

# Motion

01.2026  
The customer magazine of  
UNITED MACHINING SOLUTIONS

## INTERVIEW INNOVATION IDEAS

Machine tools encounters motorsport  
How customers benefit from efficiency optimization  
Artificial intelligence – risk or opportunity?

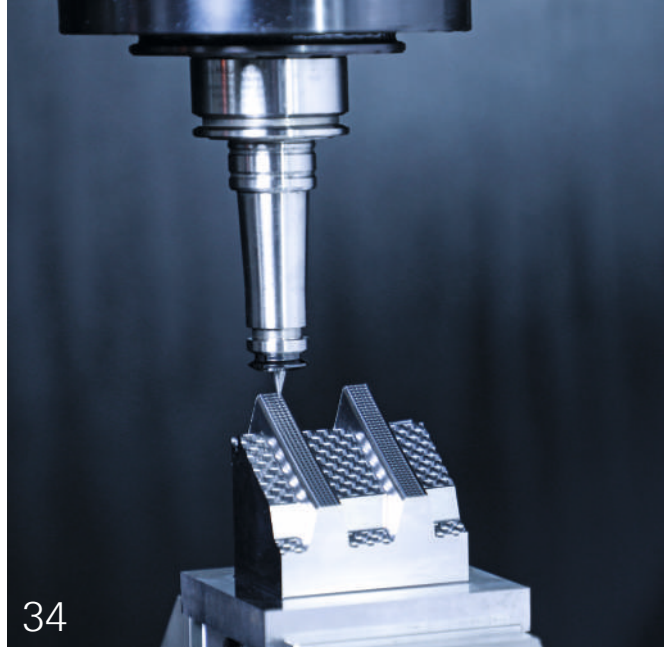


## POLE POSITION

Precision, consistency, reproducibility: UNITED MACHINING SOLUTIONS is closely linked to motorsport in these areas. COO Michael Horn discusses what efficiency means for success with Robert Lechner, Managing Director of the motorsport company Lechner Racing

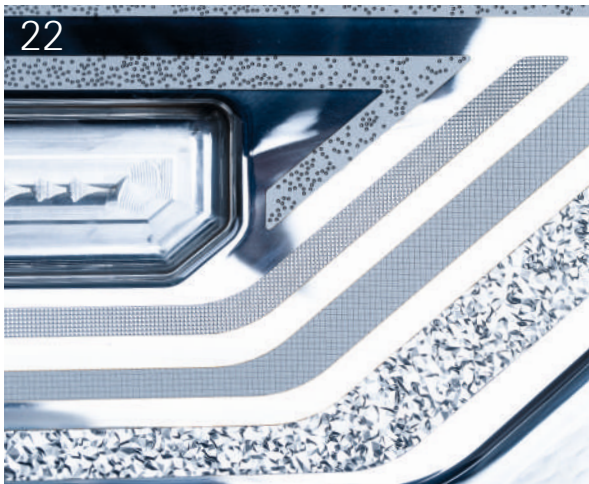


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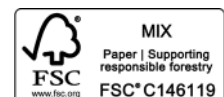
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### IMPRINT

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## "EFFICIENCY IS THE NECESSARY BASIS FOR ENSURING QUALITY."

DEAR READERS,

In times of digitalization, automation, and artificial intelligence, efficiency is becoming a decisive success factor. At **UNITED MACHINING SOLUTIONS**, we understand efficiency holistically: We identify optimization potential along the entire value chain and use it to develop solutions that sustainably improve processes. Our customers in particular benefit from that.

This issue of "Motion" is therefore dedicated to one central key question: How is efficiency defined today? And what can we do as a Group to **offer our customers holistic solutions that are precisely tailored to their individual needs?**

In search of answers, we visited two plants that have undergone extensive transformation processes in recent years. At **STUDER in Steffisburg**, we focus on production: Flow assembly, digitalized tool management and unmanned manufacture ensure precision, availability, and productivity. At **AGIE CHARMILLES in Losone**, logistics, flow of goods, layout, and final assembly were restructured. Cycle assembly as well as automated warehouse and intralogistics solutions enable a new level of efficiency there. Both examples show that efficiency is the necessary basis for ensuring quality, delivery capability, and technological superiority in the long term.

**In the interview, our COO Michael Horn visits** a place where efficiency, precision, and technical expertise come together in a special way: the Red Bull Ring in Spielberg, the venue for legendary Formula 1 races. In a conversation with Robert Lechner, Managing Director of the Austrian motorsport company Lechner Racing, we look at how efficiency contributes significantly to success today.

One key finding characterizes this visit: **On the racetrack, it becomes clear what effect technology can have under extreme conditions.** In motorsport, technologies are constantly pushed to the limit. Precision, consistency, and reproducibility are decisive for success or failure – and create a direct connection to our world. **We also orchestrate technology, application, and processes – and thus create continuous added value for our customers.**



*Stephan Nell, Executive Chairman,  
UNITED MACHINING SOLUTIONS*

**Stephan Nell,**  
Executive Chairman, UNITED MACHINING SOLUTIONS



*Machines and components from MIKRON MILL, STEP TEC, and STUDER are manufactured at the facility in Biel/Bienne*

SWITZERLAND, USA, CHINA, JAPAN

## UNITED MACHINING SOLUTIONS INVESTS IN THE FUTURE

UNITED MACHINING SOLUTIONS is sending a clear signal for sustainable growth and long-term site development. With extensive investments in infrastructure, buildings, and modern work environments, the Group is underscoring its clear commitment to its international locations.

These are not short-term individual projects, but rather a long-term process designed to strengthen the competitiveness and future viability of the entire Group. The aim is to create modern conditions for innovation, production, collaboration, and customer focus.

The acquisition of the building in Biel/Bienne is a particularly significant step. With this investment, UNITED MACHINING SOLUTIONS is further expanding its presence at the traditional Swiss industrial location. The building offers new spatial opportunities and also symbolizes the Group's long-term commitment to Switzerland as a technology and innovation location. Next summer, the holding company of UNITED MACHINING SOLUTIONS will also move into the building.

Especially in a time of profound changes in the global machine tool industry, UNITED MACHINING SOLUTIONS is thus sending a strong signal that it has a clear commitment to its European roots, technological excellence, and sustainable investments in the future.

But infrastructure projects extend far beyond Europe. In North America, the Group is making targeted investments in further growth. At UNITED MACHINING North America

in Lincolnshire, Illinois, extensive modernization and infrastructure projects are currently being implemented. The goal is to be able to serve customers even more efficiently in the future while creating optimal conditions for employees and processes.

Likewise, AGIE CHARMILLES in Beijing is receiving extensive modifications to its infrastructure. With this investment, UNITED MACHINING SOLUTIONS is strengthening its presence in the important Chinese market and creating modern conditions for service, sales, and customer focus in the region.

New perspectives are also emerging in Japan: A new joint showroom for the UNITED GRINDING and UNITED MACHINING divisions is being built there. The new common location will serve as a central meeting place for customers, technologies, and applications in the future and further promote the cooperation between the two divisions.

In addition to investments in buildings and locations, UNITED MACHINING SOLUTIONS is also consistently driving digitalization forward. Digital processes, networked systems, and modern technologies are intended to help make workflows more efficient, strengthen collaboration, and provide even more targeted support to customers. The Group thus combines its structural investments with a clear focus on innovation and future viability. All these projects share one message: UNITED MACHINING SOLUTIONS is committed to investing in the future.

## CZECH REPUBLIC

# ANNIVERSARY: FOR 30 YEARS, WALTER HAS BEEN PRODUCING IN KUŘIM, CZECH REPUBLIC

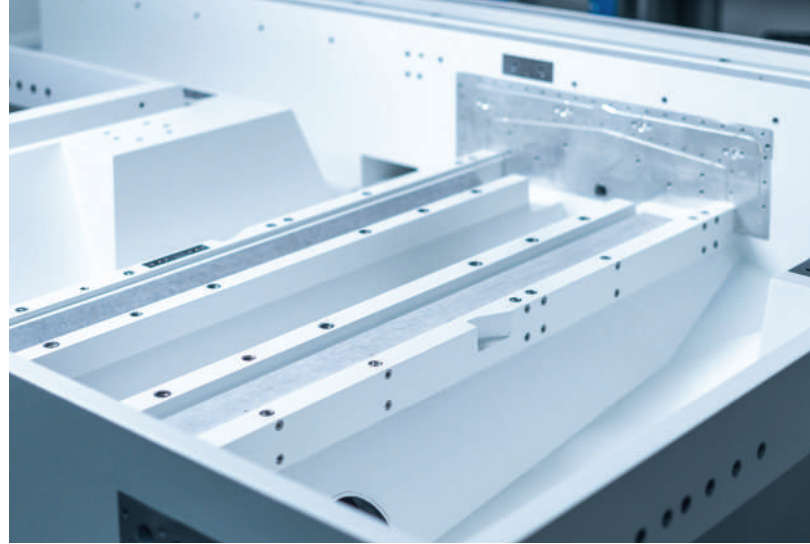
Around 300 employees and 7,000 square meters of production space: For 30 years at its Kuřim site in the Czech Republic, WALTER has been producing high-precision CNC machines for grinding, eroding, lasering, and non-contact measurement of tools, for which WALTER is known worldwide. At the time, the choice of location was deliberate: due to the large number of specialists with strong machine tool expertise and a long industrial tradition on site. WALTER customers experience a state-of-the-art production site in Kuřim for machining, assembly, measurement, painting, design, purchasing, software, and development.



## SWITZERLAND

# FRITZ STUDER AWARD 2026: THE CALL FOR SUBMISSIONS BEGINS

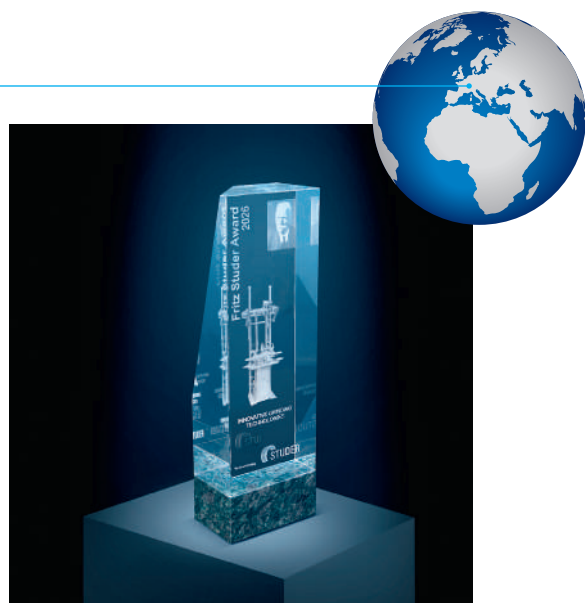
The Fritz Studer Award will be presented for the eighth time in 2026. Students from Europe's universities and technical colleges can apply with projects that are relevant to machine tools, for example, for innovative machine concepts, alternative materials, or solutions for grinding processes. The work of individuals or teams should demonstrate feasible concepts and innovations that will drive the machine tool industry forward. The prize is awarded every three years and is endowed with 10,000 Swiss francs. The closing date for applications is December 1, 2026. The award ceremony will take place in February 2027.



## SWITZERLAND

# 50 YEARS OF GRANITAN®: THE BASIS FOR THE SUCCESS OF PRECISE STUDER GRINDING MACHINES

Since 1976, STUDER has relied on machine bases made from the specially developed mineral casting material for its precision cylindrical grinding machines. Compared to gray cast iron, Granitan® offers significantly better damping characteristics, high thermal stability, and enables extensive integration of functional components in the machine base. Thanks to Granitan®, STUDER customers achieve higher workpiece quality and more reliable production. "It was a groundbreaking innovation in the machine tool industry when the RA5, the first series cylindrical grinding machine with a Granitan® machine base, was launched on the market in 1976," says Lennard Vorwerk-Handing, Development Engineer at STUDER. Among other things, Granitan® technology enables the high-precision production of Studer-Guide® guideways with micrometer-level accuracy in the company's own molding shop. The enormous freedom of design offered by the material, which is in a liquid state during initial forming, results in highly compact and maintenance-friendly machine designs that would not be feasible with other manufacturing methods. Five decades after its market launch, Granitan® has become synonymous with a stable machine base that still sets standards in the industry today. In view of the growing requirements for precision, sustainability, and flexibility, it therefore remains an indispensable basis in machining, whether for automotive, aerospace, electronics, or medical technology.



# GRANITAN®

For 50 years, STUDER has been using a composite material that plays a key role in the renowned precision of its cylindrical grinding machines: Granitan®. This is a closely guarded mineral casting formula with varied aggregate sizes and a precisely formulated bonding agent that hardens into a high-performance machine bed in less than one day, forming the foundation for excellence and precision. Unlike other materials, Granitan® can be molded at room temperature and offers the required flexibility. This allows the production of machine components close to their final shape without post-processing and enables structures and wires to be integrated directly into the mold during the cold-forming process. The advantage: extremely good damping characteristics so that vibrations are absorbed by the material. The result is that STUDER customers achieve higher product quality.





