently located, which routes they take to each individual processing station, how long each job spends at the station, and much more besides. This kind of data makes it easier to manage production efficiently – and it constantly reveals new potential for optimization.

Other examples of smart factory solutions in this issue include our Active Speed Control sensor system, which makes laser cutting more productive while substantially boosting the reliability of the cutting process, and our smart consumables, which notify users when they need to be replaced.

The basis of a smart factory continues to be our machines and the processes that run on them. We are constantly striving to make these even better. For example, our patented Highspeed Eco feature makes laser cutting much more robust and productive while also reducing the use of cutting gas by 70 percent. This issue also presents our new TruLaser Tube 3000 fiber entry-level tube cutting machine.

We hope this issue will give you even more food for thought when it comes to creating your own smart factory. If you would like us to visit your facility to offer you some advice, please feel free to get in touch!

**YOURS, HEINZ-JÜRGEN PROKOP**  
Chief Executive Officer for Machine Tools

TRU<sup>e</sup>

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## ...in Keila

AS Valdek is a family-run business that lives and breathes the e-Estonia concept – and its success shows that the sheet metal fabricator is on the right track. The company generates annual revenues of 7.3 million euros with just over 50 employees. Viljar Valdek told us how progress means having the right software.

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With 16,000 participants a year, the Ditzingen Training Center is the largest of TRUMPF's eight training centers worldwide. E-learning is the key focus right now. Francesco De Marco, who heads up Digital Learning, told us how important it is to "re-learn" how we learn.

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IMAGE: Bartłomiej Bukowski

01

POLAND

*Progress in Karczew*

## CABLE TRAYS MADE IN POLAND

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Power cables hanging from the ceiling were a common sight in Poland before the fall of the Iron Curtain. But Kazimierz Sielski had already started to build his first cable containment solutions. Nowadays, he and his son Tomasz rely on **smart connectivity** in their quest to transform their company **BAKS** into a truly global player.

It's early morning in Karczew, a Polish town situated next to the Vistula River, 30 kilometers south-east of Warsaw. Tomasz and Kazimierz Sielski are strolling through their production facility. From the outside, there is no indication that this is where robots and people work together to make cable trays for companies all over the world. Kazimierz Sielski, the 59-year-old company founder, still works up to 13 hours a day keeping the business running smoothly, while 34-year-old production engineer Tomasz Sielski handles the export side.

### Salzburg station, Mexican Lego factory

The fall of the Iron Curtain in 1989 marked the end of Poland's state-run command economy and the shift to a free market economy with a global reach. Business boomed for BAKS, and production has increased even more rapidly since the turn of the millennium. Today, the company employs 550 people and supplies over 27,000 products including cable management and installation solutions for industry, infrastructure and housebuilding. BAKS has customers all around the world. Cable trays made in

Karczew – a modest town of just 10,000 inhabitants – can be found in a Salzburg railway station, at Airbus in Toulouse, in a Lego factory in Mexico and in a hospital in Qatar. The company's German customers include Daimler and Porsche, and BAKS products have also been adopted by German pharmaceutical giant Bayer. BAKS cable management solutions are also present in some of Warsaw's most emblematic infrastructure, including the National Stadium, Warsaw Chopin Airport and the city's subway tunnels.

The company's fully automated production plant contains a few dozen machines, including laser and punching machines, press brakes and automated storage systems that are connected to the machines. There are also 38 TRUMPF systems working in two shifts. The latest acquisition is a TruLaser 5030 laser cutting system. The Sielskis chose it for its high cutting speed – because at BAKS, speed is of the essence. The cable containment professionals can deliver large batches of certain products from their extensive catalog in just one week – the perfect recipe for satisfied customers.

Over the years, Kazimierz Sielski has been consistently impressed by the reliability of TRUMPF machines and the high quality of the



IMAGES: Bartłomiej Bukowski

“ I found myself wondering  
if I could build a company  
that would create work for  
**lots** of people! ”

Kazimierz Sielski, CEO BAKS Poland

products. “TRUMPF machines are one of the keys to our success. I bought my first TRUMPF system – a Trumatic 235 – in 1999, and we've added a new one almost every year since then,” he says.

### Solidarity fuels progress

Kazimierz's entrepreneurial drive resembles a Polish version of the American dream. “I found myself wondering if I could build a company that would create work for lots of people!” he says.

Working as an electrician in 1986, he noticed power cables dangling dangerously from the ceiling in many factories. It was immediately clear to Sielski that these cables needed to be contained – and so the idea of producing and selling cable trays was born. He decided to give up his job and put his plan into action.



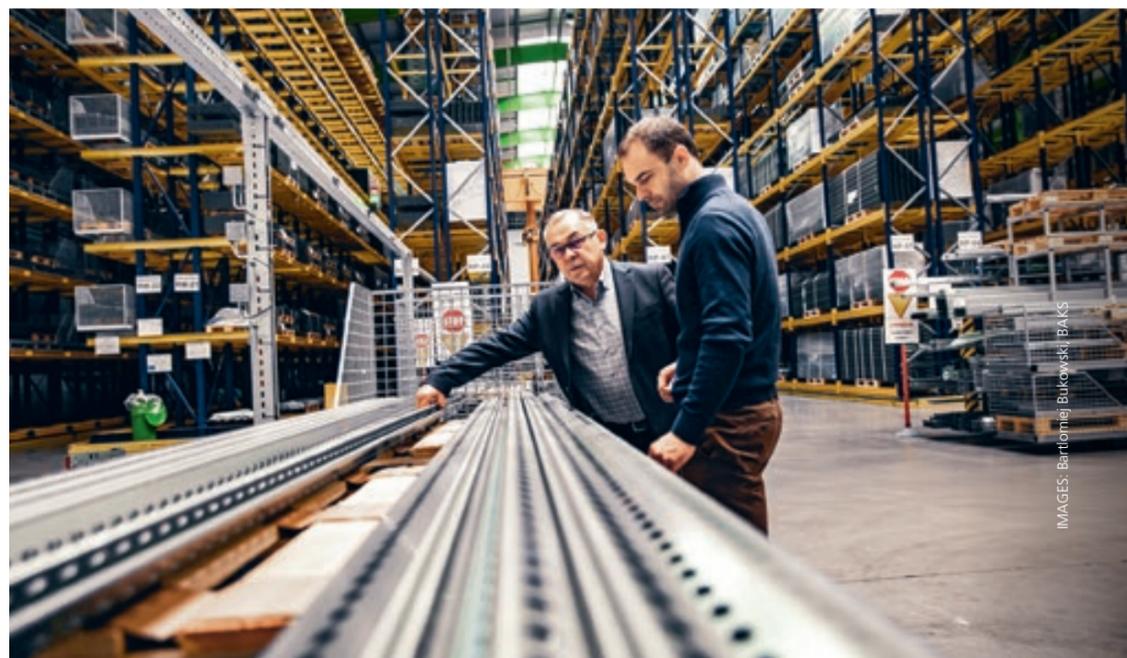
Of course that was easier said than done. The Polish People's Republic was still under the rule of socialism, so there were big risks involved in becoming self-employed. Yet Poland was also undergoing a profound transformation.

Sielski's first job was to get enough money together to buy his first machine so he could set up a new company. This was no easy matter, but he soon came up with an ingenious solution. Poland was changing fast, especially Warsaw. Small businesses were springing up everywhere, and they needed shelving systems to sell their goods at weekly markets. Steel was a scarce commodity in Poland at the time, so Sielski started buying scrap strip steel from factories and using it to make shelves. Eventually he had sold enough shelving units to enable him to buy his very first machine.

Thirty years have now passed since he bought his first sheet-fed printing press with some financial assistance from his parents. A simple machine from the former Czechoslovakia, he set it up in his first premises, which were situated right in front of his family home. In 1989, the revolution inspired by the independent



**3,000 metric tons of steel:**  
That's how much BAKS' 550 employees use each month to make cable trays.



IMAGES: Bartłomiej Bukowski | BAKS

“ I bought **my first TRUMPF system** – a Trumatic 235 – in 1999, and we've added a new one almost every year since then. ”

Kazimierz Sielski, CEO BAKS Poland

workers' movement Solidarity led to the end of communist rule in Poland. This political upheaval fueled tremendous progress throughout the country, and BAKS was no exception. Starting in 1999, the company gradually shifted its production operations to TRUMPF machines. The 2004 enlargement of the European Union, which incorporated members of the former Eastern Bloc, presented BAKS with a wealth of new opportunities. The company took full advantage by investing in new machines, employing new workers and modernizing its production facilities.

## Ready for the future

Together with his father, Tomasz Sielski is working hard to ensure the family-run company has a successful future. As well as handling the export business, he is also responsible for getting their production facilities ready for digitalization. The first steps are already underway, including the introduction of an ERP system that connects up all the company's production processes. BAKS also pushes innovation through to its customers, for example with its BAKSCAD software that allows customers to download and redesign cable tray models. The company is currently setting up a database of 3D models for its most popular products, and it has also taken the bold step of making all its cable tray models available to everyone on an open source basis. This is a win-win situation, with BAKS tapping into its customers' ideas to develop new solutions.

**Carefully contained:** BAKS cable trays can be found throughout the Warsaw metro network. Their special E90 feature, which means





An expert in product development and exports, Tomasz Sielski is busy preparing BAKS for future success.

“ Any new development requires  
**time and patience to succeed.** ”

Tomasz Sielski, COO BAKS Poland

Asked how BAKS comes up with new products, Tomasz Sielski smiles and says: “The development department – which basically consists of me and my dad!” The bond between them is evident when they chat about their investments and plans for the future. Their constant readiness to change with the times has paid off. From the economic challenges of pre-1989 Poland to today’s

market economy, BAKS has steadily evolved into a renowned and respected specialist in its field. One key advantage was the company’s determination to see potential obstacles as opportunities for progress. Now, Tomasz Sielski is writing the next chapter in the company’s success story – and preparing to face whatever challenges the future holds.

IMAGES: Bartłomiej Bukowski

01

*A closer look:*

## TruBend Series 5000 and ToolMaster

A **TruBend Series 5000** press brake is always a versatile option – so Kazimierz and Tomasz Sielski decided it was worth the investment. Their BAKS production plant includes a TruBend 5230, which operates in two shifts. The bending machine is equipped with a **ToolMaster** that handles tool set-up in next to no time.