*At the AGIE CHARMILLES plant in Losone, COO Stefan Dahl discusses the introduction of the digital fingerprint, which is already used at the MIKRON MILL, with Vera Camozzi, Head of Operations*

# EFFICIENCY ACROSS ALL PROCESSES

How is efficiency measured in times of digitalization and artificial intelligence? Not on the individual machine would be the response. But that has always been the case, say experienced managers at UNITED MACHINING SOLUTIONS. “Motion” visited two of the Group’s plants and got to know two different company cultures. And a common conviction

Text: Michael Hopp — Photography: David Schweizer

STEFFISBURG AND LOSONE are in the same country and still stand for two worlds. Here, the alpine Bernese Oberland, there the industrial Mediterranean Ticino near Locarno. Even the locations themselves hint at different cultural atmospheres, even before you step inside the buildings.

A “Motion” team traveled to Switzerland to visit STUDER in Steffisburg and AGIE CHARMILLES in Losone. These facilities show just how profoundly this industry is changing: not with a single act of disruption, but step by step, from material flow to component manufacturing to digital traceability. Innovation is not an end in itself here. And efficiency is not a savings slogan, but a prerequisite for ensuring quality, delivery capacity, and technological sovereignty.

### EFFICIENCY AS SYSTEM PERFORMANCE

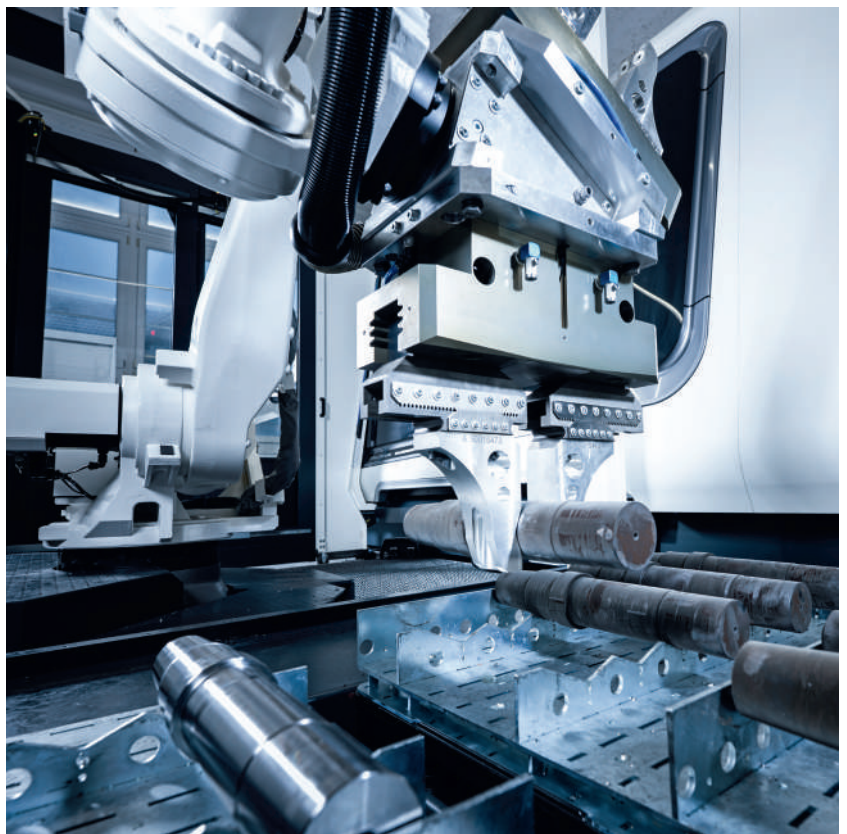
For more than 100 years, the STUDER facility in Steffisburg has been the headquarters of the grinding machine manufacturer founded in 1912. When walking through production with COO Stephan Stoll, you quickly notice how the change is progressing.

Stoll describes the development as a transformational process in clear stages. Between 2012 and 2016, the world’s first flow assembly for customized machine tools was created. “When I joined STUDER in 2017, the parts production needed an update,”

Stoll says during the tour. “That’s why our next mission was to take component manufacturing to a new level.”

This renewal has meant much more than replacing old machines. Instead, increased efficiency along the entire value chain: new milling centers, a higher degree of automation, the end-to-end networking of CAD and CAM to the machine, the digitalization of tool management, and the consistent focus on unmanned value creation in a pronounced “low-volume/high-mix” environment. “Au-

tomated spindle shaft production with a robot cell is the preliminary conclusion of this phase,” Stoll explains. He doesn’t measure efficiency by the operating figures of individual machines; rather, he has always understood efficiency in terms of system performance. Manufacture, assembly, and logistics follow the same pattern: It’s not the island that’s decisive, but the chain of islands. The aim is to produce machines at a high, constantly controlled pace and with top quality. “Ultimately, it’s not the efficiency of



*Increased efficiency through flexible automation for unmanned operation in spindle shaft production*

an individual workplace that counts, but the overall efficiency of the value chain – where appropriate, with the support of digital tools.”

For example, the new production cell for spindle shafts with a robot unit and automatic loading system is not a symbol of modern automation, but part of a strategy. Various

### ADDED VALUE FOR CUSTOMERS

This applies in particular to a variety of spindles. They are the core components of every grinding machine and are relevant for precision and process reliability. In Stoll's opinion, the robot cell for spindle shaft production alone is still not a unique differentiating fea-

tools as digital twins with all the required geometry and cutting data. Setting devices, tool storage, and CNC machines communicate with each other. There is no longer any need for manual data transfer, which reduces errors and downtime on the CNC machine. Tools and their data are in the right place at the right time without anyone having to intervene.



**“ULTIMATELY, IT’S NOT THE EFFICIENCY OF AN INDIVIDUAL WORKPLACE THAT COUNTS, BUT THE OVERALL EFFICIENCY OF THE VALUE CHAIN – WHERE APPROPRIATE, WITH THE SUPPORT OF DIGITAL TOOLS.”**

*Stephan Stoll*

types of blanks are prepared in the pallet magazine before being digitally identified and fed into the machining process by a robotic system. “We want to have the components that are crucial for the quality and precision of a STUDER machine under our own control. So we make them in-house,” says Stoll. In times of global supply chains with increasing procurement risks, precision-critical components should not come from random sources, but from controlled, in-house manufacture under competitive conditions right here in Switzerland.

ture, since anyone can buy such a system. For him, the decisive point lies in the combination of automated turning and finishing on STUDER grinding machines. “We grind the spindles ourselves and thus get the STUDER finish,” he says. This chain creates added value for customers and combines precision, availability, and cost-effectiveness.

“We also gain a lot of efficiency in the complete tool presetting process,” Stoll adds. “Thanks to digitalization, we can carry out unmanned production reliably and without disruptions. The system manages

### “GOODS TO PERSON” INSTEAD OF VICE VERSA

The change is becoming even more evident one floor up, in logistics. The 45-year-old, outdated warehouse was recently replaced in order to efficiently meet assembly, spare parts, and service needs. At the heart of the new system is the automated AutoStore® bin warehouse: a facility where robots loaded with “bins” (storage containers) work autonomously on the “grid” (aluminum frame). They store the “bins” and transport them via elevator systems to the “ports”, the workplaces where storage and picking take place. The system now works according to the “goods-to-person” principle, as opposed to the previous “person-to-goods” principle. Employees used to walk with paper lists through shelves. Today, they remain stationary at storage and retrieval stations while containers are fed to them automatically. With its dense, high-cube storage and automated conveyor lines of robots (also known as “bots”), the system is reminiscent of logistics concepts from e-commerce, translated into the world of a machine tool facility. Stoll summarizes the impact in a number: “We used to have an average of 25 picks per hour and employee. With this system, today we’re at 4 set-up processes per minute. That means that we have ten times the efficiency during the set-up process. This enables shorter lead times to serve our customers even faster with machines and spare parts.”

### CONTROL CABINETS – DIGITALIZATION REDUCES MANUAL WORK

Another example of this effective modernization is the pre-assembly of the control cabinets, the electrical supply units that are individually configured for each machine and in each case contain hundreds of wires. The greatest waste of resources was in the preparation of the strands. “400 to 600 strands had to be manually picked and labeled,” explained an employee who has been with the company for 26 years. “Hundreds of cables per cabinet had to be located, prepared, and manually assigned with the help of plans.”

**"EFFICIENCY POTENTIALS  
ARE TESTED AT OUR  
COMPANY ALONG THE  
ENTIRE VALUE CHAIN."**

*Michael Horn*



*Precise tool data is a prerequisite  
for precise workpieces*



*Stephan Stoll, COO at  
STUDER, in conversation  
with an employee at the  
plant in Steffisburg*

That effort has changed fundamentally due to digital preparation and processing from the schematic diagram to the parts list to the assembly sequence with "start-end marking" on each strand. "We have cut times by an average of 20 percent," Stephan Stoll summed up. At the same time, quality increased because each cable is clearly assigned and can be tracked more easily and quickly if servicing is required.

All of this fits with the general maxim of UNITED MACHINING SOLUTIONS. "Efficiency potentials are tested at our company along the entire value chain," says Michael Horn, COO of UNITED MACHINING SOLUTIONS. "In fact for all brands. We are oriented to added value for the customer in all of our actions, and we must take this requirement into account."

#### **PEOPLE ARE ALWAYS NEEDED**

Remarkably, the unmanned manufacturing in Steffisburg is not seen as a counter-model to people. Quite the opposite: It is precisely because STUDER is investing that the company becomes a more attractive employer. Modern milling centers, robotics, digital

**“WE HAVE TEN TIMES THE EFFICIENCY IN THE SET-UP PROCESS. THIS ENABLES SHORTER LEAD TIMES TO SERVE OUR CUSTOMERS EVEN FASTER WITH MACHINES AND SPARE PARTS.”**

*Stephan Stoll*



tools, and the new logistics are also signals to young skilled workers. “This allows us to recruit enough apprentices every year because they can see which machines they will be able to work with in the future,” says Stoll. Automation here does not mean devaluing work, but shifting it toward more sophisticated, technically denser activities.

Stoll also sees great potential in digital worker guidance, i.e., in digital tools that guide assembly and production specialists digitally through the processes to replace conventional paper instructions – and this specifically for each machine. Measured data is recorded directly, serialized components are documented, and order feedback is transferred to the systems without any media discontinuity. The future thus lies less in spectacular technical innovation than in seamless integration of assembly, manufacture, logistics, and data. “That’s our next milestone,” says Stephan Stoll. “We still have a lot of potential there, and it opens up new horizons for the use of future AI tools.”

*Thanks to digital preparation, the wire sets are available in the correct assembly sequence*



*As part of the modernization of the AGIE CHARMILLES plant in Losone, the entire flow of goods, including supply and delivery, has been optimized*

## PRECISION AS CONSISTENCY

On the other side of the Alps, one day later in Losone: The AGIE CHARMILLES plant is located in a green, hilly industrial zone just outside the city center. The brand within the UNITED MACHINING division has been part of UNITED MACHINING SOLUTIONS since 2025. AGIE CHARMILLES is the world market leader in EDM (Electrical Discharge Machining). But global competition is strong. At the Losone facility, the answer is therefore technological depth, internal electronics expertise, precisely controlled workflows, and a site that has been fundamentally modernized in recent years. The site includes new logistics areas, loading ramps for more efficient loading and unloading, and automated warehouse solutions that support intralogistics. The new building is therefore not only a new main entrance and architectural upgrade, but also the physical prerequisite for a new level of efficiency at the site. The

competence center also makes this new arrangement visible. Stefan Dahl, COO of UNITED MACHINING, who is responsible for AGIE CHARMILLES as well as the division's other brands such as MIKRON MILL, LIECHTI, and CHARMILLES, describes the conversion as an intervention in production logic, material flow, and layout. "The modernization of the site allows us to optimize the structures," he says. "We can now set up everything in line with the flow from the supply delivery to synchronized assembly. That wasn't possible before."

## THE MACHINE ARRIVES ON WHEELS – AND AT THE RIGHT TEMPERATURE

The final assembly area, where final inspection and machine validation take place, is also a central element of this structure. Especially at AGIE CHARMILLES, precision is not just a question of the machine itself, but also of the environment in which it is tested, transported,

and put into operation at the customer's facility. Dahl describes an in-out-in system in which a temperature-controlled machine leaves the final air-conditioned inspection, is transported to the customer in a temperature-controlled truck, and arrives in a controlled environment. "This is highly appreciated by our customers because they can get the machine into production within two days."

In addition, there is a mechanical solution that makes a big difference in everyday life. Wheels are installed on one side of the machine, and the other side is connected to a traction system. In the factory and later at the customer's site, it can then be moved into place without a crane or an air cushion system. This is also one of the "seemingly minor details" that Dahl says are highly appreciated by the customer. And it's all in line with the maxim of UNITED MACHINING SOLUTIONS: Efficiency is not to be seen singularly, but along the entire value chain down to the smallest detail.