In brief

# TruBend Series 5000: designed with the operator in mind

The **TruBend Series 5000** offers an array of features that make life easier for operators, freeing them up to do other tasks.

01

## EASIER TO CONTROL

**Touchpoint** is a user-friendly control panel for bending, laser and punching machines. Its clear, uncluttered interface makes it easy to enter commands directly in the machine's control system. Operators also benefit from a built-in help system which can be accessed by swiping or tapping the touch panel with two fingers.

02

## SAY GOODBYE TO THE FOOT SWITCH

The **MagicShoe** is a work boot that gives machine operators complete freedom of movement, allowing them to activate machine strokes from any position in front of the machine. The shoe contains sensors that are linked directly to the machine, eliminating the need for a foot switch.

03

## PRECISE ANGLES

Variations in material properties such as strength and springback can compromise precision. The **Automatically Controlled Bending (ACB) system** measures the bending angle using laser beams and a camera system. This ensures precise bend angles in the metal.

05

## ALWAYS IN THE RIGHT POSITION

The **PartIndicator** camera system helps operators position the sheet metal blank correctly in the bending machine. This helps reduce scrap rates. The PartIndicator is particularly suitable for very symmetrical or evenly shaped parts that need to be placed in a specific position which can be hard to identify with the naked eye.

06

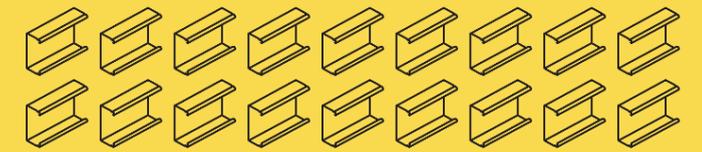
## SAVE TIME AND AVOID MISTAKES

**BendGuard Automatic** automatically moves the machine's safety device to the height of the upper tool, eliminating the need for the operator to adjust this device manually. That makes life easier for the operator and saves valuable time.

04

## EASY TOOL CHANGES

The latest generation of the ToolMaster is 50 percent faster than its predecessor. The **tool changer** offers up to twice as much capacity and automatically equips the bending machine for each new program. The ToolMaster changes standard tools, ACB sensor tools and customer-specific tools in a matter of seconds, freeing up the operator to carry out other tasks.



**27,000 products** available

# 38

**38 TRUMPF machines**



Works in two shifts,  
sometimes three



First TRUMPF machine:  
TruMatic 235

## Cable trays around the globe

RWE Westfalen power plant in Hamm  
Salzburg station  
Airbus in Toulouse  
Mexican Lego factory  
National Stadium in Warsaw



## Customer details

**BAKS Kazimierz Sielski**  
ul. Jagodne 5  
05-480 Karczew, Poland  
Chief Operating Officer:  
Tomasz Sielski

Phone: +48 22 710 81 00  
Fax: +48 22 710 81 01  
www.baks.com.pl  
export@baks.com.pl

## Machinery

- TruBend 5230 + ToolMaster
- TruBend 5230
- 3x TruBend V85
- TruBend 5130
- 2x TruBend V200
- 5x TruBend 5085
- TruBend V170
- TruBend V130
- 2x TruBend V1700S
- 2x TruBend V230
- 2x TruBend V50
- TruBend V850
- TruBend V5085
- TruBend 7036
- 3x TruPunch 3000
- TruPunch 3000 + SheetMaster
- TruPunch 5000 + SheetMaster
- 2x TruMatic 6000
- TruMatic 7000 + SheetMaster
- 2x TruLaser 5030 + LiftMaster
- TruLaser 5030
- 2x STOPA Lager



02

ESTONIA

*Progress in Keila*

## SMART FAMILY

Imagine a country where Internet access is **a basic human right**, the cell phone network covers **every inch of territory** – and it only takes **a few clicks** to set up a company! That country has a name: Estonia.

After the collapse of the Soviet Union, Estonia transformed itself into an e-nation seemingly overnight.

Today, the **Valdek family's** production plant offers a great example of how small-scale sheet metal fabricators everywhere can benefit from **digitalization**.

IMAGE: Christian Gogolin



No business talk at the table on Sundays. That's the Valdek family's rule when they sit down to eat together – but it can be hard to stick to when these eight adults and six children get together in one place! The parents, their three sons and the sons' wives all work for the same company, which supplies a broad array of industries with sheet metal components – from telecommunications and robotics to the retail sector.

Of course there are always plenty of other topics for the 14 members of this family to talk about, including the grandchildren's latest aerobics and soccer achievements, recent and upcoming vacations, and whatever illnesses or school-related issues are currently affecting the kids. It's true that the temptation to discuss the company's digitalization strategy is sometimes hard to resist for Viljar Valdek, development manager at AS Valdek and the eldest son of company founder Mihkel Valdek. But that's hardly surprising in a country where digital technologies play such an important role in people's professional and private lives.

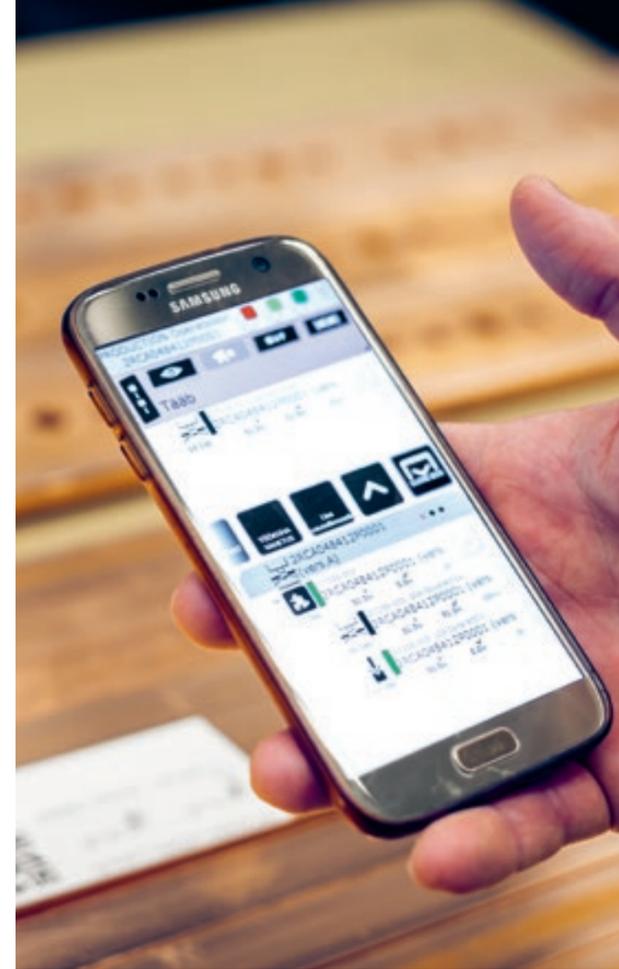
The country has been nicknamed e-Estonia – and for good reason. From the capital city of Tallinn to the Baltic coast and the country's many birch forests, Estonia's 1.3 million inhabitants can access the Internet at any time from just about anywhere. Enthu-

siasm for this blanket coverage is certainly high, with 99 percent of the population in possession of an electronic identity card, according to the tech-savvy government. Most people vote in elections and submit their tax declarations online. Physicians use a fast and easy e-prescription system, and it takes just 15 minutes to set up a company.

Things were very different back in 1991 when Mihkel Valdek first got his garage-based business off the ground. He started from scratch just one year after his country declared independence from the Soviet Union, initially making wooden doorknobs but quickly switching to sheet metal fabrication. Soon he had his first four employees, two of whom are now over 70 and still working for the company. Today, the workforce numbers more than 50, though this is still surprisingly low for a company with annual revenues of 7.3 million euros.

### Two generations, one goal

"Smart manufacturing enables us to do a lot with a relatively small team," says 36-year-old Viljar Valdek. He and his two younger brothers joined the company in 2006, and Viljar has been putting his passion for IT to good use ever since. Priit Valdek, now 32, took



“ We need to prepare for the future without knowing exactly what it will be. ”

Viljar Valdek  
Development Manager at AS Valdek

**Mihkel Valdek with his son Priit (left) and production manager Sten (right):** The company started out in 1991 in a garage with just four employees. Now AS Valdek employs well over 50 people.



IMAGES: Christian Gogolin

on the post of sales manager, and 33-year-old Märt took charge of running and digitalizing all the company's logistics activities. While Mihkel Valdek relies on his extensive experience to manage day-to-day processes, his sons focus on keeping AS Valdek on – or even ahead of – the technological curve.

"We need to prepare for the future without knowing exactly what it will be," says Viljar Valdek, echoing the entrepreneurial spirit that stems from both his family roots and Estonian history. "Setting up a business in Estonia in the 1990s meant starting from scratch. There were no companies to show us the way, so it was up to us to decide which direction AS Valdek should take. Nowadays we do keep an eye on what other companies are doing, but only so we can do it differently!" says the development manager.

Bold steps can lead to real progress. The company's revenues doubled soon after bringing the three sons on board, and in 2011 the Valdeks took the plunge and purchased a TruBend Cell 5000, a decision that Viljar Valdek describes as a "really big step that gave us a huge boost". "Nobody else in Estonia had an automated bending cell back then, so it really set us apart from the competition." Today, AS Valdek has a total of three TRUMPF bending cells and a TruPunch 3000 machine. Even more importantly, it has a whole series of software solutions at its disposal. "That was the key to reaching the next level," says Valdek.



**The visionary:** Viljar Valdek (left, next to one of his employees) is preparing the family business for the digital future – and breaking new ground in the process.



**Modern software optimizes production:** Workers on the shop floor can quickly tailor the production processes to new situations as they arise.



IMAGES: Christian Gogolin

“ Having the right **software** gives us more flexibility on the shop floor. ”

Viljar Valdek  
Development Manager at AS Valdek

### On-the-fly job rotation

TruTops Fab plays a crucial role at AS Valdek. In addition to TruTops Fab, it also uses V-Soft, a software solution the company developed in-house. “Having the right software gives us more flexibility on the shop floor: instead of people always working in the same place, we can deploy them where they are needed,” says Viljar Valdek. This also has a positive effect on product quality: “The person operating the bending machine is the one who knows best how to join the parts together.” There are other advantages too, says Viljar Valdek, including greater process flexibility. The software allows the production team to modify their production processes at very short notice. For a company with such a small workforce, this offers major benefits for throughput and delivery times. AS Valdek’s production plant has been fully paperless since 2015.

Now this entrepreneurial family is taking things to the next level with its new production facility in Keila. This takes them one step closer to their vision of industry 5.0, in which humans will work side by side with robots. This is another topic that Viljar Valdek has to bite his tongue to avoid at the family’s Sunday dinner. Fortunately, his son is more than happy to chat about his digital classroom at school. Viljar Valdek has no idea if his son will follow him into the family business, but he has certainly inherited the gene from his grandparents and parents – and e-Estonia is giving him the digital schooling he will need to succeed.

02

*A closer look:*

## TruTops Fab

Based in the “**digital paradise**” of Estonia, AS Valdek is in the perfect place to tap into the latest technological advances. This family-run company is striving to create a **connected production environment** that is **fit for the future**. To link all the processes on the shop floor, the Valdeks also rely on a modular software solution called **TruTops Fab**, which provides a seamless, efficient and transparent means of **controlling and managing** every step in the process – from customer order to delivery.

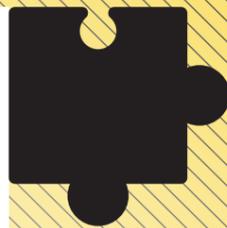
*In brief*

# Everything at a glance with TruTops Fab

The more machinery a company has, the more important it is for a production manager to have a clear overview. That's where the modules of the TruTops Fab manufacturing execution system can help.

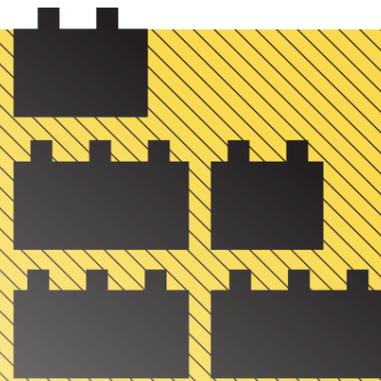
## Pieces of a puzzle

TruTops Fab modules fit together like the pieces of a puzzle. Information flows seamlessly from one module to the next. For example, the TruTops Fab Storage module notifies the Purchase module when stocks of a certain part drop below a certain level, automatically triggering a new order.



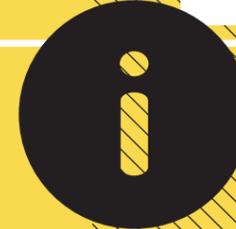
## Upgrade at any time

TruTops Fab is a smart software solution from TRUMPF that can be upgraded at any time. Modules are available for status monitoring, production control, and warehouse management, as well as for calculating and preparing offers.



## All the information at a glance

TruTops Fab automatically reports back on the machines' current job status and material consumption.



## Always up-to-date

The capacity overview gives the factory manager real-time information on all the orders and their current status.



## Learning from data analysis

Analyzing production data gives the factory manager a clearer idea of each machine's condition as well as information on job throughput times.



## Estonia: the digital heart of Europe

### The joy of going paper-free

Estonians can conduct all their dealings with the authorities online, because all the paperwork is digital.

### Tax declaration in less than three minutes

Citizens can complete their tax declarations online in a matter of minutes. Any tax refund they are entitled to is paid into their account within five days.

### Multifunctional ID card

Every Estonian has an electronic identity card that also serves as their driving license, train season ticket and health insurance card.

### Digital voting

Estonians have been voting online in elections since 2005 instead of going to polling centers. Top-notch cyber security measures keep the elections safe from hackers.

### Click and govern

Estonia adopted a paperless e-Cabinet system in 2000 to reduce bureaucracy in cabinet meetings and government administration.

### AI judges

Estonia's court system plans to draw on the support of artificial intelligence.

### 95 percent ultra-fast broadband

Digital Estonia boasts near-perfect Internet access thanks to its LTE 4G network. Estonia is also at the forefront of European plans to implement 5G.

## Customer details

**Valdek AS**  
Keila, Piiri 12A  
76610, Harjumaa  
CEO: Mihkel Valdek  
[www.valdek.ee](http://www.valdek.ee)

## Machinery

- 3x TruBend Cell 5000
- 2x TruBend 3100
- TruPunch 3000



03

AUSTRALIA

Progress in Melbourne

# PROGRESS DOWN UNDER

IMAGES: Mike Baker

The trucks that transport goods across the Australian Outback cover **thousands of kilometers**. These heavy-duty vehicles require robust parts – and that’s exactly what Preston General Engineering (PGE) has been producing for **nearly 50 years**. Current owner John Kaias told TRUe how he automated his father’s factory and increased the company’s headcount tenfold.

**Smart restructuring:** John Kaias automates process to free up his employees’ valuable time so they can focus on other tasks.

**John, your father founded Preston General Engineering in 1971 in the Melbourne suburb of Preston with two employees. Over the past five decades, PGE has grown from a small jobbing shop to a company that manufactures and tests components for heavy-duty vehicles. What’s your recipe for success?**

J: Automation has been the catalyst for our steady growth since 1994, although none of it would have been possible without our hard-working, talented employees. I’m proud to see PGE working with truck OEMs like Volvo and supplying genuine four-wheel-drive parts for automakers such as Toyota and Mazda – and that’s not just because I’m a car enthusiast! We make a range of products for those companies including safety guards such as roll bars, chassis rails and suspension components.

**Let’s focus on automation for a moment. What were things like before you automated your shop floor, and what are they like now?**

J: Before we automated our factory floor, our production processes were unstructured and we only had the most basic machinery for metal fabrication. Now we have five manufacturing plants that are neatly laid out with painted floors and clearly defined lanes for fork lifts and pedestrians – a total of 40,000 m<sup>2</sup>.

**PGE’s automated workflows depend heavily on STOPA systems. How have they helped you optimize the business?**

J: Our STOPA system – 76 meters long with 640 pallet spaces – has been up and running since 2011. It has greatly improved our produc-



tion efficiency and reduced material handling. The STOPA holds all our raw sheets as well as work-in-progress and semi-finished parts that enable us to supply just-in-time products to specific clients.

**When your father, Greg Kaias, founded the company, there was no automation at all. Since you and your brother came on board, the workforce has grown steadily from 30 employees in 1989 to over 300 full-time employees today. How has the company’s vision changed since your father started out?**

J: When my father founded Preston General Engineering there was no real urgency to automate. Technology in the Australian metal fabrication industry was still very limited. But today’s steel industry consists of enterprises of all shapes and sizes that together have an annual turnover of 29 billion Australian dollars and contribute 11 billion Australian dollars to Australia’s GDP. When I joined the company in 1993, I was determined to automate some of the

labor-intensive processes and free up resources for more value-added jobs. I remember manually oxy cutting 125 diameter holes in 8 millimeter thick steel day after day for truck cross members. In 1994, we invested in our first TRUMPF laser. We've been buying the machines from TRUMPF's distributor in Australia, Headland Machinery, for the past 30 years and the level of support has been fantastic. We currently have 16 TRUMPF machines in operation. I hope my sons will keep the business moving in the same direction.

**Do you think PGE's success also stems from being a family business?**

J: Absolutely! Our father gave us a stable business and a solid platform to build on, and that really motivated me and my brother to keep expanding. We are both on site every day running the business with some very talented staff and shop floor personnel. I still enjoy assisting the shop floor team with breakdowns and technical advice.

**Being close to the action is clearly one of the keys to your success. So how do you keep up to date with the latest TRUMPF technologies despite the distance between Ditzingen and Australia?**

J: I regularly check out new technologies online and talk to Headland Machinery. I've made several trips to TRUMPF in Ditzingen and visited some German manufacturing facilities to keep updated, and I will continue to do so.

**It sounds like your company's automation went without a hitch!**

J: We're certainly on the right path. Automating a whole production facility requires a shift in mindset. Right now, we're working on achieving our mid-term goal, which is to further integrate the



“ I hope we'll **continue to be an employer of choice** for many more people in the future. ”

John Kaias, Director Preston General Engineering

TruTops Fab production control system in our workflows and go paperless on the shop floor.

**Looking to the future, what's your vision for the company?**

J: Our aim is to continue down the path of automating our processes. Right now we're testing out automated guided vehicles to transport parts from one production facility to the next. We're also investing in automated welding and polishing systems and aim to be completely paperless by 2025. We hope that all these measures will make us the benchmark metal part manufacturer in Australia. We'll continue to rely on automation – and hopefully we'll continue to be an employer of choice for many more people in the future.

03

*A closer look:*

## Laser welding pays off

John Kaias from Preston General Engineering (PGE) is looking to increase automation on the shop floor and introduce **automated laser welding**. This technology pays off for almost any order volume, often eliminating the need for post-processing and producing consistently robust weld seams. That makes it the perfect choice for PGE's truck components, which have to survive the hardships of Australia's roads.



**Help and advice:** John Kaias is always on hand to offer his employees technical tips and hands-on support when things get tricky.

*In brief*

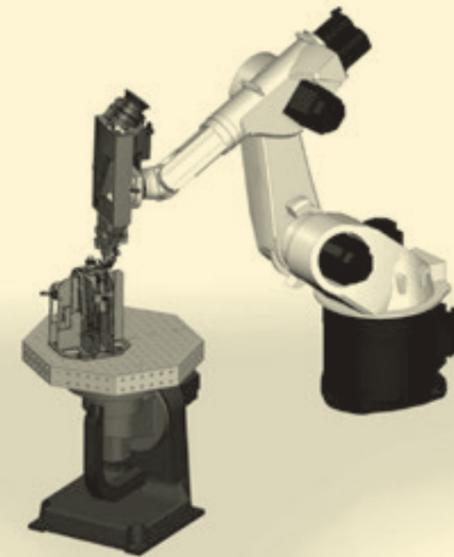
# Welding for high and low volumes

Laser welding also makes sense for low-volume production. The laser welds parts at high speed, producing seams that, in many

cases, require no additional processing or rework. The right software and some simple fixtures make job preparation quicker and easier.

## Simple fixtures:

Automated laser welding requires users to mount parts in a fixture in the machine. The cost of this fixture can be recouped quicker for bigger batches than smaller ones. But it isn't necessary to design and build a separate fixture for each welding module. Some parts can be mounted in the welding cell using simple clamping systems. For very short production runs, tack welding is a good alternative to fixtures. This involves making several tack welds at some distance from each other using the laser or a manual TIG welding set. A simple clamp can then be used to hold the part in place while final welding is performed by the laser.