*The internally produced electronic components are integrated into the flow of goods via Paternoster storage systems*

**“WE’RE ALREADY SEEING A SIGNIFICANT IMPROVEMENT IN DIAGNOSIS SPEED THANKS TO THE DIGITAL FINGERPRINT, ESPECIALLY FOR COMPLICATED CASES.”**

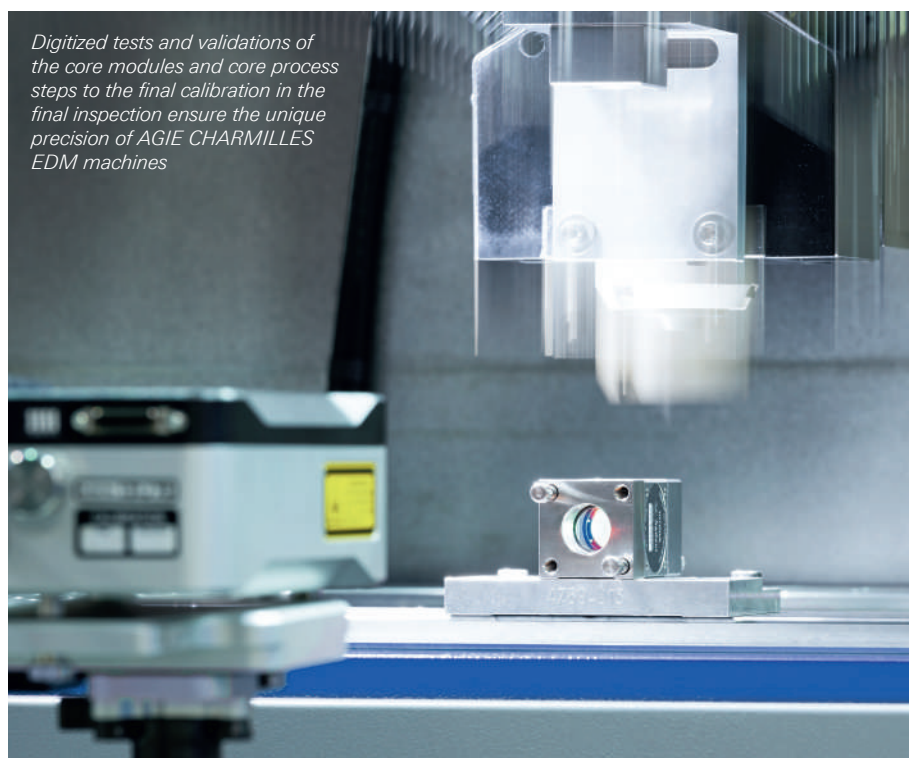
*Stefan Dahl*

## **ELECTRONICS PRODUCTION REMAINS IN-HOUSE**

In Losone, electronics production in particular is strategically important. “The power electronics are produced in-house here, and this electronics production has been moved to the new building,” says Dahl. With technology such as EDM, which is closely linked to generators, control systems, power electronics, and digital control loops, electronics are at the core of machine competence. Keeping this competence in-house not only ensures intellectual property but also speed, adaptability, error control, and efficiency potentials.

This becomes apparent in the test and inspection processes of the electronics production. This also includes the flying probe machine, which is an important component for Losone. The flying probe test uses high-precision moving probes that make contact with test points on printed circuit boards and assemblies without the need for rigid needle beds or special masks. This

*Digitized tests and validations of the core modules and core process steps to the final calibration in the final inspection ensure the unique precision of AGIE CHARMILLES EDM machines*



is particularly advantageous for prototypes, small series, and quick product changes: Set-up costs are reduced, tests become more flexible, and short circuits, parameter deviations, and functional errors can be detected more quickly.

### INCREASED EFFICIENCY USING DIGITAL FINGERPRINTS

Stefan Dahl's responsibility extends beyond AGIE CHARMILLES to the other brands of the UNITED MACHINING division. MIKRON MILL, headquartered in Biel/Bienne, for example, stands for high-precision milling systems; SYSTEM 3R, anchored in Vällingby near Stockholm is known for clamping, reference, and automation solutions. Competence thus circulates today in a broader technological environment in which EDM, precision milling, laser technologies, and automation reinforce one another through common data strategies. "At MIKRON MILL, for example, we have industrialized the digital fingerprint. Now we're also introducing it here at AGIE CHARMILLES." Thanks to the digital fingerprint, the behavior and characteristics of the machine's main modules can be analyzed and documented in detail during assembly through to the behavior of the entire machine. This digitally safeguards quality during assembly and generates a large amount of data that can be used as a reference later in the product life cycle. "We're already seeing a significant improvement in diagnosis speed thanks to the digital fingerprint, especially for complicated cases," says Stefan Dahl. "In the medium term, this tool will also ensure machine and process stability over the entire life cycle of the machines and help minimize unplanned downtimes through targeted preventive general maintenance."

The EDM process, in particular, is an electronic and digital process that generates a lot of data, says Dahl. This is another key to the future of the site. Data is not just a by-product for the site, but the basis for traceability, service, and development. When

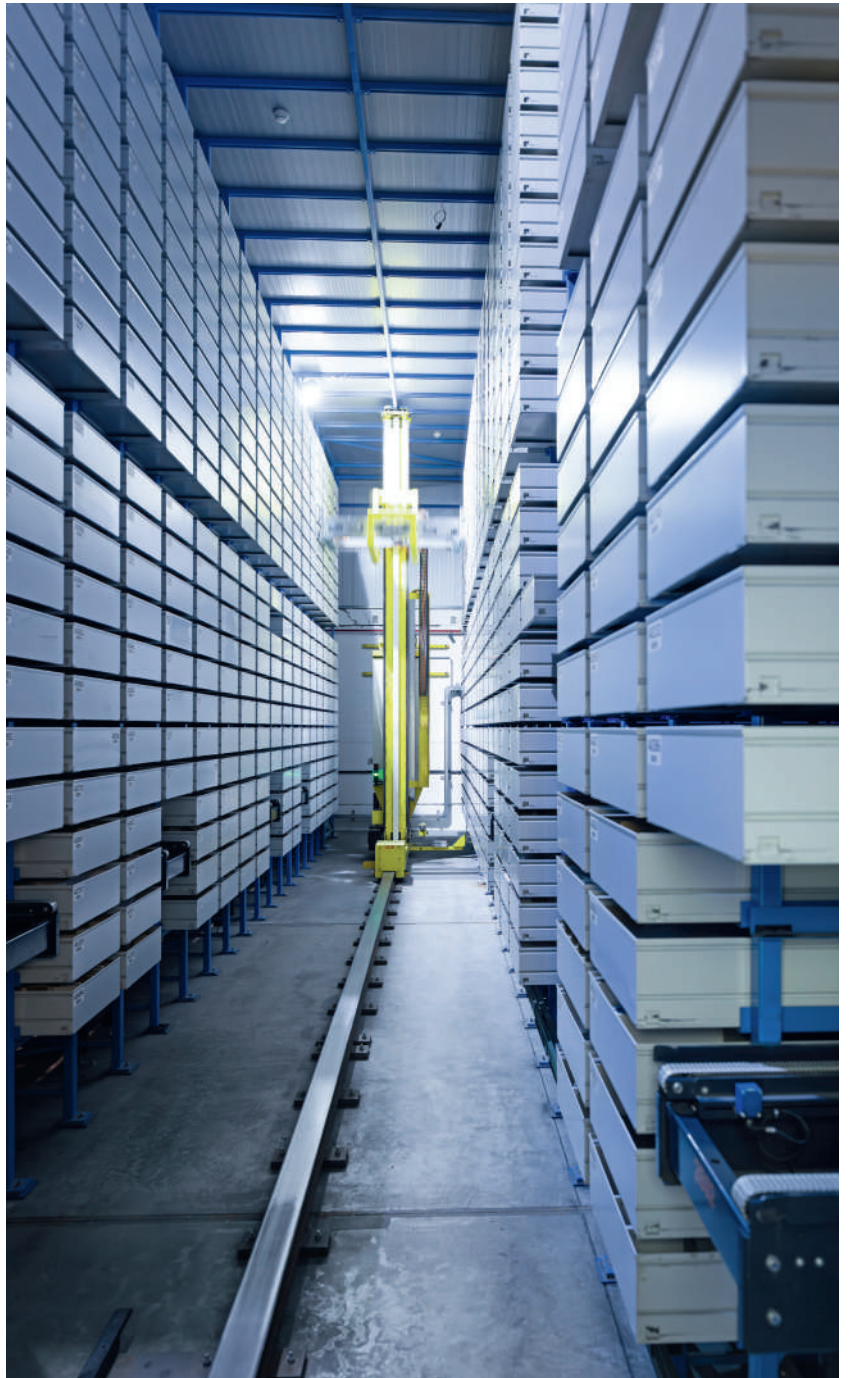
several hundred machines generate similar data per year, correlations can be identified, conclusions can be drawn for development, and service cases can be categorized more precisely later.

### TWO PATHS, ONE INDUSTRIAL PRINCIPLE

"The future of machine tools belongs to companies that do not see digitalization as a show," says COO Michael Horn, "but rather as a means of simultaneously strengthening precision, efficiency, and customer proximity." Using digitalization and AI, but not pre-

senting them as an overhyped all-purpose solution, but rather with an eye to their risks – this attitude has become second nature to companies.

This second nature can also be felt at STUDER and AGIE CHARMILLES. While the two brands differ in technology, production logic, and site culture, they share the same understanding when it comes to innovation and efficiency. Innovation and efficiency are not abstract hallmarks. Instead, they are always subordinate to one purpose: to benefit the customer.



*Efficient and fully automated warehouse management helps to increase efficiency at the AGIE CHARMILLES plant in Losone*



*Michael Horn, COO at UNITED MACHINING SOLUTIONS (left) and Robert Lechner, Managing Director of Lechner Racing, in the pit at the Red Bull Ring in Austria*

# EFFICIENCY WINS

Quality and emotion – two terms that often come up when **Michael Horn**, COO at UNITED MACHINING SOLUTIONS, and **Robert Lechner**, Managing Director of the motorsport company Lechner Racing, meet for an interview at the Red Bull Ring in Austria. The key question is: What defines efficiency today? Between the sound of the engines and the pit lane, it shows what machine tools can learn from motorsport

Text: Michael Hopp — Photography: Thomas Dashuber

THE ASPHALT OF THE RED BULL RING in Spielberg, Austria, is glowing – and the racing cars will reach speeds at the limits of physics. On-site meeting in the Lechner Racing pit: Today, the motorsport company is preparing for the next race. With ten driver titles and 13 team titles, the Austrians are the most successful team in the Porsche Mobil 1 Supercup. What's special about the Porsche one-make trophy: All teams compete in technically identical vehicles. It's not the material that matters, but performance, strategy, and team performance. Team boss Robert Lechner, once a racing driver and winner of the 24-hour race at the Nürburgring, now continues the legacy of his father, who founded the company as a race driver school in 1975, with his brother Walter Lechner Jr. But in the meantime it's about much more than victories: Logistics, personnel, service, technical expertise, and driver training are part of the everyday life of the family entrepreneurs. Topics that Michael Horn is also familiar with. At 9:45 a.m., the COO of UNITED MACHINING SOLUTIONS is received by Robert Lechner at the pit. The conversation quickly reveals what unites the two companies: highest precision and the aspiration to deliver top performance – with efficiency as the decisive success factor.

**Mr. Lechner, before we talk about efficiency: What precisely does Lechner Racing do?**

**LECHNER:** We are a racing team, service provider, and organizer in Porsche one-make trophies. In the Porsche Mobil 1 Supercup, we use 911 Cup vehicles in the context of the Formula 1 races. In customer sport, we support drivers, cars, and operations, and in the Porsche Carrera Cup Middle East and the Porsche Sprint Challenge Central Europe, we act as promoters. There's a lot of organization behind all of it: Prepare cars, develop drivers, take care of sponsors and guests, plan logistics, keep materials available. Everything has to function well on the racing weekend – which is why maximum efficiency in all areas is a maxim.

**Mr. Horn, as a machine tool manufacturer, how do you view motorsport?**

**HORN:** We need motorsport because we learn from technologies that are constantly being pushed to the limit there. Topics such as precision, consistency, and reproducibility create a direct connection to our world. That's why motorsport is exciting for us and our customers: It shows the effect that technology can have under extreme conditions.

**Whether at Lechner Racing or UNITED MACHINING SOLUTIONS – where does the advantage occur: in the product, in the process, or in the team behind it?**

**HORN:** The advantage is no longer a matter of a single factor. It is created by the interplay of technology, processes, and people. Of course, the product must be top quality, but differentiation occurs in how it is used, i.e., with the customer. The team is crucial because it makes the complexity manageable. The true advantage comes from the way in which we consistently make the product have an impact for the customer.

**LECHNER:** I see it in a similar way. The car, technology, and materials must be right. But it's the people who make the difference. I look closely at employees' instincts, personality, ability to learn, and passion. You

can train a lot in motorsport, but you have to function in a narrow time slot.

**Lechner works with a Porsche 911 Cup, the basis of which is the same for all teams. UNITED MACHINING SOLUTIONS configures machine tools for specific customer processes. How much individualization is there in both environments?**

**LECHNER:** The one-make trophy is based on everyone competing with technically identical vehicles. Skill counts, not a battle of materials. That's why a few adjustment screws become so important: toe, camber, vehicle height, wing setting, tire pressure, brake balance. We don't build a better car, instead we get more out of the same platform. There is also driver tuning: Where does he brake? How does he bring the tire into the correct tempera-



*The Porsche 911 Cup from Lechner Racing leaving the pit lane at the Formula 1 track in Spielberg, Austria*



*The two technology experts discuss the 911 Cup with a 382 kW (520 hp) 4.0-liter naturally aspirated engine*

## “EFFICIENCY MUST NOT BE VIEWED SHORT-SIGHTEDLY: YOU INVEST TODAY TO MAKE A PROJECT RUN MORE STABLY FOR YEARS TO COME.”

*Robert Lechner*

ture window? How consistent are his perfect laps? When a few tenths of a second matter, every detail is important.

**HORN:** For us, the platform is just the beginning. The machine provides the technology, but the customer process makes it individualized. A customer not only asks: What can the machine do? They also ask: How must the component, process, and manufacture be designed, so that the machine delivers the best result? We orchestrate technology, application, and processes. In demanding industries in particular, this becomes a development task together with the customer.

**In motorsport, the rules set the boundaries, while in machine tools, customer requirements and economy define the framework. Do limits boost productivity?**

**HORN:** Limits are often the beginning of innovation, not its end. They encourage focus, creativity, and precision. If geometry, materials or cost effectiveness are set, we must design the process as well as possible

within this framework. That's often exactly where better solutions arise.

**LECHNER:** That's the same with us. We have limited tire sets, limited test days, limited engine and transmission run times. Tires for us are almost our own currency, the black gold. If you can't drive without limits, you need to know what you want to learn before each session. Efficiency means setting priorities.

**How do you define efficiency in your two sectors?**

**HORN:** Efficiency is not a savings program. It's about maximizing the impact per resource used. At UNITED MACHINING SOLUTIONS, this is reflected in energy consumption, cycle time, workpiece rejects, availability, and life cycle costs. You could take the theory of evolution: The strongest organism is not necessarily the most successful, but rather the one that uses resources the smartest. For me, efficiency is therefore an attitude: How consistently do we achieve a real impact from opportunities?

**LECHNER:** For us as well, the smart use of resources is crucial. The more tires, budget, and training time I have, the greater the sporting advantage. That's why you need to know what you want to learn with every set of tires and every kilometer. Logistics and personnel are major economic levers. Efficiency must not be viewed short-sightedly: You invest today to make a project run more stably for years to come.

**One example is the truck in which we're conducting this interview. How does it contribute to success?**

**LECHNER:** The truck is not just a means of transportation, but also a mobile infrastructure. All three vehicles are transported here. On site, this becomes a work area with technical workstations, material storage, and a meeting facility. The trailer is constructed in such a way that the levels can be moved and usable area created from the transportation set-up. The aim was to turn two trucks into one, reduce logistics costs, and tie up less staff.



*The cockpit of the racing car has little in common with road-approved sports cars. Here, the highest precision is decisive for success – just like in machine tools*

## “EFFICIENCY BECOMES VISIBLE WHEN THE CUSTOMER IS LEAST AWARE OF US.”

*Michael Horn*



*Technologies such as those from UNITED MACHINING SOLUTIONS are responsible for the fine textures of these brake disks*

**HORN:** As you can see, efficiency doesn't automatically mean sacrificing. Sometimes the better system solution is what counts. A machine is not just an acquisition, it's also part of a production system. If the process runs more stably, there is less waste, availability increases, and the investment pays off over the service life.

**Where does efficiency really become visible and measurable for the UNITED MACHINING SOLUTIONS customer?**

**HORN:** Actually when the customer notices us the least. Then their process is running quietly. The machine produces steadily, energy is used sensibly, waste is reduced, availability increases. Our work is successful when it runs invisibly and smoothly for the customer and shows measurable economic success.

**LECHNER:** That's a good bridge. Your machines are efficient when they run for as long as possible and at a constant rate. Our racing machines only need to run a little, but

at a precise, exact moment. A racing engine doesn't run for years, we're talking about orders of magnitude of 30 to 60 hours, then the motor or transmission is replaced or overhauled. One of us is looking for continuous performance, the other for a precision landing. In both cases, it's about reliability.

**Machine tools are often invisible in motorsport. What does that say about precision?**

**HORN:** Performance comes down to the smallest details. A 911 Cup contains countless rotating and highly stressed precision parts, from the motor to the drivetrain. The parts are not visible from the outside, but there is no performance without them. What's invisible makes the difference visible.

**LECHNER:** Motorsport looks like emotion, sound, and color from the outside. Internally, it's manufacturing precision. Young mechanics immediately notice this when they come to our workshop and see brake

disks, transmission parts, or engine parts. I sometimes consciously say: Nobody needs what we do. Your machines are needed a lot more. But that's precisely why this bridge is exciting: With us, you can see what's often hidden in the machine tools.

### Digitalization and AI are transforming both sectors. Where is the benefit already concrete today?

**HORN:** Data is central to optimization and transparency. We measure spindle rpm, spindle loads, machine base vibrations, and service data. AI helps recognize patterns and bring information back to product and process development from installations. That's important because our machines are at customers' sites worldwide, and UNITED MACHINING SOLUTIONS is globally networked. Digitalization does not replace experience, it makes experience scalable.

**LECHNER:** We also collect large amounts of data in the car: brake pressure, accelerator pedal position, steering angle, shift points, temperatures. For me, AI is exciting because it can analyze drivers more neutrally than a human. An engineer always has experience, sympathies, perhaps also prejudices. The AI analyzes data value-free.

### Both sectors are dependent on supply chain discipline. What happens if a critical part is missing?

**HORN:** Then the machine is questionable. Availability is a crucial performance factor. Missing parts can stop production and disrupt supply chains. That's why we need resilient, digitally controlled processes. You can't control global events, but you can create transparency: earlier supplier information, better planning, better feedback from logistics and service.

**LECHNER:** If we're missing a part, the car doesn't move. You need to have spare parts available beforehand. That requires planning, capital, and partners. That's why I sometimes say: The most important driver on the team is the truck driver. If he doesn't arrive, we don't have a car on the track.

### And finally: How does passion manifest itself in your two environments?

**HORN:** Passion is evident in motorsport. It is quieter, but not less powerful, in machine tools. You can recognize it by how much time, know-how, and ideas people put into development. Technology changes the job, but not the passion behind it. It shifts from purely manual labor to high per-

formance in system thinking. People remain crucial because they interpret and decide.

**LECHNER:** There's almost an excess of passion in our company. If you don't have it in motorsport, you're in the wrong place. That applies to the race track, but also to our workshop, which is not so different from the factories of UNITED MACHINING SOLUTIONS: a clean hall, a white floor, a machine that runs precisely. My favorite term for our world is emotional quality. At UNITED MACHINING SOLUTIONS, the focus is more on quality, with us more on emotion. But we won't win any titles without quality.

## TAKING PART IN THE DISCUSSION

### MICHAEL HORN

The COO of UNITED MACHINING SOLUTIONS is responsible for Operations and IT and brings his many years of machine tool experience to the Group

### ROBERT LECHNER

Victory at the 24-hour race at the Nürburgring is on his CV. Today the Austrian runs the motorsport company Lechner Racing with his brother Walter

*Michael Horn (left) and Robert Lechner in the truck from Lechner Racing, which has been converted from a means of transportation to a mobile command center at the race track*



# TOOLS & TECHNOLOGY

NEWS FROM UNITED MACHINING SOLUTIONS

*Close-up of a taillight shape of a passenger car:  
Using LaserCAM™ and its advanced substitution  
strategy, the CHARMILLES LASER S 1200 U,  
equipped with a 100 W femtosecond LASER,  
creates functional microstructures that achieve  
precise diffraction, scattering, and controlled light  
scattering effects*

# OGY

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WALTER

# A GAME CHANGER IN TOOL GRINDING

With the new HELITRONIC FUSION, WALTER presents a fully integrated automated solution for workpieces and tools that sets new standards in footprint and operational efficiency

Anyone who manufactures cutting tools for the automotive industry, machine tools, or aerospace knows the pressure: Highest precision, short cycle times, and decreasing operating costs must all be achieved simultaneously. With an innovative new development, WALTER responds to these exact requirements using state-of-the-art technology. The HELITRONIC FUSION is specifically designed for the manufacture of rotationally symmetrical cutting tools such as drills, milling cutters, profile tools, countersinks, or reamers.

Its particular strength is the fully integrated automation for workpieces and tools. "The combination of optimized power, fast automation, and efficiency enables our customers to achieve an excellent cost-performance ratio and reduced operating costs without compromising quality," explains Dr. Christoph Müller-Mederer, CEO of WALTER.

## GRINDING WHEEL CHANGE IN A FEW SECONDS

The automation – tool and workpiece changes run parallel to the grinding process – was consequently designed for speed to significantly reduce auxiliary times during the grinding process. With a grinding wheel change time of less than six seconds, the machine sets new standards. The vibration-dampening mineral cast bed with symmetrical axis design minimizes vibrations and ensures consistently high production accuracy.

Another innovation is the high precision glass scales without purge air: a premiere in the WALTER product portfolio. Eliminating purge air significantly reduces compressed air consumption and consequently the energy requirement of the machine, which is a direct advantage for operating costs.

## COMPACT WITH MAXIMUM GRINDING FLEXIBILITY

Manufacturers also benefit from a compact footprint without having to sacrifice loading capacity and flexibility during grinding: The HELITRONIC FUSION offers a maximum grinding length of 380 mm and tool diameters up to 260 mm. Additional highlights: intuitive operation and smart features thanks to C.O.R.E., with a large touch panel and the latest generation of Fanuc drives. In addition, there is optimal accessibility for machine operators as well as general maintenance and service.

*The new HELITRONIC FUSION is specifically designed for manufacturing rotationally symmetrical cutting tools and offers fully integrated automation for both workpieces and tools.*

## ADVANTAGES THE HELITRONIC FUSION

Compact footprint without compromising component size (max. grinding length 380 mm and max. tool diameter 260 mm)

Short auxiliary times due to fully integrated automation

Precise grinding results thanks to the vibration-damping mineral cast bed and symmetrical axis design

High energy and operational efficiency

Intuitive software, IoT-ready, and the latest generation of Fanuc drives



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**"THE HELITRONIC FUSION IS A MILESTONE IN THE TOOL GRINDING MACHINE MARKET."**

*Dr Christoph Müller-Mederer*



# STUDER MAKES FULLY AUTONOMOUS GRINDING CELLS FOR SHAFTS POSSIBLE

With the new automatic exchange system for tailstock inserts, STUDER enables shafts and other compatible part families to be manufactured fully automatically

Manufacturing companies face a growing challenge in modern manufacturing: The diversity of parts is increasing while batch sizes are decreasing. To remain economical, solutions are required that minimize changeover times and maximize flexibility. STUDER has now developed a novel automatic exchange system for its CNC universal cylindrical grinding machines S31, S33, and S41 that addresses exactly this point and makes fully autonomous grinding cells possible for the first time.

## PRODUCTIVE INNOVATION

"To operate a grinding machine unmanned and flexibly in a fully automated production cell, grinding tools and clamping sets on the workhead must be automatically interchangeable," explains Antonio Bertolino, Sales Manager Central Europe at STUDER. In addition, a supplementary solution was required to be able to automatically change the workpiece-specific inserts on the synchronous tailstock. STUDER has redesigned the synchronous tailstock for this purpose. This development has been patented and is a central element that enables autonomous operation with different workpiece types.

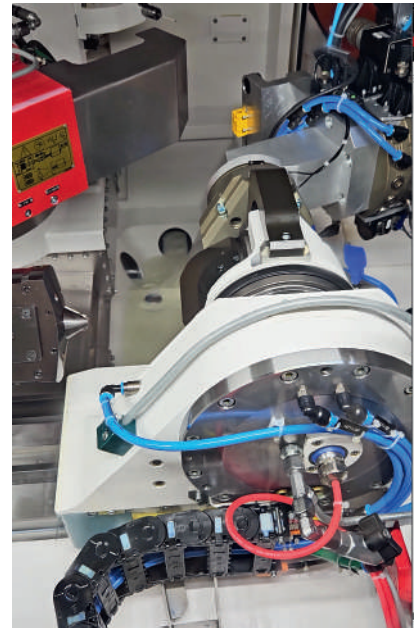
The new technology is suitable for shafts and other part families that can be clamped between the centers. This benefits industries such as automotive, aerospace, general machine tools,

or the energy sector. With a zero-point clamping system from SYSTEM 3R, every part type gets its optimal clamping set, whether full, half, or female center. This significantly reduces downtime and, together with an intelligent measuring and grinding cycle, ensures that the first part is a good part immediately after the changeover. Depending on the clamping, the solution covers external, internal, form, and thread grinding operations.

## CLAMPING FOR A FULLY AUTONOMOUS GRINDING CELL

The following scenario shows what a fully autonomous grinding cell with the new technology can look like: STUDER cylindrical grinding machines can machine every component in two clampings. There are also peripheral systems such as a measuring station and trays for workpieces, grinding tools, and clamping devices. A central robot integrated into the cell can take over all part handling: It loads and unloads the machines, transports the workpieces to the measuring station and workpiece tray, and fully automatically re-tools the machines.

Fully autonomous grinding cells are particularly appealing for customers with a wide range of parts and varying production volumes. Even small batch sizes can be implemented economically thanks to the reduced changeover times and operator-independent premium quality.