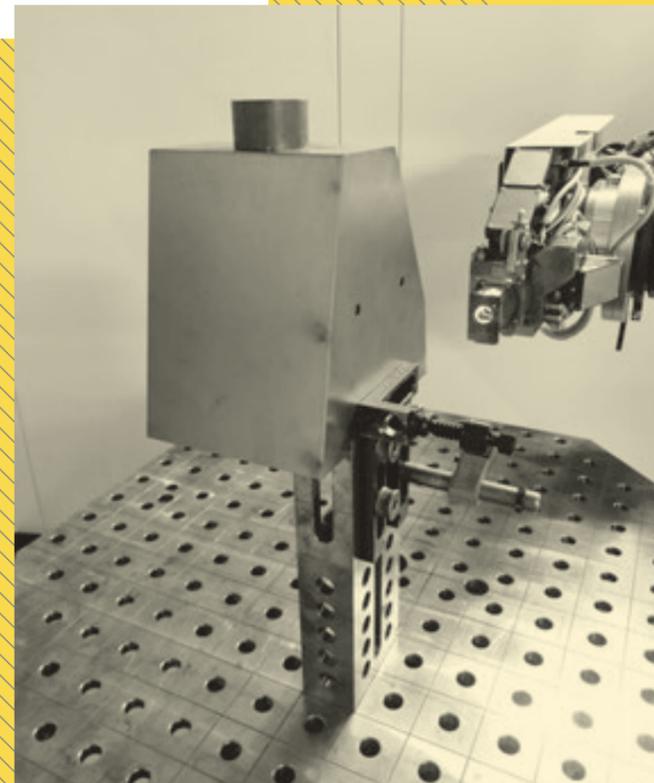
## Fast programming:

The TruTops Weld programming software allows users to create welding programs on a computer while the laser welding cell is in operation. The user can then transfer the program to the machine and run a quick check. The TeachLine sensor system helps determine the part's exact position and adjusts the program if it detects any discrepancy.



## Quick-change fixtures:

The zero-point clamping system is useful in situations where the operator has to switch between multiple fixtures. It holds the fixtures in exactly the right position and makes it easy to switch between fixtures in a matter of seconds.



## Customer details

### Preston General Engineering (PGE)

Director: John Kaias  
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Campbellfield, Victoria, 3061  
Phone: +61 03 9357 0011  
Fax: +61 03 9357 0020  
[www.abc.com.au](http://www.abc.com.au)

## Machinery

- 2x TrumaBend V130
- TrumaBend V230
- Trumatic 2020
- TruLaser 7040
- TruLaser Cell 8030
- TruLaser Tube 7000
- TruLaser 3030
- TruLaser 5030
- TruLaser 5030 fiber
- TruBend 5085
- TruBend 5130
- TruBend 5320
- TruBend 7036

From digital whiteboards and VR headsets to teacher avatars, digitalization continues to make inroads into the worlds of **adult education and vocational training**. This is especially true at TRUMPF's **Training Center** in Ditzingen, where Francesco De Marco is planning **virtual learning formats** that will soon allow trainers to summon up customers' machines at the touch of a button.



**Practicing on virtual machines:** Christopher Poppel – a member of Francesco De Marco's team – uses a virtual reality headset to learn how to use TRUMPF machines.

It's a busy day at the Ditzingen Training Center. Twenty machines are dotted around the large hall, which is flooded with fall sunshine. Each machine is surrounded by a small group of training participants who are taking notes, asking the TRUMPF experts questions and trying out the touchscreens on the machines. "This is a fairly typical day for us," says Francesco De Marco, the Training Center's e-learning manager, as he strolls through the hall. "Traditional face-to-face teaching still has an important role to play in education despite online learning tools, and I don't see that changing in the future."

### 3D printer in VR

Together with his staff and colleagues, De Marco develops digital learning formats. He leads us into a dimly lit classroom, where

staff member Christopher Poppel is carrying out repair and maintenance work on a machine using a virtual reality headset and two hand controllers. The TruPrint 3000 3D printer he is currently working on is projected on the screen in front of us.

"VR will play a major role in how people learn in the future," says De Marco, pointing to his colleague. Poppel has just activated a print job on the virtual machine by clicking a button on one of his hand controllers. "The virtual world will enhance face-to-face training rather than replacing it," says De Marco. "One reason is that VR doesn't have haptic feedback. To use a torque wrench properly, for example, mechanics need to feel the weight of the tool in their hand and hear it engage. You can't get that in a VR application. But what VR can do is give an impression of how the machine works and let people try things out without the risk of breaking anything!"

04

GERMANY

*Progress in Ditzingen*

# DIGITAL SCHOOLING

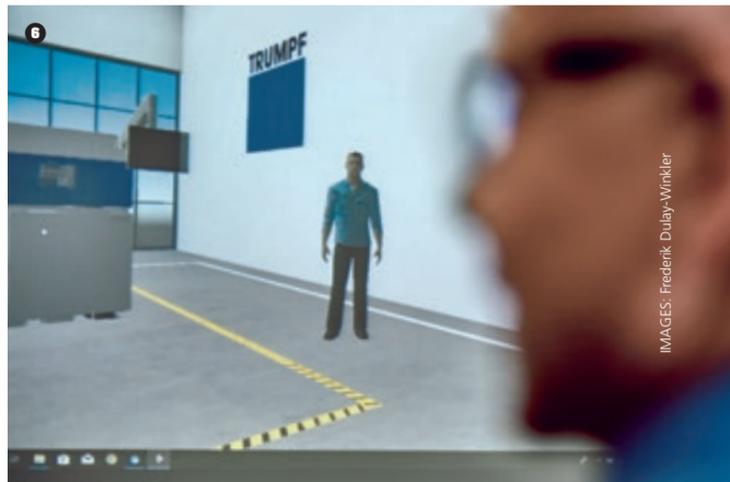
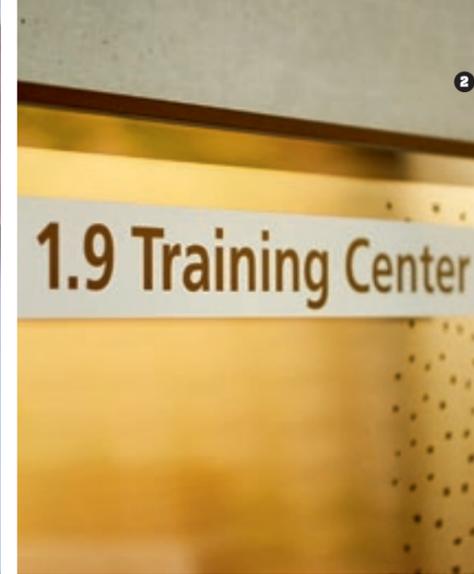
“ I love being the first one to try out **new things.** ”

Francesco De Marco,  
E-Learning Manager, Ditzingen Training Center

“**Digital natives have a head start**”

The VR application forms part of the VASE project, which stands for virtual and analytic services in mechanical and plant engineering. VASE is a research and development project funded by the German Federal Ministry of Education and Research – and the Ditzingen Training Center is one of the organizations taking part. With an annual total of almost 50,000 face-to-face participant training days, some 2,500 e-learning participant training days and around 500 different types of courses, the Ditzingen Training Center is the largest of TRUMPF’s eight training centers worldwide. Headed up by Stephan Bundschu, it is a pioneer in setting global standards. TRUMPF started incorporating digital learning methods in its training programs as long ago as 2014. Part of the impetus was to give customers and employees the flexibility to choose when they want to train and to participate from wherever they are using a computer, tablet or smartphone.

The center now uses a total of four well-established e-learning methods. The first, web-based training, offers users the opportunity to participate in online courses at a time of their choosing. The second is a virtual classroom, which participants can attend from anywhere, but at a scheduled time when both the teacher and students are online. The teacher typically makes use of a digital whiteboard, and participants can communicate with each other via audio conferencing as well as text chats. A third way of learning how to use TRUMPF machines is through video tutorials. Available around the clock, these focus on a defined set of operating steps and help learners find answers to specific questions. The fourth option is instructional videos. These take things to the next level by guiding the viewer step-by-step through more complex situations. All the learning modules are available in both German and English, and TRUMPF can also provide them in other languages on request. “We try to design our learning materials in a way that is accessible to everyone,” says De Marco. “There’s a big variation in the average age of our training participants. Digital natives certainly have a head start, but our training materials also go down very well with my generation.” The Training Center in Ditzingen performs a number of other tasks besides offering digital learning. The team also provides advice to TRUMPF departments on how to use e-learning tools and navigate legal issues.



**(1, 2) Train the trainer:** Headed up by Stephan Bundschu, the Training Center is the biggest of TRUMPF’s worldwide educational facilities. The seminars it offers include train-the-trainer courses for teaching professionals from other training centers.

**(3, 4, 5, 6, 7) Virtual reality is only the beginning:** Francesco De Marco heads up the digital learning group. He and his team plan to continue incorporating modern teaching methods in the Ditzingen Training Center and making them available on a global basis.

**The right machine appears at the touch of a button**

De Marco’s enthusiasm to try out new things is what motivates him to come up with new learning formats. “I love being the first one to try out new technologies,” says the mechanical engineering expert, who has worked at TRUMPF since 1989. “My first experience with VR was trying out various different VR headsets at home with my son and his friends. Nowadays, I’m pretty good at spotting things that need to be improved in our training – for example if I can’t find my way around a VR environment or if the voice-over doesn’t match the learning content.”

Yet virtual reality is only one of the tools the Ditzingen Training Center is taking on board for the future. De Marco and his team are currently experimenting with a number of other approaches. One example is micro learning, a strategy that breaks down learning into bite-sized portions. Participants can choose exactly which elements they wish to learn without having to plough through an entire module. The idea is to use video tutorials and instructional videos that get straight to the point and encourage viewers to reflect on what they have learned.

De Marco also dreams of one day creating an entirely digital training center in which all the different learning formats will be accessible online. He believes in keeping an open mind and learning new things because, as we all know, learning never stops - and nor does the search for new learning methods.

“ The **virtual world** will **enhance** face-to-face training rather than replacing it. ”

Francesco De Marco,  
E-Learning Manager, Ditzingen Training Center



*Fascinating facts and exciting innovations.*



## Great to switch off

The machines TRUMPF uses to produce bending tools in Pasching have a high base load. Nowadays, TRUMPF's main Austrian location switches the machines off at the end of a shift and over the weekend, leading to savings of some 93,600 kilowatt-hours a year. This achievement was recently recognized by the Austrian Federal Ministry of Sustainability and Tourism with an award presented to companies that adopt measures to combat climate change, thereby supporting the European Commission's goal of net-zero greenhouse gas emissions in the EU economy by 2050. TRUMPF is also aiming to achieve carbon-neutral production worldwide by the end of 2020. As well as switching to electricity from renewable sources, the company will initially be purchasing certificates to offset its emissions from the combustion of fuel, heating oil and natural gas.



## Waging war against multidrug-resistant bacteria

TRUMPF Venture GmbH is assisting in the fight against multidrug-resistant bacteria. A new method developed by Swiss start-up Resistell helps doctors determine which antibiotic a seriously ill patient needs so they can give them the right treatment as quickly as possible. "Photonics-based microbiological diagnostics is up to one hundred times faster than conventional methods," says Dieter Kraft, managing director TRUMPF Venture GmbH. "We're keen to support this as a strategic investment." The new method uses tiny light sensors to measure the response of living microbes to antibiotics without the need for artificial and prolonged bacterial culture.



## Microwaves pave the way to the future

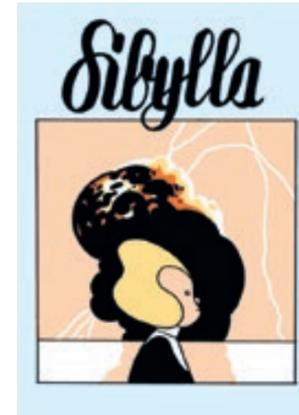
TRUMPF Hüttinger in Freiburg has acquired the microwave technology company HBH. This acquisition adds semiconductor-based, solid-state microwave generators to TRUMPF Hüttinger's portfolio, which already includes technologies such as RF generators for plasma excitation. HBH's devices are used in industrial applications such as plasma generation and industrial heating as well as in communications and radar technology. Another important market the company has in its sights is particle accelerators for research, medicine and industry. "This acquisition gives us a real boost in the trending field of microwave power generators," says Rafal Bugyi, managing director of TRUMPF Hüttinger in Freiburg.



## Getting trains back on track faster with 3D printing

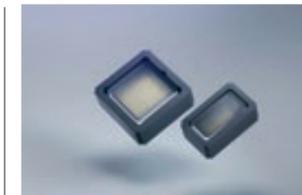
Spare parts for trains are now being produced using TruPrint systems from TRUMPF. With 3D printing, spare parts can be produced from metal much faster, drastically reducing delivery times. "This helps keep our supplies of spare parts well stocked, so we can get trains back on track sooner for our passengers," says Stefanie Brickwede, project manager for 3D printing at Deutsche Bahn. By 2021, the company hopes to make thousands of different spare parts available through 3D printing. "Deutsche Bahn is a great example of how 3D printing can be used to produce small batches quickly and cost-effectively," says Klaus Parey, managing director of TRUMPF Additive Manufacturing. "They have opted to use an innovative manufacturing method to tackle the trend of customized 'batch of one' production runs." DB is also using 3D printers to make parts for passenger carriage interiors. For example, TRUMPF 3D printers are currently being used to make a cover for the luggage rack in ICE high-speed trains.

IMAGES TRUMPF, Max Baitinger, Martin Braun Fotografie



## Comic Book Award 2020 goes to Sibylla

The Berthold Leibinger Stiftung recently presented its sixth Comic Book Award to Max Baitinger for Sibylla, which tells the story of the 17th-century poet Sibylla Schwarz from Greifswald, Germany. The comic book focuses on the Thirty Years' War, which brought widespread destruction and suffering to much of Central Europe. A total of 83 authors and illustrators from Germany, Austria, Argentina and Switzerland applied for the Comic Book Award and its 20,000-euro prize. Presented annually, the award aims to give authors the support they need to complete unfinished works.



## 1,000,000,000th laser

More than 150 smartphone models feature TRUMPF laser technology. The TRUMPF subsidiary Photonic Components makes VCSELs, or "mini lasers", which are used in many smartphone sensors. VCSELs perform various functions, such as improving the camera's autofocus, enabling face recognition to unlock the device's display, and switching off the display when users raise the smartphone to their ear to receive a call. Last fall, TRUMPF delivered the one billionth VCSEL (Vertical Cavity Surface Emitting Laser) to its partner, the sensor manufacturer STMicroelectronics. "We've been working successfully with STMicroelectronics since 2012 and intend to intensify this collaboration in the future to tap into the huge potential for growth in consumer electronics," says Joseph Pankert, the managing director in charge of the VCSEL line of business.



## Agile and successful

Is agile product development a pioneering way to guarantee success? Or simply overrated hype? This was the question tackled in the "Agile Product Development" benchmarking study carried out by RWTH Aachen University's Machine Tool Laboratory, the Aachen-based Fraunhofer Institute for Production Technology IPT and the Complexity Management Academy. Together with an industry consortium of 16 companies, the research institutes examined tried-and-tested solutions as well as the success factors behind the agile development of specific products. Of the 243 companies that participated in the study, five were awarded special recognition – and TRUMPF was one of them. "This demonstrates the success of our efforts to develop targeted agile methods and models for TRUMPF machine tools," says agile transition expert Reiner Köttgen. "This recognition will spur us on to develop other areas of agile excellence."



## TRUMPF nominated for Demography Award 2020

TRUMPF is participating in the VASE project, which aims to investigate how virtual reality can be used to help train customers and service technicians. VASE is short for Virtual and Analytics Service in mechanical and plant engineering. TRUMPF's partners in the project include the University of Stuttgart as well as companies such as Festo, Stihl, TriCAT and HOMAG. Funding has been provided by the Karlsruhe Institute of Technology (KIT) and the German Federal Ministry of Education and Research (BMBF). TRUMPF's involvement in VASE has earned it a nomination in the "Opportunities of digitalization" category of the 2020 German Demography Award.

## SMART POWER TUBE TAKES CHARGE

The Power Tube from TRUMPF is the key generator component in almost all of our CO<sub>2</sub> laser processing machines. It supplies the energy required to produce the laser beam. If the Power Tube fails, so too does the machine. Companies should therefore be sure to replace the Power Tube in good time. In the future, they will no longer have to work out when this moment has arrived – because the new Smart Power Tube sends an automatic notification when it needs replacing. This new feature will help improve maintenance planning. The benefits of the Smart Power Tube are already clear to Günter Ruf, head of punch laser processing at RATIONAL AG in the German town of Landsberg am Lech.



“TRUMPF sends us an email before the Power Tube fails,” Günter Ruf explains. “The big advantage is that our employees can continue working while TRUMPF sends us a replacement. And the people in maintenance and production have sufficient time to plan the work required to replace the component.”

Ruf mentions a further advantage: “In the past, our employees had to monitor the condition of the Power Tube at regular intervals so that we would know when to replace it. But they don’t need to do that now.”

**Smart monitoring:** a transmitter mounted on the Power Tube sends TRUMPF data on the status of the generator. Users no longer have to check it at regular intervals and are therefore protected against unplanned downtime.

## MAKING LIGHT WORK OF MILD STEEL



The mere idea of cutting parts out of thick mild steel can make some users break out in a sweat. But with the right features, there’s no reason to panic.

### Flame cutting

Cutting gas: oxygen



#### CoolLine

As the laser carves its way through thick mild steel, the material along the cutting interface heats up and melts. To prevent this heat from building up in the material and impairing the quality of the cut, users can take steps such as increasing the distance between parts. This increases the amount of material left behind in the scrap skeleton. The CoolLine nozzle solves this problem by spraying water onto the workpiece around the laser beam. This cools the metal and makes the overall process more reliable. Parts can be placed closer together on the sheet and the system can also handle smaller, more intricate parts. The CoolLine feature is available for material thicknesses starting at 15 millimeters and a laser power of at least four kilowatts.

#### BrightLine fiber

BrightLine fiber enables users to cut mild steel with a large focal diameter. This leads to a wider kerf and improves the quality of the cut edge. The large diameter stabilizes the cutting process, which means variations in material quality have less of an impact on the final result. This makes part removal easier and increases processing speed. Thanks to the greater stability of the process, users can cut with higher-power lasers. Using a ten-kilowatt laser, BrightLine fiber can process sheet thicknesses up to 30 millimeters.

### Flame cutting & fusion cutting

Cutting gas: oxygen or nitrogen



#### Active Speed Control

The Active Speed Control cutting sensor system is a key step on the road toward autonomous laser cutting. The camera-based sensor system looks straight through the cutting nozzle right into the kerf and adjusts the feed rate as necessary to ensure that the machine is always cutting at the optimum speed. In this way, Active Speed Control increases the machine’s tolerance for fluctuations in material quality and reduces scrap. If a thick sheet of metal has already been processed and heated up by the laser, less energy is required. In this case, the sensor system increases the feed rate. Active Speed Control can be used with material thicknesses up to 25 millimeters and a laser power of ten kilowatts.

### Fusion cutting

Cutting gas: nitrogen



#### Highspeed Eco

More and more fabricators are using nitrogen as a cutting gas instead of oxygen in order to prevent oxidation of the cut edges and eliminate post-processing work – and mild steel is no exception. In order to reliably eject molten material from the kerf, the gas needs to be under high pressure. Thanks to the new design of the Highspeed Eco nozzle and its sleeve, which glides directly across the metal sheet, users can reduce the amount of nitrogen while simultaneously increasing the speed of the cutting process.

#### CO<sub>2</sub> laser:



Fusion cutting with BrightLine



Flame cutting with BrightLine

#### Solid-state lasers:



Flame cutting with BrightLine fiber



Fusion cutting with BrightLine fiber

Check it out!

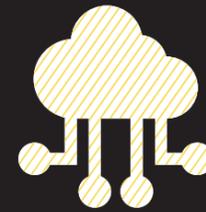
# RETROFITTING MADE EASY

In a competitive market, it is important to respond flexibly to changing requirements and adapt your production facilities as needed. TRUMPF machines are designed to be upgradable, so you can add new features to tackle new tasks. Here we present **ten product enhancements** that can be retrofitted to existing machines.