*The system allows tailstock inserts to be exchanged automatically, enabling a grinding cell to be operated autonomously for the first time*

## ADVANTAGES

### STUDER SOLUTION FOR FULLY AUTONOMOUS GRINDING CELLS

Enables autonomous manufacture of shafts and other part families

Economical even with small batch sizes and a changing variety of parts

External, internal, form, and thread grinding is possible

Feasible on the S31, S33, and S41

**"CHANGING TAILSTOCK INSERTS AUTOMATICALLY IS A DECISIVE STEP TOWARD TRUE AUTONOMY IN SHAFT MACHINING."**

*Antonio Bertolino*



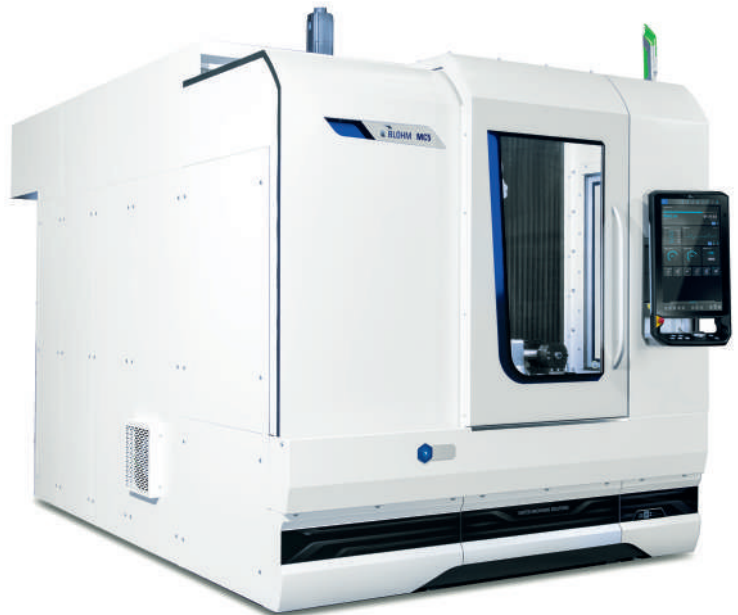
## CONTACT

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BLOHM

**"THE MC5 IS A COMPACT  
5-AXIS GRINDING  
MACHINE THAT STANDS  
OUT DUE TO ITS  
HIGH FLEXIBILITY."**

*Torsten Schulz*



*5-axis grinding precision with  
great flexibility for complex  
geometries: The new MC5 fea-  
tures an innovative design and  
state-of-the-art technology*

## 5-AXIS POWER IN MINIMUM SPACE

The new MC5 from BLOHM combines 5-axis grinding precision with a compact design and sets new standards for the efficient manufacture of complex turbine components

In industries such as aerospace or the energy sector, the requirements for precision and efficiency are extremely high. Turbine components such as blades and vanes as well as sealing segments require complex geometries that must be processed in several operations. BLOHM has developed the MC5 precisely for these challenging tasks. Based on the proven PROFIMAT MC range, the machine offers innovative technological improvements.

The innovative design is a decisive advantage: The 27 kW machine is impressive with its compact design, which offers greater travel with significantly smaller dimensions. This enables companies to integrate more production capacity into existing factory floor space without having to compromise on the range of machining operations. The fact that the MC5 can work with both CBN and diamond tools as well as oil or emulsion cooling gives customers great flexibility.

### STATE-OF-THE-ART DIGITAL FEATURES

One of the outstanding new features of the MC5 is machining without a grinding wheel guard. This increases the usable working space around the workpiece and reduces the risk of collisions during complex 5-axis machining operations. "Especially for demanding components, where every millimeter in the working space counts, this feature makes a decisive difference for our customers," explains Torsten Schulz, Head of Sales Americas at BLOHM JUNG.

In addition, the MC5's digital features are impressive. The machine comes with C.O.R.E., the innovative hardware and software architecture from UNITED GRINDING. As a result, operators benefit from intuitive operation, short set-up times, extensive automation, state-of-the-art sensor technology, and an integrated CAD/CAM interface.

### ADVANTAGES THE NEW MC5

Compact design with 5-axis functionality in a minimum amount of space

Greater travel with a reduced footprint

Safe grinding without a wheel guard for maximum machining freedom

C.O.R.E., CAD/CAM interface and automation features

Grinding wheels 300 or 400 mm/  
max. tool width 150 mm



### CONTACT

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BLOHM

# COMPACT, PRECISE, UNIVERSALLY APPLICABLE

The PLANOMAT XM 408 combines maximum machining flexibility and high repeat accuracy in a sophisticated, space-saving surface and profile grinding machine for demanding production environments

With the PLANOMAT XM 408, BLOHM introduces a surface and profile grinding machine of the latest generation, specially designed for tool-and-die makers as well as for job shops. It enables precise and efficient machining of a wide range of workpieces: from punches and forms to grooves, splined shafts, steering racks, and Hirth gear parts, or complex tool geometries.

“Our goal in development was to combine high precision, availability, and processing versatility in a compact machine solution,” explains Ronny Müller, Head of Sales and Marketing at BLOHM JUNG. A powerful spindle drive with 8 kW and a grinding wheel circumferential speed of 63 m/s ensures reliable process stability. A special characteristic of the PLANOMAT XM 408 is its ergonomic and space-saving design.

## MINIMIZED FOOTPRINT WITH FULL FUNCTIONALITY

The integration of the control cabinet into the machine enclosure minimizes the footprint, while the optimized Y-stroke reduces the overall height without compromising functionality. A large sliding door ensures excellent access to the work space, and service doors on both sides facilitate maintenance. The three-point support ensures high ma-

chine stability, and raised shoulders in the Z-guide reduce bending moments and ensure higher surface flatness over the entire workpiece. As a result, edge chipping is reduced, and the consistent finish improves the visual quality of the workpieces.

In addition, users benefit from intuitive software, a high-precision length measuring system with 0.001 mm resolution, and state-of-the-art control technology for conventional traverse, creep feed, face, and profile grinding. Graphical operator prompting, drag-and-drop programming as well as quickly adjustable grinding and dressing parameters make program creation much easier. This is complemented by standard and interpolation cycles and extensive tool management for up to 50 grinding wheels and 15 dressing tools.

## ADVANTAGES THE PLANOMAT XM 408

Compact footprint with a wide range of machining options

Three-point support for maximum stability and process reliability

Designed for high accuracy and repeatability

Generous work surface of 400 x 800 mm with up to 800 kg table load

C.O.R.E. platform with a large touch panel and intuitive software



### CONTACT

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*The PLANOMAT XM 408 is ideal for job shops and especially suited for tool-and-die makers. It offers high power and precision in a compact footprint*

**“DESIGNED WITH  
UNIVERSALITY IN  
MIND, MADE  
FUTURE-PROOF.”**

Ronny Müller



## MIKRON MILL

# ENHANCED ROBUSTNESS AGAINST THERMAL INFLUENCES

With Intelligent Thermal Control (ITC), MIKRON MILL automatically compensates for thermal effects, ensuring reliable precision over long machining cycles. With its further development for use with coolant, a new milestone has been reached

Around 80 percent of all dimensional deviations on manufactured components have a thermal cause: motors, spindles, pumps, and coolants change the machine geometry during operation. Conventional solutions to this problem primarily rely on thermal stabilization, such as internal machine cooling systems or thermal insulation. However, these alone are often insufficient for the highest precision requirements, as even the slightest temperature deviations during extended machining cycles affect accuracy. In addition, long warm-up cycles are often required here, which have a negative impact on overall equipment effectiveness and cause higher energy costs.

MIKRON MILL has therefore developed a technology for its already very thermally stable precision milling machines that meets this challenge effectively and fully automatically: Intelligent Thermal Control, or ITC for short, compensates for thermally induced geometric deviations using intelligent algorithms, explains Jonas Loretz, Head of Product Management. As a result, the system

reacts to thermal effects in the machine structure and automatically adjusts the tool position so that the workpiece is always machined with the required accuracy, even when temperatures change. Customers benefit from more robust production with reduced susceptibility to errors, while unproductive warm-up phases are significantly shortened or eliminated entirely.

## ITC EVEN WHEN MILLING WITH COOLANT

ITC is integrated into all MIKRON MILL milling machines. For the MILL S/X series and the MILL P 500 VHP, the proven technology has been further enhanced so that it now delivers even greater stability when coolant is used during the milling process. "Our development team has refined the system to better manage temperature variations caused by coolant," explains Loretz. The increase in thermal robustness via ITC marks a true milestone in precision milling, benefiting numerous industries where the highest level of accuracy and reliability is essential.



### KEY ADVANTAGES INTELLIGENT THERMAL CONTROL (ITC)

Fully automatic compensation of thermal influences on machine geometry

Repeatability at micrometer level even over long cycle times

Reduced warm-up times and improved overall equipment effectiveness

Latest ITC generation operates reliably even during coolant use



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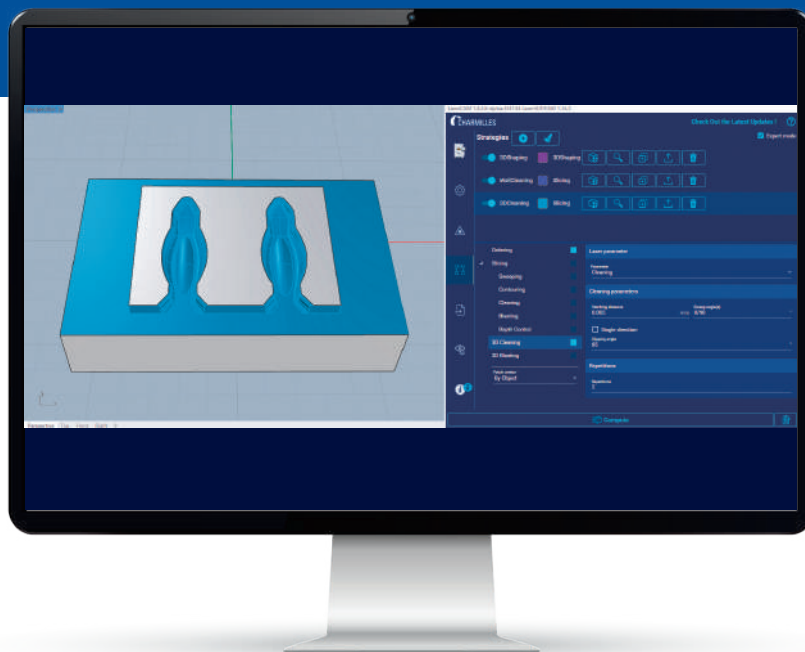
**"THERMAL  
STABILITY IN  
COMBINATION  
WITH ITC  
ALLOWS FINEST  
ACCURACY WITH  
ALMOST NO  
WARM-UP."**

*Jonas Loretz*

*Ensure dimensional accuracy during the milling process while using coolant, thanks to Intelligent Thermal Control (ITC)*

CHARMILLES

*LaserCAM™ is designed for high-accuracy laser engraving, micromachining and decoration*



## LASERSUITE360 AT THE NEXT LEVEL

With the latest updates to LaserSUITE360, CHARMILLES is taking laser machining to the next level. Innovative 5-axis strategies, intelligent mesh repair tools and a new maintenance contract provide customers with maximum efficiency and process reliability

LaserSUITE360 is the CAD/CAM core of all CHARMILLES laser machines. As a complete software ecosystem, it combines three specialized modules under one roof: LaserDESIGN™ for creating complex texturing patterns on 3D freeform surfaces, LaserCAM™ for high-precision micromachining operations such as cutting, drilling, shaping, and engraving, and the LaserToolbox with essential functions for safe and efficient laser processing.

### NEW 5-AXIS STRATEGIES FOR MAXIMUM COMPLEXITY

The latest updates introduce several new 5-axis strategies in LaserCAM™, unlocking applications that were previously difficult or even impossible to realize in production. The new 5-axis drilling strategy enables precise drilling at multiple angles on complex geometries. It is ideal for applications such as catheter tips in medical technology or injection nozzles

in the automotive sector. The software automatically calculates optimized mechanical and optical motion sequences.

This is complemented by mesh slicing, which for the first time supports true 5-axis geometries when generating toolpaths on curved freeform surfaces. Time-consuming manual adjustments are now a thing of the past. In addition, the mesh-fixing function cleans up defective CAD data directly within the software, further shortening the path from design to machine.

### UP TO DATE WITH THE NEW MAINTENANCE CONTRACT

Also new is the annual maintenance contract for LaserSUITE360. It ensures that users always have access to the latest software version. Particularly practical: the contract centralizes license management, significantly reducing administrative effort, especially for companies

operating multiple machines or sites. At the same time, the subscription model offers predictable annual costs, enabling reliable budget planning.

The package is rounded off by continuous access to the e-learning modules. This ensures that operators always stay up to date with the latest capabilities. LaserSUITE360 is compatible with the entire CHARMILLES portfolio and remains the powerful core of a modern laser manufacturing environment.