## BUILT-IN CAMERA

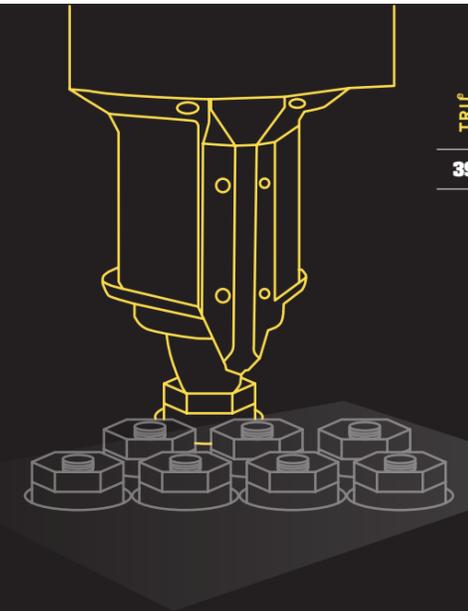
A **camera** inside the machine saves valuable time by showing operators an overview of the process on a screen or tablet. That allows them to respond quickly to any problems even when they are not right next to the machine.



## MACHINE APPS\*

Apps analyze data generated before, during and after production to provide information such as capacity utilization and the amount of material used. This gives operators greater insights into their production line and helps them optimize their processes. Built-in **internet connectivity** means the data can be uploaded to the cloud and accessed from anywhere on a mobile device.

\* Available from spring 2020 in Germany, Austria, Switzerland, the Netherlands and the U.S.



## NOZZLE CHANGER

When a nozzle becomes too worn or the laser is ready to process a new job, the nozzle changer **automatically** replaces the nozzle without requiring user intervention.

# 70 HIGHSPEED ECO

Fast, faster, Highspeed Eco! This efficient cutting process makes nitrogen cutting with solid-state lasers considerably faster and **reduces gas consumption** by an average of **70 percent**.

## DROP& CUT

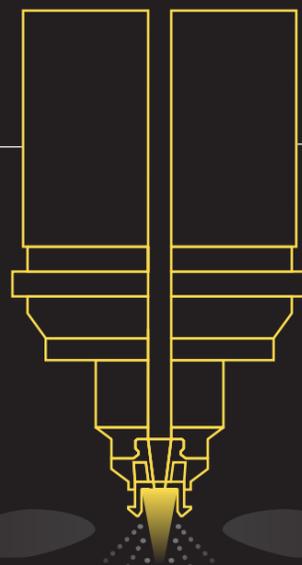


**Drop&Cut** captures an image of the scrap skeleton inside the machine and **transmits** it to the control panel. This helps operators lay out part geometries on the remaining metal and keep waste to a minimum.

## COOLLINE

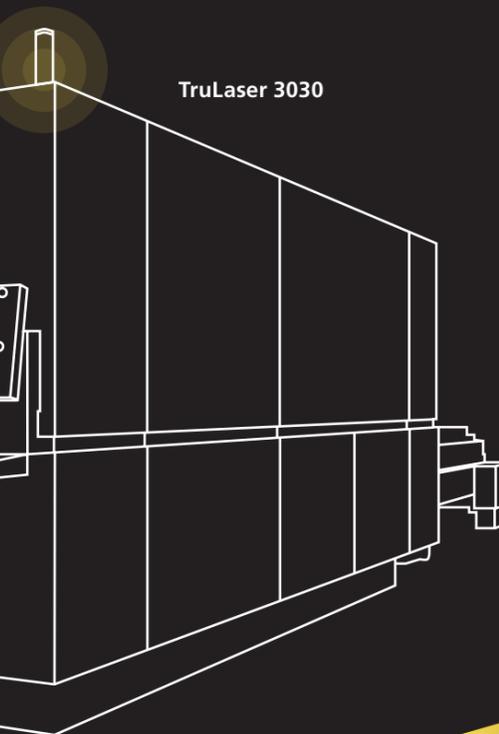
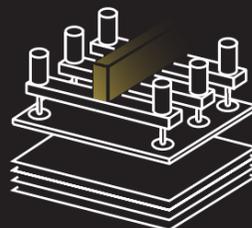


Things can get hot at the cutting interface when processing thicker metal. To prevent these high temperatures causing problems, operators increase the distance between parts during nesting. The CoolLine nozzle solves this problem by spraying water onto the workpiece around the laser beam and relying on vaporization to cool the metal. This makes nesting simpler and reduces scrap by **up to 25 percent**.

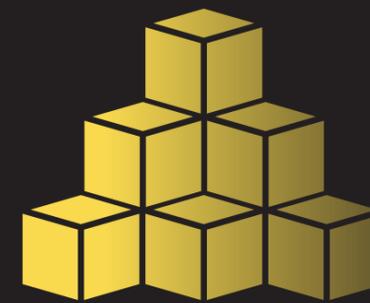


The **fully automatic** LiftMaster Compact makes loading and unloading quick and easy. It works around the clock, either independently or hooked up to a storage system.

## LIFTMASTER COMPACT



## CONNECTION TO STORAGE



## SMART COLLISION PREVENTION

If a part tilts during laser cutting, it may end up colliding with the cutting head. Smart Collision Prevention **takes tilting into account** in its calculations and guides the laser around any potential hazards to avoid collisions.

## COMPRESSED AIR CUTTING



In addition to cutting with oxygen and nitrogen, this feature also allows **pressurized air to be used as a cutting gas**. This reduces costs, providing operators with a cost-effective alternative to standard cutting gases.

Where's the box of new parts? Which compartment is my tool in? When will the forklift truck get here? And what's the best route for that automated guided vehicle to take? Questions like these are a daily occurrence on the shop floor – and the market has responded with an ever-increasing assortment of **indoor positioning technologies**. Here we take a look at the best options for sheet metal fabrication – and learn the difference between a well-managed production facility and a bowl of pasta!

05

FUTURE

## ULTRA-WIDEBAND: POSITIONING SOLUTIONS FOR INDUSTRY 4.0

IMAGE: BeSpoon

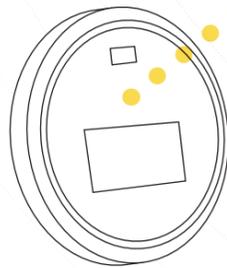
Connectivity has become an indispensable part of the production process – and intralogistics is no exception. Various products are available to track job batches, production resources and automated guided vehicles in real time, using electromagnetic waves to determine their position. Yet many of these are unsuitable for sheet metal fabrication because metal, machines and steel storage systems reflect the waves, making indoor positioning a lot more difficult. One way to solve this problem is by using ultra-wideband, or UWB, a radio technology that has proved to be a robust choice for

sheet metal fabrication settings. Just like other positioning technologies such as Wi-Fi, Bluetooth and RFID, UWB uses hardware to receive radio signals from transmitters and forward the data to an industrial computer. What makes UWB different is the type of radio signal it uses. Working across a very wide frequency spectrum, UWB uses individual electromagnetic pulses rather than continuous waves. TRUMPF has successfully developed an indoor positioning solution based on this technology that generates a stable signal and reliable positioning information – even in industrial settings.

## Developed for production environments

A minimum of four ultra-wideband receivers independently measure the time it takes for individual electromagnetic pulses to travel from the transmitter to the receiver. This allows the technology to calculate where the transmitter is located with an accuracy of just a few centimeters. UWB works in 3D, calculating both the horizontal and vertical position of the transmitter, so it can also be used to find the exact location of parts in high bay storage systems. UWB correctly determines the position of objects up to a distance of 150 meters, with no interference or noise. That means it also works in situations where other radio signals are in use at the same time, or where the signals are reflected or scattered by reflective metal surfaces, people or machines. Thanks to its low latency time, UWB can perform up to 60 position updates a second – enough to track the precise position of forklift trucks or other moving objects in real time and then analyze and improve their routes.

**Markers:** Users can digitally assign a marker to an object or product and then attach it to the part they wish to track. The part's location can then be determined with an accuracy of less than 30 centimeters.



**Satellites:** At least four satellites determine the location of the marker mounted on the part and send up to 60 position updates a second to an industrial computer.

## First applications already on the market

TRUMPF has been using UWB since 2018 in its Track&Trace indoor positioning system. Thomas Schneider, Managing Director Research & Development at TRUMPF Machine Tools, told us what the future holds for this technology.

| Technology | Accuracy | Range   | Suitable for                 | Tracking              | Power supply     | Battery life     |
|------------|----------|---------|------------------------------|-----------------------|------------------|------------------|
| Wi-Fi      | < 15 m   | < 150 m | wide-area indoor positioning | Person, box           | or               | medium           |
| BLE        | < 8 m    | < 75 m  | wide-area indoor positioning | Person, box, forklift | or               | high             |
| UWB        | < 30 cm  | < 150 m | wide-area indoor positioning | Person, box, forklift | or               | medium           |
| RFID       | < 10 cm  | < 1 m   | localized positioning        | Person, box, forklift | passive RFID tag | passive RFID tag |

**At a glance:** Here we compare four of the most popular indoor positioning solutions. UWB stands out for its high accuracy even over larger distances, accurately locating forklift trucks, production equipment and other resources. It can also take on the task of authorizing access for people and vehicles.

IMAGES: TRUMPF

## Three questions

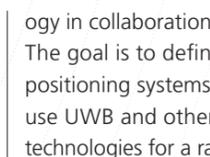
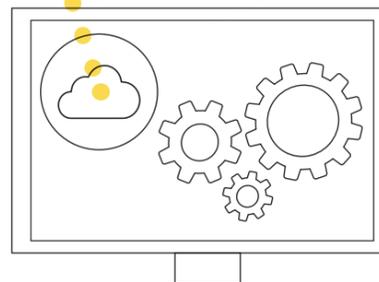
for Thomas Schneider, Managing Director Research & Development at TRUMPF Machine Tools in Ditzingen.



**Mr. Schneider, what are the next steps in UWB development?**

Our Track&Trace system brings greater transparency and efficiency to intralogistics – a key prerequisite for a smart factory. But we're already taking that further. We want our customers to be able to use UWB positioning technology for many different applications. That's why we set up the omlox initiative to standardize the technol-

**Industrial computer:** By processing position data from the markers, an industrial computer can perform efficient analyses of movements in production settings.