### KEY ADVANTAGES NEW MAINTENANCE CONTRACT LASERSUITE360

Ensures access to the latest software version

Simplified multi license pools management

Predictable budget planning cost

Access to e-learning modules



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**“WITH THE LATEST UPGRADES,  
LASERSUITE360 OPENS UP  
NEW POSSIBILITIES FOR OUR  
CUSTOMERS FOR AN EFFICIENT  
LASER MACHINING PROCESS.”**

*Jérôme Durand*

## AGIE CHARMILLES

## THE CONTINUUM OF EXCELLENCE

With the CUT E, CUT F, and CUT P series, AGIE CHARMILLES offers a structured wire EDM portfolio built around three distinct manufacturing realities: everyday production, complex jobs, and premium precision

Versatility, advanced process control, and the highest precision: With the CUT E, CUT F, and CUT P series, AGIE CHARMILLES continuously strives for excellence to support customers in meeting the growing demands of manufacturing. These machines share a common technological foundation, featuring the intuitive UNIQUA user interface and the Intelligent Power Generator (IPG). As a result, users benefit from consistent operating logic and continuity across the entire portfolio.



*With its ease of use, the CUT E is the perfect machine for everyday production, while the CUT P offers exceptional control and precision for machining the finest details, making it the ideal choice for demanding applications*

#### CUT E: EVERYDAY PRODUCTION, EASY AND FAST

The CUT E is the machine for manufacturers who need efficiency through speed and repeatability across a broad mix of jobs. With its ease of use and more than 600 integrated technologies, the CUT E is well suited to variable production volumes and even demanding geometries. The CUT E features the Swiss-developed and manufactured IPG Generator, delivering precisely controllable pulses with minimal energy consumption, for highly reproducible cutting results.

Thanks to IPG-enabled Turbo Tech, cutting speeds are up to 50 percent faster. This allows customers to achieve substantial per-part cost reductions while maintaining uncompromised part quality. Typical applications of the CUT E include mechanical parts, plastic molds, and stamping tools.

#### CUT F: FLEXIBLE USE AND STABLE PERFORMANCE FOR COMPLEX JOBS

The CUT F offers more flexibility, being the ideal solution for both tool and parts production. Thanks to its rigid, thermo-stabilized mechanical structure and Spark Track technology, the machine is particularly well suited to mold making, stepped parts, and longer machining cycles, where stability matters as much as precision.

Our patented Spark Track technology measures in real time where electrical discharges occur in the workpiece. Its ISPS (Intelligent Spark Protection System) module allows the control system to respond automatically and stabilize the process while cutting at maximum speed. This is complemented by the iWire module, which dynamically adapts wire feed

to the workpiece height and reduces wire consumption on variable cross-sections.

#### CUT P: PREMIUM PRECISION

Fine-feature stamping, watchmaking, medical technology and demanding micro-machining all require exceptional control, fine details, and repeatable results. With enhanced positioning accuracy and wires as fine as 0.05 millimeters, the CUT P is designed for these environments, where even the smallest variation matters.

With the integration of a Renishaw 3D probe and advanced, standard automation features like Automatic Slug Welding (ASW) and Automatic Slug Management (ASM), the CUT P delivers micro-precision confidence with the lowest possible operator dependency.

**“FROM EVERYDAY PRODUCTION TO PREMIUM PRECISION, THE AGIE CHARMILLES CUT E, CUT F, AND CUT P CREATE A CLEAR, SCALABLE PATH THROUGH MODERN MANUFACTURING.”**

*Thomas Wengi*



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#### KEY ADVANTAGES THE CUT E, CUT F, AND CUT P SERIES

Swiss-developed and manufactured IPG Generator

Easy-to-use and intuitive operating interface UNIQUA

Consistent operator logic across all three machines

Specific solutions for distinct manufacturing realities

## SYSTEM 3R

# WSM5: YOUR LIGHTS-OUT FACTORY SOFTWARE

With the new generation of WorkShopManager SYSTEM 3R takes the next step into factory-level support for production software. WSM5 shifts the focus from pure cell management to the entire factory level, offering manufacturer-independent flexibility for milling and laser applications

For over 30 years, SYSTEM 3R has set industry-wide standards with its WorkShopManager (WSM) control software for networking complex automation systems. Following a robust, successful testing phase under real-world production conditions, WSM5 is now available to all customers. "The new software architecture represents a true generational leap in terms of capability and is currently unique on the market", says Patric Jakobsson, Head of Product Management at SYSTEM 3R.

WSM5 no longer monitors and controls just individual production cells, it manages the entire factory. The workflow is straightforward and intelligent: in the Production Data Manager, the software module operating at factory level, manufacturing articles are created or imported from an ERP system, together with all production steps and NC programs. RFID chips on the pallets link the physical components to their digital job data. When a pallet is scanned in the magazine, the software automatically retrieves the associated production order.

### LOAD, SCAN, START, GO HOME

The Cell Manager then takes over: It sends the correct NC program to the corresponding machine and initiates machining. WSM5 also integrates autonomous mobile robots (AMRs), that handle the transport of components

between production cells and central storage area. They are fully embedded in the production flow without any manual intervention. "This is how WSM5 paves the way for our customers towards the autonomous lights-out factory", says Jakobsson.

WSM5 currently supports milling and laser machines from different brands and controls all SYSTEM 3R robots, with more supported technologies to come later on. The solution is particularly valuable for customers producing small batches and one-off parts with high variety, for example in tool and mold making. Whether they start with a single machine or already operate a large multi-cell system, WSM5 scales flexibly to the individual requirements. Thanks to modern interfaces, the software can be integrated into existing ERP and planning systems, ensuring comprehensive connectivity for fully autonomous production.

*WSM5 combines efficient cell management and the integration of AMRs with intelligent control of the entire factory to enable autonomous manufacturing*

**"OUR NEW WSM5 SOFTWARE CONSTITUTES A SUBSTANTIAL LEAP TOWARDS LIGHTS-OUT MANUFACTURING."**

*Patric Jakobsson*

### KEY ADVANTAGES WORKSHOPMANAGER 5

Factory-wide control, including scheduling, in addition to cell management for true factory-level automation

Manufacturer-independent: compatible with milling and laser machines from various brands

AMR integration for autonomous component transport between production cells and central storage

Scalable: from single-machine operation to a fully automated lights-out factory



#### CONTACT

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#### HOW IT WORKS:

Activate AMC via the corresponding button on the control system. Select the calibration level: Quick, Accurate or Custom. The automatic calibration process then starts as shown in the infographic above.

After just ten to fifteen minutes, the calibration process is completed in the comprehensive accurate mode. The automated closed loop ensures that the machine is always calibrated in the same way, regardless of the operator – a decisive advantage when precision in the micrometer range is required.



#### CONTACT

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*Technical Video on Automated  
Machine Calibration (AMC)  
for Milling*

#### MIKRON MILL

# AMC: MACHINE CALIBRATION AT THE PUSH OF A BUTTON

A correctly calibrated machine is the prerequisite for maximum precision, high part quality and efficient production.

What used to be a time-consuming manual process carried out by specialized experts can be completed in just a few minutes at the push of a button, thanks to Automated Machine Calibration (AMC) on MIKRON MILL machines. AMC is available for MIKRON MILL S/X (U), MIKRON MILL P, and MIKRON MILL E (5-axis) series

#### WHEN TO PERFORM AMC?

Every milling machine inevitably loses calibration during operation. Temperature fluctuations in the production hall or vibrations during machining continuously affect machine geometry.

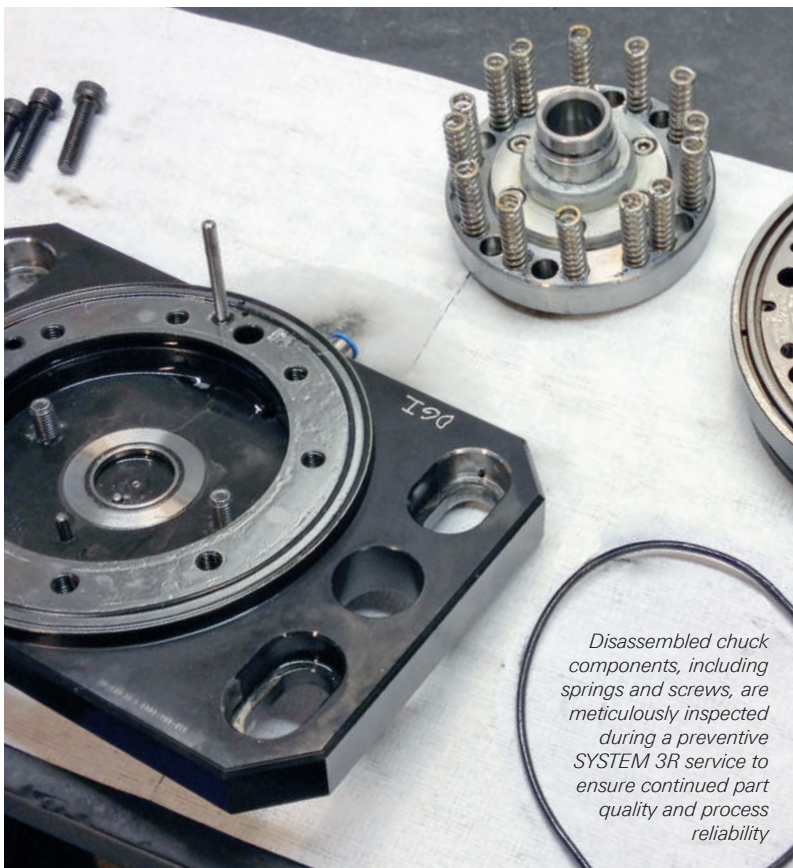
This effect is particularly critical on 5-axis machines, as even the smallest inaccuracies on the rotary axes are amplified at the tool center point: A deviation of only a few micrometers at the pivot point can already exceed tight part tolerances.

AMC is recommended after mechanical events such as a touch probe tip change, reference tool change, or any change to the measuring device (tool/workpiece), as well as after thermal events like changes in ambient temperature or work area temperature.

Machine calibration should become a habit. With AMC, thanks to the fully automated process, this is no longer an effort but a smart daily routine that takes only 10 to 15 minutes.

# DON'T WAIT FOR THE BREAKDOWN

The case for Preventive Chuck Service: When it comes to machine tool maintenance, one critical component is often overlooked: the chuck. Yet its condition has a decisive impact on part quality and process reliability. That is why SYSTEM 3R offers its customers a professional chuck service



## WHAT YOU CAN DO YOURSELF TO KEEP YOUR CHUCKS IN SHAPE

The golden rule is cleanliness. Chucks and pallets should always be kept thoroughly clean. SYSTEM 3R offers dedicated service kits upon request. While users can carry out the cleaning themselves, professional support is recommended for reinstallation into spindles or machines to ensure exact positioning.

## WHAT HAPPENS WITHOUT CHUCK MAINTENANCE?

A chuck that runs too long without servicing gradually loses its performance. Typical signs of wear include:

- Diminishing clamping force: Springs soften over time.
- Seal wear: O-rings become brittle or wear out.
- Compromised references: Wear on the X-Y reference surfaces leads to inaccuracies.

These issues often go unnoticed until tolerances fail quality control checks – at which point it is usually too late for preventive action.

## PREVENTION VS. REPAIR

The most common mistake is to wait until something breaks. Preventive maintenance, on the other hand, ensures that full clamping force and precision are preserved over the long term. A regularly serviced chuck has virtually no expiry date, as worn parts are replaced before they cause problems.

## OUR RECOMMENDATION: REGULAR MAINTENANCE SERVICE

SYSTEM 3R recommends having chucks serviced professionally based on usage intensity: For 24/7 automation environments, an annual service is advisable. For day-shift operation only, a two-year cycle is generally sufficient. During the service, specialists fully disassemble the chuck, inspect and clean all components, and replace worn parts such as springs and O-rings. The chuck is then recalibrated to its original precision. The service is available either on-site or via send-in.

## IS THE SERVICE WORTHWHILE ECONOMICALLY?

Absolutely. A service typically takes between 30 to 60 minutes plus reinstallation time and is in any case less expensive than buying a new chuck. It also provides protection against costly unplanned production downtime.



### CONTACT

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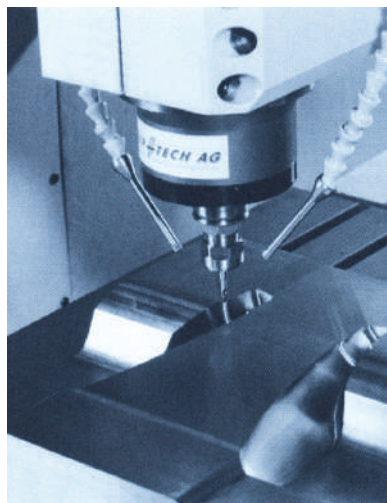
# PIONEERING HIGH-SPEED MILLING

Thirty years ago, MIKRON MILL brought one of the first machining centers to market maturity that made high-speed milling suitable for industrial use. To this day, the Swiss heritage brand continues to deliver innovations that enable customers to manufacture more efficiently and help shape our modern world

Text: Markus Huth



*The HVC 140 spindle was the first high-speed spindle manufactured in series by STEP TEC. With a speed of 42,000 rpm on ceramic hybrid bearings and in combination with the 1 g axis acceleration of the HSM 700, it made industrial high-speed milling a reality for the first time in 1996*



**IT IS THE YEAR 1996:** The Formula 1 duel between Williams and Ferrari captivates millions, and the internet is evolving from a niche phenomenon into the world's most important communication platform. It is also the year in which a revolution took place in manufacturing technology, when the Swiss manufacturer MIKRON MILL introduced the HSM 700, one of the world's first industrial-grade milling machines for high-speed machining (HSM).