**UWB localization yields a lot of data. Can analyzing that data provide any insights?**

Absolutely, it can provide important insights into how a smart factory runs. Making processes and workflows transparent helps factory operators quickly identify potential areas for improvement. In many cases, a fairly simple analysis is sufficient. For example, if you see that the routes taken by an automated guided vehicle resemble a plate of spaghetti rather than an efficiently structured roadmap, it's pretty clear where action needs to be taken!

**Thomas Schneider** studied mechanical engineering and went on to develop flight control and actuation systems. For the past two years he has been at the helm of research and development at TRUMPF Machine Tools in Ditzingen.



**Will UWB end up dominating shop floors and replacing other positioning technologies such as Wi-Fi, RFID and Bluetooth?**

UWB is the most suitable option for sheet metal fabrication plants because the technology is so robust and precise. Many use cases actually require UWB because the positioning has to be so exact. But there are also cases in which other positioning technologies might be a better option – GPS is a good example outside factory settings. That's why it's so important to have a standard that facilitates the use of multiple positioning technologies.

Some 60 industrial companies will be presenting **omlox**, the new standard for positioning technology, at **Hannover Messe**. The new standard should make it possible to connect up different positioning technologies including **ultra-wideband**, RFID, 5G and GPS. The partners joining forces in the omlox initiative are responding to the rising tide of positioning solutions in industrial manufacturing.



*Innovations, technologies and future trends.*



### The new TruBend Cell 5000

Good news for all fans of the TruBend Cell 5000: starting this spring, TRUMPF will be offering customers the option of equipping the automated bending cell not only with the latest generation of the TruBend 5000 (B23), but also with the new TecZone Bend software. TecZone Bend uses 2D and 3D data to create a suggested program in a matter of seconds. The new machine's on-demand servo drive makes the cell quieter and more productive. It's also more eco-friendly, because the machine only consumes energy during the bending process. The TruBend Series 5000 (B23) machines can also be equipped with the ACB Laser and ACB Wireless angle measuring systems, ensuring customers get exactly the right angle from the very first part.



### Right format, right laser

The TruLaser Series 1000 is now also available with a six-kilowatt laser and a six-meter long working area. This variant is particularly suitable for processing large-format sheets. That brings the total number of TruLaser Series 1000 variants to 12, with a three, four or six-meter long working area and laser power of two, three, four or six kilowatts. Users can combine these length and laser power options however they wish. The TruLaser Series 1000 can also be equipped with a wide range of smart features, automation solutions and connectivity options. Learning to use TruLaser Series 1000 machines is a quick and intuitive process, so they are also suitable for operators who have minimal experience with laser cutting.



### Significantly short-set-up times

TRUMPF's Tool Setup Optimizer provides useful assistance in setting up bending tools. It checks the tooling plan and finds the perfect combination of tool and tool station and the correct sequence to keep the number of tool changes to an absolute minimum. As well as making life easier for the machine operator, this also reduces throughput time for bending parts. The Tool Setup Optimizer is part of the TecZone Bend software package.



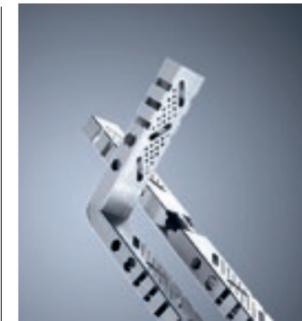
### Making offset tools easier to manage

The curved shape of offset tools often causes friction between the tool and the tool clamp. That makes the tools difficult to move and causes both the tools and the clamp to wear out faster. To tackle this problem, TRUMPF now offers offset bending tools with roller pins and, where necessary, sliding pieces. These reduce friction between the tool and the clamp, making set-up easier.



### That's a job for the Sorting Guide

Which order does this part belong to? What machine should it go to next? In future, questions like these will be handled by the Sorting Guide. Featuring a camera system and large screen, this assistance system helps workers with the task of removing and sorting sheet metal parts on the pallet changer of 2D laser cutting machines. The screen, which is mounted above the pallet changer, provides the worker with all relevant information on the cut parts at a glance. This eliminates the time-consuming task of cross-checking everything with paper documentation. The Sorting Guide registers all the parts removed from the machine and updates them in the TruTops Fab manufacturing execution system.



### Tube programming made easy

TRUMPF has developed new programming software for tubes and for open and closed profiles. It is designed completely in 3D. The integrated Tube Design software makes working with open and sharp-edged profiles easier. Users can open Tube Design files in the programming software in just one click, with the software creating the NC code while loading the file. As well as calculating the laser's cutting path and parameters such as laser power and speed, it also offers other features, such as the ability to automatically program threads connections. The result is displayed in the form of a simulation. Users can make changes to the program in this simulation at the click of a mouse. The software makes the changes immediately and continues the simulation from that point.



### Narrow nozzle for welding

TRUMPF has improved the coaxial nozzle of the TruLaser Weld 5000 automated laser welding cell. The nozzle supplies shielding gas to the welding process, which reduces oxidation in the weld bead. Thanks to its new, narrow design, it reaches the weld point better than ever, regardless of what direction the laser and optics are moving. The coaxial nozzle can now be used for both heat conduction welding and deep penetration welding. It makes use of a stream of compressed air known as a crossjet, which protects the machine optics against the vapors generated when the laser penetrates deep into the material.

# HELLO, WORLD!

TRUMPF will be presenting various new machines this spring. TRUe asked what they can do and what kind of user they are aimed at...

## Cute and compact!

The TruLaser Tube 3000 fiber is the latest addition to the TRUMPF portfolio of tube cutting lasers. Norbert Beier is head of sales for tube cutting machines. He explains his role at INTECH and discusses the new machine.

**Six questions** about the TruLaser Tube 3000 fiber for Norbert Beier, head of sales for tube cutting machines at TRUMPF



IMAGES: TRUMPF

## Mr. Beier, when you talk with trade fair visitors, do you discuss the actual machines or the technology behind them?

**BEIER:** At trade fairs, my colleagues and I often still find ourselves in the position of having to explain the technology. More and more companies are now using laser tube cutting machines, but by far the majority still use conventional processes such as sawing and drilling! This is because a lot of users still aren't familiar with the advantages of tube cutting. And that's why we have a lot of sample parts on our stand, so that we can demonstrate what laser tube cutting machines can do.

## So what can a laser tube cutting machine do?

**BEIER:** It combines, in a single machine, standard tube processing steps such as sawing, drilling, punching and milling. And it also reduces the work involved in downstream processes such as welding and assembly. Let's say, for example, you want to join two tubes. In most cases, you would need a fixture to hold the tubes in place while they are being welded. However, with a laser machine, you don't need the fixture, because it produces a cut-out on one tube and a tab on the other. In other words, one tube can be inserted inside the other. This provides an easy way to fix the tubes in position, which makes welding easier in many cases.

## Why has TRUMPF produced a new addition to its tube cutting machines?

**BEIER:** From our discussions with users, we know there is a need for smaller and cheaper machines, which will enable companies to gain initial experience with laser tube-cutting.

## How does the TruLaser Tube 3000 fiber help users get started with this technology?

**BEIER:** Every machine we supply comes with a comprehensive set of cutting data. This data is already loaded on the machine, making it much simpler to use. In addition, the TruLaser Tube 3000 fiber sets important parameters itself. For example, the FocusLine feature sets the focus of the laser according to the type and thickness of material. And Controlline ensures the right distance between the tube and the cutting nozzle. SeamLine detects the weld seam and markings on the inner and outer surface of the tube and makes sure the tube is properly aligned in accordance with the design drawing.

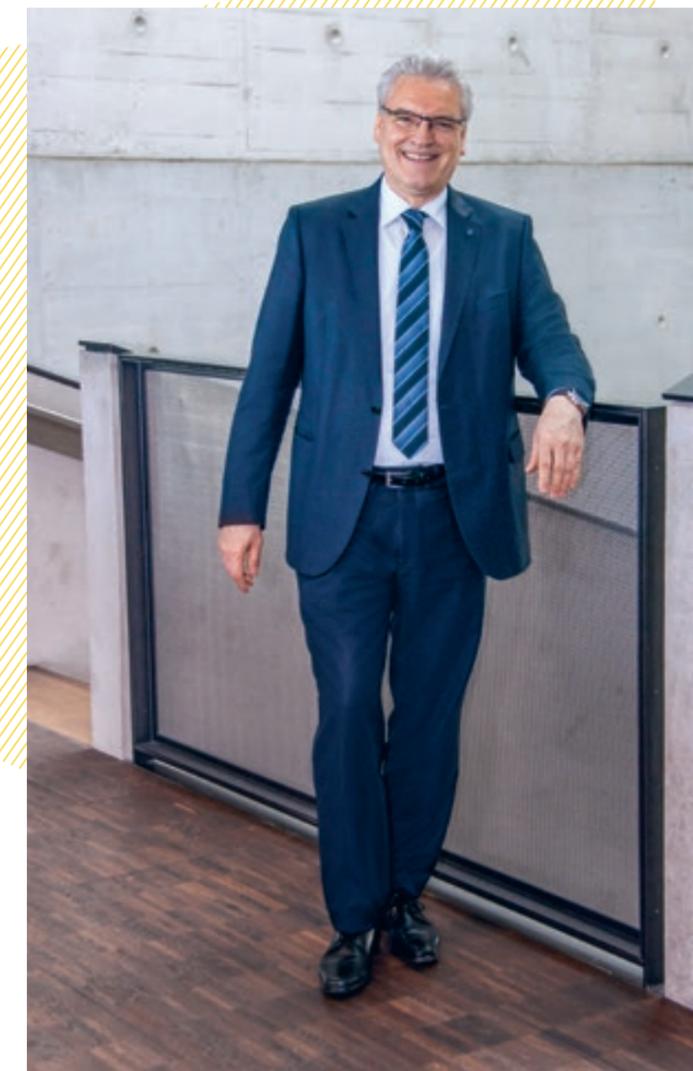
**Norbert Beier** is head of sales for tube cutting machines at TRUMPF.

## Which tubes can be processed with the TruLaser Tube 3000 fiber?

**BEIER:** It's our smallest tube cutting machine, but it covers a broad spectrum. It cuts tubes with a diameter of up to 152 millimeters and profiles with an outer circle of up to 170 millimeters. The laser can process mild steel, stainless steel, aluminum and also non-ferrous metals such as copper or brass.