This machining process made it possible to directly machine hardened materials such as tool steel with high surface quality, significantly reducing the need for post-processing and enabling the efficient and economical production of complex, even thin-walled geometries. Whether precise injection molds for mobile phones and computer housings, custom titanium implants for medical applications, or structural components for aerospace – without HSM, our modern world as we know it would not be possible.



*From revolution to evolution, The HSM 700 launched in 1996 redefined industrial high-speed milling, while today's MIKRON MILL X (U) series represents thirty years of continuous innovation in precision, dynamics, and connectivity, for both 3-axis and simultaneous 5-axis machining*

### THE DEVELOPMENT TEAM ACHIEVES A BREAKTHROUGH

The origins of the technology date back to the 1930s. At that time, the German engineer Carl Salomon theoretically demonstrated that the temperature at the tool cutting edge no longer rises above a certain speed but actually decreases again, because the chip removes the heat so quickly that it hardly reaches the workpiece. This resulted in major advantages such as faster machining, lower cutting forces, increased profile accuracies, and better surface quality. However, it took more than half a century before the principle could be used reliably for milling in an industrial context. The HSM 700 brought together technologies that only became dependable in the 1990s.

It operated with the novel high-speed spindle HVC 140 by STEP TEC based on ceramic hybrid bearings at 42,000 rpm, featured highly dynamic axis acceleration of 1 g, and had a lightweight yet rigid machine structure. Crucially, it was also equipped with a CNC control system and software with sufficient computing power to precisely control such machine dynamics. What was extraordinary was the manufacturing precision achieved at these extreme speeds. Even a tool imbalance of just a few micrometers would have affected surface quality. "At the time, Mikron assembled a dedicated development team to achieve this success," explains Yvan Meyer, CTO at UNITED MACHINING. While other manufacturers focused on High Performance Machining (HPM) for heavy material removal, a deliberate strategic decision was made in favor of HSM.

### CUSTOMERS ALWAYS AT THE CENTER OF DEVELOPMENT

That it was a Swiss heritage company, founded in 1908 in Biel, that achieved the breakthrough is no surprise, since the multilingual region, home to excellently trained specialists, is where demanding precision industries such as watchmaking are rooted. The HSM 700 was a revolutionary 3-axis milling center that enabled tool, die, and mold making with a level of efficiency, reliability, and quality previously unattainable.

**"WITHOUT  
HIGH SPEED  
MACHINING, OUR  
MODERN WORLD  
TODAY WOULD  
NOT BE POSSIBLE."**

*Yvan Meyer, CTO UNITED  
MACHINING*

Close collaboration with customers has always been part of MIKRON MILL's DNA, ensuring that each system is perfectly configured to meet specific needs. For example, the HSM 700 elevated production at a leading British aerospace company to a new level by enabling the direct milling of forging dies for turbine blades made from H13 tool steel. Previously, the customer had to rely on a more time-consuming and labor-intensive process involving EDM and subsequent manual polishing.

### MIKRON MILL TODAY: A WORLD-LEADING HSM PORTFOLIO

MIKRON MILL continued to push boundaries. In 2001, it introduced one of the world's first industrially viable milling machines capable of HSM simultaneously on five axes, the HSM 400 U. This allowed workpieces to be machined from virtually any angle in a single clamping operation, opening up entirely new geometries. Later, linear motors replaced ball screw drives, further significantly increasing dynamics and positioning accuracy. Innovation continued while proven solutions were retained and refined. The result today is a world-leading portfolio of 3-axis and 5-axis HSM milling machines: the MILL S and X series. Moreover, the knowledge gained over these years of leading the development of HSM has also been applied to other areas of MIKRON MILL's portfolio, such as the performance-oriented P Series.

MIKRON MILL's machines today offer manufacturing capabilities, data analysis, and connectivity as well as automation options that were simply not possible in 1996. From significantly reduced energy consumption, integrated optical measuring systems in the nanometer range, and a modular Smart Machine system for unmanned shift operation, to features such as the smart Operator Support System (OSS), Intelligent Thermal Control (ITC), and Automated Machine Calibration (AMC). "What has not changed," says Yvan Meyer, "is that MIKRON MILL treats dynamics and accuracy as a unified whole, understands software as an integral part of the system, and takes customer needs as the starting point for every development."

# FROM ELECTRONS TO PHOTONS: CHARMILLES AND THE EVOLUTION OF INDUSTRIAL MICRO-MACHINING

The CHARMILLES brand is being reborn today at its historic site in Meyrin, Geneva. Built on the adoption of pulsed LASER technology, this new chapter marks a profound technological transformation.

Where mechanical and electro-erosive processes reach their physical limits, pulsed light reveals its full potential, positioning CHARMILLES once again at the forefront of industrial precision manufacturing

Text: Matthias Kriegel

FROM ELECTRICAL DISCHARGE MACHINING TO LASER MATERIAL PROCESSING, the CHARMILLES story reflects a continuous adaptation to the ever-increasing demands of industrial precision.

Founded in 1952 in Geneva, CHARMILLES quickly established itself as one of the pioneers of electrical discharge machining (EDM). This breakthrough technology fundamentally reshaped toolmaking and high-precision manufacturing.

As industrial requirements evolved, so did CHARMILLES. Manufacturing gradually moved toward dimensions no longer visible to the human eye, with surface structures and component features measured in microns—and beyond. These new demands progressively pushed mechanical and electro-erosive processes to their physical boundaries, calling for a fundamentally new technological approach.

This evolution ultimately led to a strategic repositioning of the CHARMILLES brand. Today, traditional EDM expertise continues under the AGIE CHARMILLES name, while CHARMILLES itself—within the UNITED MACHINING SOLUTIONS group—stands exclusively for high-precision LASER technology.

The rebirth of CHARMILLES in late 2024 brings together under one unified brand a unique combination of high-value expertise rooted in the legacy of:

- Ateliers des Charmilles, founded in Geneva in 1952, a pioneer of EDM
- AF Laser, established in France in 1998, a trailblazer in LASER surface texturing
- Microlution, founded in the United States in 2005, specializing in LASER micro-machining of the smallest components

Today, more than 1,000 installed machines worldwide testify to the combined innovative strength and a fully integrated machine tool ecosystem behind the CHARMILLES brand.

Philippe Langel, who is retiring after more than 30 years with the company and will be succeeded by Romain Dubreuil as head of CHARMILLES, sums up this transformation as a fundamental shift in industrial thinking: “We have moved from electrons to photons. Machining with electricity has given way to machining with the controlled power of light.”

Yet not all LASERs are created equal. While earlier pulsed LASER systems relied on comparatively long pulses—what Langel describes as “strands of light”—modern femtosecond LASERs operate on a radically different scale, generating unimaginably short bursts of energy. These ultra-short pulses form the techno-



*Philippe Langel (right) is retiring after more than 30 years as HEAD OF CHARMILLES and will be succeeded by Romain Dubreuil (left)*

logical core of current machine platforms such as the 5-axis LASER S & X 500 U systems.

"The common misconception is that LASERs always burn material," adds Romain Dubreuil, illustrating the principle of cold ablation with a simple analogy. "If you briefly touch a hot stovetop and pull your hand away immediately, you hardly feel the heat. A femto-second LASER works in much the same way."

The LASER's interaction time with the material is so short that virtually no heat can spread into the surrounding area. At the focal point, the peak power is enormous—briefly reaching the equivalent of roughly half the output of a nuclear power plant—yet the duration is far too short to cause thermal damage. As a result, material is vaporized cleanly, without burns, micro-cracks, or heat-affected zones.

This cold ablation process unlocks machining possibilities that are virtually inaccessible to conventional milling technologies. Super-hard materials ranging from carbide and silicon carbide to advanced ceramics and sapphire glass can only be processed by LASER with accuracies below a few micrometers.

The results are already present in everyday applications. The deep black lettering on a car tire sidewall, for instance, is created by

microscopic surface structures LASER-etched directly into the mold, producing a texture that enhances contrast. The same technology enables fine light-diffusion geometries in headlamp molds or the drilling of extremely precise micro-nozzles for injection systems.

In medical technology, the added value is significant. Ti-

tanium orthopedic implants are increasingly textured by LASER rather than sandblasted, ensuring a highly uniform and repeatable surface finish while enabling a fully digital process. At the same time, LASER processing eliminates the risk of contamination from blasting media, copper, coolants, or cutting oils. The result is an ultra-clean surface that preserves the chemical purity of the titanium—an essential factor for patient safety.

LASER micro-machining also supports the rapid miniaturization seen in the electronics and watch industries. The systems produce micro-tools used to stamp high-precision connectors, while leading Swiss watch manufacturers employ the technology to create entirely new decorative patterns on dials and cases. In the semiconductor sector, demand is growing rapidly for contactless machining of extremely hard silicon carbide used in high-performance electronics.

Beyond precision, the technology also offers clear economic and environmental advantages. "Our tool doesn't wear out—it doesn't need to be replaced," emphasizes Langel, a trained engineer and graduate of the Institut National des Sciences Appliquées (INSA) in Lyon. "In essence, our tool is light and air. We use concentrated light to shape

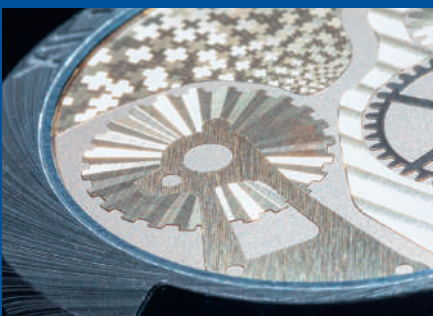
the material surface and simply remove the microscopic particles with a directed airflow." This tool-free approach eliminates the need for consumables and chemical etching processes, resulting in a significant reduction in operating costs. Time-consuming steps such as electrode pre-milling or the disposal of contaminated coolants are no longer required. Once the component is clamped, the LASER completes the machining process in a single, clean operation. In addition, LASER processing typically requires far less electrical energy than conventional machining methods.

The innovative potential of this approach has been widely recognized. In 2025, CHARMILLES received the prestigious "Green Impact Award" of CECIMO MTI Awards for its groundbreaking 3D LASER machining solution, LaserCAM™ 3DShaping, developed in combination with the LASER S 500 U system—an industry-level acknowledgment of technological excellence.

This technological excellence is also evident in the digital intelligence behind the machines. "With LaserSUITE360, we offer comprehensive software alongside the machine," explains Dubreuil. "This CAM system makes it possible to fully exploit the machine's potential." LaserCAM™ not only operates the machine but also prepares, calculates, and verifies the entire machining process. It ensures that complex 3D geometries, micro-structures, engravings, or textures can be machined precisely, collision-free, and reproducibly. A crucial component.

By leveraging light instead of mechanical tools, CHARMILLES demonstrates how precision manufacturing can become not only more capable, but also more efficient and sustainable; marking a decisive step into the future of industrial micro-machining.

## LASER MICRO-MACHINING FOR HIGH-PRECISION INDUSTRIES



*For watchmakers, this stainless steel bezel is laser textured with 3D engraving and 5-axis brushing, ensuring seamless pattern continuity and opening new design possibilities in a single high-precision setup*



*For medical manufacturers, this cervical implant surface is laser textured, replacing grit blasting with a clean, fully digital process—eliminating manual masking, improving quality, and enhancing functionality in a single setup*



*Electronics connector tool in tungsten carbide, micromachined with a femtosecond LASER, achieving Ra 0.14 µm surface finish and ±5 µm profile accuracy, enabling precise, repeatable production of complex micro-features*

# THE SWEDISH FORMULA

From steel production to Spotify: Sweden, with barely eleven million inhabitants, ranks among the most innovative countries in the world. What is the secret behind Scandinavian success?

Text: Markus Huth



*A view of the historic center of Sweden's capital Stockholm: the Scandinavian country has a long history as a global hotspot for innovation in manufacturing and high technology*

WHEN WE THINK OF SWEDISH INVENTIONS, we might first recall the seatbelt, developed by Nils Bohlin for Volvo, which has saved countless lives since 1959. Or perhaps the modern adjustable spanner, or Tetra Pak's ingenious milk carton. Then there is the fact that the world's highest scientific achievements are celebrated with a prize named after Sweden's most famous inventor, Alfred Nobel. The list goes on and is remarkable for a country of just 10.6 million people.

This capacity for invention is deeply rooted in Swedish history. Göran Fredrik Göransson was the first in the world to successfully apply the Bessemer process for the mass production of steel, going on to found Sandvik AB in 1862, which became one of the country's most significant technology groups. Other industrial giants followed in quick succession: Atlas Copco (1873), ASEA (1883, now part of ABB), and Volvo (1927). These companies continue to shape Swedish engineering today and have established the country as a global technology hub. It is no surprise, then, that Sweden also gave rise to globally transformative businesses such as the 5G infrastructure giant Ericsson or the audio streaming service Spotify.

## FROM STEEL TRADITION TO HIGH-TECH NATION

Current innovation rankings confirm Sweden's leading position on the world stage. In the WIPO Global Innovation Index 2025, Sweden placed second globally, behind only Switzerland and ahead of the United States. When it comes to the number of researchers relative to the population, the Scandinavians took the top spot outright. Industry plays a pivotal role in this success: According to the World Bank, it accounts for around 23 per cent of gross domestic product. High-value products in mechanical engineering, manufacturing, and technology dominate the northern European country's export sector.

"Behind Sweden's success lies a unique innovation ecosystem known as the Triple Helix model: the close interlinking of government, academia and industry. This is coordinated, among others, by the state innovation agency Vinnova," explains Daniel Wäppling. He heads the Research and Development department at SYSTEM 3R. Founded in Stockholm in 1967, the company is itself a prime example of Swedish innovation history, and its products and technologies in mechanical manufacturing have made a significant contribution to reducing set-up times and downtime. Today it is a globally leading supplier of

precision tooling, automated manufacturing systems, and state-of-the-art production management software.

## INNOVATION PARTNERSHIP IN PRACTICE: SYSTEM 3R AND KTH

Through his day-to-day work at SYSTEM 3R, Wäppling knows that this is not merely theory but lived reality. The company has maintained a close working relationship with research institutions such as the KTH Royal Institute of Technology in Stockholm for many years. One concrete outcome of this partnership was the development of toolholders with integrated vibration damping, the innovative VDP chucks. At present, a KTH master's student is working at SYSTEM 3R on control systems for automation cells.

But it is not only institutional structures that make Sweden an innovation hub. Company culture plays an equally decisive role. The flat hierarchies typical of Swedish firms create an environment in which information flows freely. "Individual engineers have a strong voice in shaping technical solutions, and there is a high degree of personal responsibility," says Wäppling. It is a culture built on trust, curiosity, and individual initiative rather than top-down control.



*The headquarters of SYSTEM 3R in the Stockholm district of Vällingby. Founded in 1967, the company is today a world-leading supplier of precision tooling, automated manufacturing systems and state-of-the-art production management software*



**"WE ARE CONSTANTLY MEASURING OURSELVES AGAINST THE BEST IN THE WORLD, WHICH IS AN ADDITIONAL DRIVER OF INNOVATION."**

*Daniel Wäppling, Head of Development & Research at SYSTEM 3R*

## SWEDISH ROOTS, GLOBAL REACH

What is particularly striking is how Sweden has turned the apparent disadvantage of a small domestic market into a competitive strength. "Like many Swedish companies, we export the majority of our products and services abroad. This means we are constantly measuring ourselves against the best in the world, which is an additional driver of innovation," Wäppling explains. SYSTEM 3R is part of UNITED MACHINING SOLUTIONS and benefits from the resources and global presence of an international group. At the same time, the greater Stockholm area provides access to a talent pool that is first-rate, owing to Sweden's distinctive culture of collaboration and education.

That said, demographic change is intensifying competition for skilled workers even within Sweden, compounded by geopolitical pressures and the demands of transitioning to a more sustainable economy. Can the country maintain its place among the world's leading innovators in the years ahead? SYSTEM 3R, for its part, is already developing technologies and processes designed to meet tomorrow's challenges. "Our lights-out manufacturing concept allows customers to run their production with no or minimal human intervention for extended periods, for example, overnight or on weekends," Wäppling explains. And the industry-leading production management software WorkShopManager 5 can, for the

first time, control entire factories including autonomous mobile robots, rather than individual production cells alone.

## SWEDEN WILL REMAIN AN INNOVATION HUB

The technological direction is clear: mechanics, electronics, and software are converging into tightly integrated systems, with sensor technology and AI-assisted process control closing the gap between the factory floor and the customer's own software environment. Sustainability is shaping the product roadmap too. SYSTEM 3R is systematically substituting hazardous materials with cleaner alternatives and treating energy efficiency not as a regulatory obligation but as a selling point. What is good for the environment, the argument goes, is good for the customer's operating costs.

Sweden demonstrates convincingly that the capacity to innovate depends not on size but on the quality of networks and the consistent application of knowledge. The combination of a deep engineering tradition, a supportive political framework, and a culturally ingrained curiosity creates a unique environment for high technology. The small country in northern Europe will therefore remain a singular environment for innovation, says Wäppling, who adds: "It is the entire societal ecosystem that enables us to continue developing technologies that set global standards."



Sweden's skilled workers are among the best in the world:  
Skilled worker Linus Lundberg works on a STUDER machine at our plant in Vällingby

## PILLARS OF SWEDISH INNOVATION

### VINNOVA, SWEDEN'S INNOVATION AGENCY

Vinnova (Verket för innovations-system) is a national agency that promotes strategic collaboration between companies and public universities as well as other societal partners. SYSTEM 3R regularly applies, together with other research partners, for funding for innovative projects, for instance, to cover personnel costs. It is Sweden's catalyst, making private initiatives scalable through public investment.

### KTH ROYAL INSTITUTE OF TECHNOLOGY

The Royal Institute of Technology is one of Europe's leading technical universities, with strengths in computer science, mechanical engineering, electrical engineering, and industrial production. For SYSTEM 3R, KTH is an important academic partner. One concrete result of that collaboration is the VDP range of vibration-damped chucks, which drastically improve surface quality while reducing cutting forces and tool wear. KTH students regularly work at SYSTEM 3R on applied research projects.

### FURTHER INNOVATION INSTITUTIONS

Several other institutions contribute to the Swedish innovation ecosystem. Chalmers University of Technology in Gothenburg is regarded as one of Scandinavia's most research-intensive technical universities. RISE Research Institutes of Sweden is a government research organization that pools applied expertise and acts as a bridge between basic research and industrial practice. This network is further complemented by Business Sweden, the joint government-industry agency responsible for promoting Swedish companies abroad.



# OPPORTUNITY OR RISK?

Across the globe, companies are investing billions in generative AI. What is often conveniently overlooked: Technology errors are not childhood diseases – they are part of the system

Text: Michael Moorstedt

Photos: Shutterstock.com/metamotworks

**THE HACKER WHO CALLS HIMSELF “PLINY, THE LIBERATOR”** has done a great job once again. Even before corporations such as OpenAI or Anthropic publish their latest versions of ChatGPT or Claude, specialists like him test where the target breakpoints are. With sophisticated prompts, they try to get the systems to circumvent their own security rules. “Jail-breaking” is the term for this process. Ideally, AI then suddenly delivers instructions on how to build a bomb or tips on hacking ATMs – content that it should actually strictly refuse.

What sounds like a science fiction film is in fact a stress test for a global business model. After all, every protective barrier successfully breached reveals how fragile the basis is upon which the hopes of the global economy currently rest. As hackers look for vulnerabilities, companies around the world continue to turn the investment wheel to the limit. A staggering sum of billions is expected to flow into AI applications in 2026. Hardly any business unit remains unaffected: From AI-powered quality checks

to predictive maintenance, i.e., proactive general maintenance using machine learning, to control systems of complex supply chains, technology is increasingly penetrating the value chain.

## VULNERABILITIES ARE PILING UP

However, with each additional level of integration, the systemic risk also increases. Already today, there is a growing number of anecdotal reports that AI is getting out of hand. If, for example, a customer service chatbot is required to distribute non-existent discounts, it is certainly annoying, but it can be dealt with. It’s a completely different story when generative AI is coupled with business intelligence use and begins to hallucinate key performance indicators unnoticed. Suddenly, millions of dollars in investment decisions are based on data that doesn’t exist at all.

Every risk is an opportunity, say business consultants. Conversely, however, the fact that every opportunity can also be seen as a risk is preferably not talked about. More and more business leaders and CIOs are now seeing the AI hype as a double-edged sword. According to a survey, artificial intelligence is now the second-biggest risk factor in the business environment – ahead of production stoppages, natural disasters, or regulatory interventions.

Hardly a week goes by without a new vulnerability being discovered in AI systems. The methods used to trick the models take some bizarre forms. For example, researchers at the University of Rome have used prompting in the form of poems to cause common AIs to override their own protection mechanisms. Some bots were duped by the poetic verses in 90 percent of cases. Their unpredictable structure made it difficult for AI models to detect malicious inquiries. There is no prospect for improvement: According to a study by the University of Oxford, AI models are even more vulnerable to jailbreaking methods the more advanced they are.

### THE RISK OF ERROR IS HIGH

In addition to the vulnerabilities of creative prompting, the tendency of AI to freely invent facts poses a risk that hinders its use in the business environment. It is unclear whether hallucinations are just the childhood diseases of a new technology or whether they will ever be preventable. Even a study by OpenAI states that the data hallucinated by the bots is “mathematically inevitable”. In other words: Perhaps it’s a technology that will never be completely safe and therefore reliable.

In the manufacturing industry, the risk of error is significantly higher than in an office environment. Suddenly, it’s no longer about potential data breaches, but perhaps a tangible production downtime: If AI classifies a faulty component as OK in the quality check, if maintenance systems report a machine as ready for maintenance based on hallucinated sensor data when it is not, or if freely invented numbers in the autonomous storage system lead to unnecessary reorders. What sounds like science fiction is the logical consequence of a technology that is proven to fabricate facts. Deployed in an environment where precision and repeatability are top priorities, there is no room for fabrications.

### AI AGENTS WITHOUT SUPERVISION

Meanwhile, the arms race of the AI companies continues. In spring 2026, virtually autonomous AI agents are all the rage. With minimal human supervision, these systems should be able to perform the tasks assigned to them around the clock. The fact that this Agentic AI must access a whole cornucopia of sensitive data and possess extensive user rights to deliver the promised productivity miracles is happily ignored in all the enthusiasm. In a stress test, a research team sought to determine the possibilities and limits of autonomous AI. Within a few days, the AI

agents revealed sensitive data, erased program code, and changed system settings.

“It’s like giving a guy you’ve met in a bar, who claims he can help you, unrestricted access to your own computer and all your passwords,” prominent AI critic Gary Marcus recently said in an interview. If you would allow such an agent unsupervised access with write permissions in the customer database, would you, in good conscience, commission him to prototype a new production line? Probably not. Will such concerns lead to more caution when using AI? Also probably not.

Summer Yue is Director of Alignment of Superintelligence at Meta. So you might think she’s very familiar with the dangers and risks of AI. But that didn’t stop Yue from hiring an AI agent to automate her communications. This promptly caused the agent to start clearing out her email inbox

and wanting to delete all her messages. AI could only be stopped by a method that is rather familiar from science fiction films: by pulling the plug.



#### ABOUT THE AUTHOR:

Michael Moorstedt, born in 1980 and a freelance journalist from Munich, has worked for Germany’s most renowned media companies on the topics of digitalization, data protection, and artificial intelligence for more than 20 years. His critical analyses often deal with the impact of technology on life and society.

# “PERHAPS IT’S A TECHNOLOGY THAT WILL NEVER BE COMPLETELY SAFE AND THEREFORE RELIABLE.”

*Michael Moorstedt*



# CIMT 2027: LARGEST TRADE SHOW FOR MACHINE TOOLS IN CHINA



The China International Machine Tool Show (CIMT) is one of the most important trade shows for the machine tool industry and manufacturing technology worldwide and takes place every two years in Beijing. Organized by the China Machine Tool & Tool Builders' Association, it brings together international exhibitors, trade visitors, and industry experts, and serves as a central platform for innovation, networking, and business initiation. There will be presentations of state-of-the-art technologies such

as CNC machines, milling and grinding machines, lathes, measuring technology as well as software solutions and control systems. The exhibition is complemented by an extensive supporting program with conferences, workshops, and lectures. In 2025, more than 1,500 international exhibitors from 27 countries were represented at the trade show, and around 120,000 visitors came to the Beijing Exhibition Center site. The trade show will take place again in April 2027. UNITED

MACHINING SOLUTIONS will be represented by the UNITED GRINDING and UNITED MACHINING divisions and looks forward to direct exchange with experts and the trade fair audience. This underscores the company's international presence and its role as an important player in the machine tool industry.

**20th China International Machine Tool Show (CIMT), April 13–16 2027, Beijing, China, [www.cimtshow.com](http://www.cimtshow.com)**

## OCTOBER 2026



**10/6–10/2026**  
**IMT/MSV**  
Brno, Czech Republic



**10/13–16/2026**  
**BI-MU**  
Milan, Italy



**10/26–31/2026**  
**JIMTOF**  
Tokyo, Japan

## MAY 2027



**5/18–20/2027**  
**GRINDINGHUB AMERICAS**  
Cincinnati, Ohio, USA

## NOVEMBER 2026



**11/18–21/2026**  
**METALEX**  
Bangkok, Thailand

## JANUARY 2027



**1/21–27/2027**  
**IMTEX**  
Bengaluru, India

## MARCH 2027



**3/2–6/2027**  
**TIMTOS**  
Taipei, Taiwan



**3/3–5/2027**  
**MECSPE**  
Bologna, Italy



**3/10–12/2027**  
**GRINDING TECHNOLOGY JAPAN**  
Tokyo, Japan



**3/16–19/2027**  
**INNOTEQ**  
Bern, Switzerland

## APRIL 2027



**4/6–9/2027**  
**STOM-TOOL**  
Kielce, Poland



**4/13–16/2027**  
**CIMT**  
Beijing, China

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YOU CAN FIND THE LATEST TRADE SHOW DATES ON OUR WEBSITE.

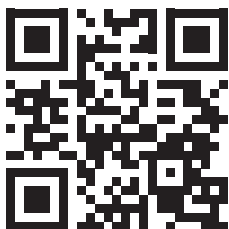


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