## Is the machine really only suitable for first-time users of this technology?

**BEIER:** No, not at all. It's also great for companies that already have laser tube machines in operation and need extra capacity. Some orders can be produced more economically with the smaller TruLaser Tube 3000 fiber.



The **TruArc Weld 1000** is TRUMPF's first commercially available automated arc welding system. Maximilian Merk heads up the TRUMPF department responsible for laser welding in sheet metal fabrication. He told us which situations can benefit from this new electric arc system – and where the laser still comes up trumps.



**TRUMPF has always used lasers for joining processes in sheet metal fabrication. Why add another tool?**

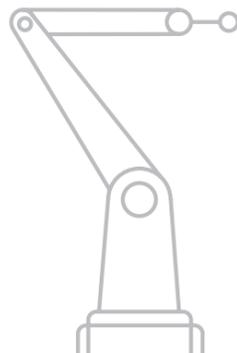
**MERK:** Our belief in the superiority of laser welding hasn't changed! A laser dramatically reduces the cost of fabricating some parts. No arc welding system can compete with that. But it's also true that many companies still use manual arc welding to produce certain parts – and that requires a trained professional with an in-depth understanding of the process. But people like that are getting harder to find, especially in highly industrialized nations. That's where the TruArc Weld 1000 comes in. It makes it easier for our customers to take the plunge into automated welding, and they can even get the machine up and running themselves thanks to our video tutorials. No training is required to program the robot. Once the program is ready, any operator can run the system – even if they have no previous experience in welding.

**Other manufacturers offer similar systems. What are the advantages of the TruArc Weld 1000?**

**MERK:** The most important aspect of automated welding is the programming. That's why we've made it as simple as possible. The operating unit mounted directly on the welding torch can be used to define how the robot moves and where the weld seam should start and finish. The robot control unit includes a programming feature that allows users to create a welding program in just 60 seconds.

The TruArc Weld 1000 also includes all the key safety features that our customers would expect from a TRUMPF system. It comes with a safety cabin equipped with a glare shield that opens and closes automatically, as well as automatic safety doors and an exhaust system. It is CE certified and approved by TÜV Austria.

The operator can also choose to process one large part or several smaller parts, because the system comes with two welding stations that can be loaded and unloaded while welding is in process.



**Maximilian Merk** heads up the TRUMPF department responsible for laser welding in sheet metal fabrication.

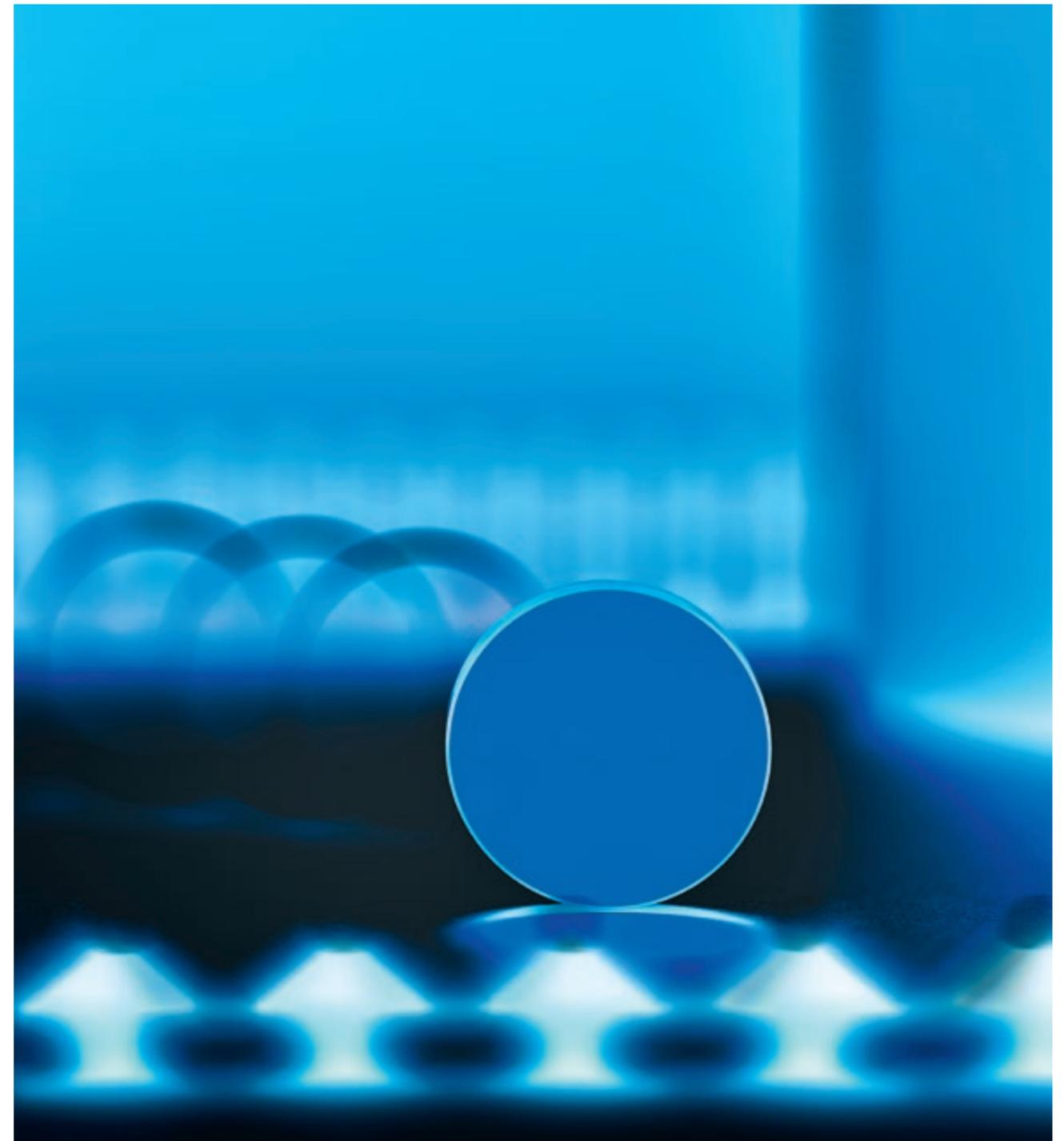
**Which customers do you think can benefit from this new system? And which customers would be better off with its 'big sister' – the TruLaser Weld 5000?**

**MERK:** One of the key benefits of a laser is to cut costs. Its high speed really pays off for longer weld seams, and the quality of the join is a big advantage for parts that require post-processing. So the laser is a great choice for companies that spend a lot of time polishing and grinding weld seams. In contrast, the new TruArc Weld 1000 is a good option for parts that fabricators currently weld by hand.

Perhaps its biggest benefit is that it produces clean welds and minimizes spatter without requiring a specialist operator. It's also quick to program, so it's a good choice for low-volume production. We've even used it for batch sizes of one in our own production facilities. Customers can use the TruArc Weld 1000 to handle routine tasks so that their welding experts can focus on more complex jobs.

#11

# pARTgallery



**Technology transformed into art.** Presenting parts in a new light is something we do in every issue of TRUe. This picture shows a **lens** as you've never seen it before. Photographer Heiko Hellwig took this TRUMPF spare part out of its familiar environment and placed it in an entirely different setting.

## Taking a sledgehammer to progress

Sometimes progress can be halted by something as simple as a steel ball. That's what happened when Elon Musk revealed his new electric pick-up truck to the world in November 2019. Amid dramatic clouds of smoke and laser beams, Tesla's new Cybertruck took to the stage in Los Angeles – a stainless steel beast with an indestructible air that could easily be mistaken for a stealth bomber. If both Terminator and Mad Max had emerged from behind the wheel, nobody would have been very surprised. When the smoke cleared, Tesla's chief designer Franz von Holzhausen climbed out of the truck in a black leather jacket. In front of the cheering crowd, he picked up a sledgehammer and smashed it into the driver's door. It bounced off like a rubber ball without even leaving a scratch. Next, von Holzhausen grabbed a steel sphere the size of a tennis ball and threw it at the driver's side window. The ball bounced off the window with a thud – but the supposedly bullet-proof glass shattered! Cursing, Musk insisted that von Holzhausen should throw it again, this time at the rear passenger window. Astonishingly, this shattered too! Tesla's share price promptly plummeted, wiping 700 million dollars off Elon Musk's fortune.

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The stock traders who had previously been among Tesla's biggest supporters suddenly saw their own dreams shattered. Yet their reasons for trusting Musk's innate understanding of what drives progress had a solid basis. When the native South African set up his first IT company in 1995, he reportedly had only a vague idea of the opportunities that a dotcom company could offer. Four years later, he sold Zip2 to the computer company Compaq for 307 million dollars. That same year, he founded X.com, much to the derision of many bankers. Today, under the name PayPal, the company is the world's most widely used online payment system – and many bankers are out of work. In 2002, Musk reached for the stars and founded SpaceX. Today, the space company is considered to be the world's leading private satellite launch provider. It even flies resupply missions to the International Space Station (ISS). Tesla and solar-energy company Solarcity followed, right around the time when Greta Thunberg was born...

For Musk, then, progress is essentially about the realization of utopias – but how does he do it? First, Musk never backs down from a challenge. That applies to his bike as much as to his business. He once went on a seriously tough mountain bike ride without training, and the effort

almost killed him. But there was no way he was going to stop. Second, Musk surrounds himself with the right people and then throws himself into his work. "It is a mistake to hire huge numbers of people to get a complicated job done. Numbers will never compensate for talent in getting the right answer, will tend to slow down progress, and will make the task incredibly expensive," he once said. Last but not least, he is not interested in following conventions or listening to idle chatter. Some say that his company Neuralink, which plans to connect human brains with computer interfaces using sensors, suggests delusions of grandeur. But it also shows that Musk doesn't really care about making money or worry about what might or might not work. He is passionate about tackling what he sees as mankind's biggest problems – using a sledgehammer if necessary.

Some say that the greatest enemy of progress is not error, but inaction. So it makes sense that, a few days after his mishap in Los Angeles, Musk posted a video online in which the armored glass passed the steel ball test without breaking. But even before he uploaded it, Tesla had already received 200,000 orders from Cybertruck fans!

*Karl Thomas*



## TRUe #11

## IMPRINT

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