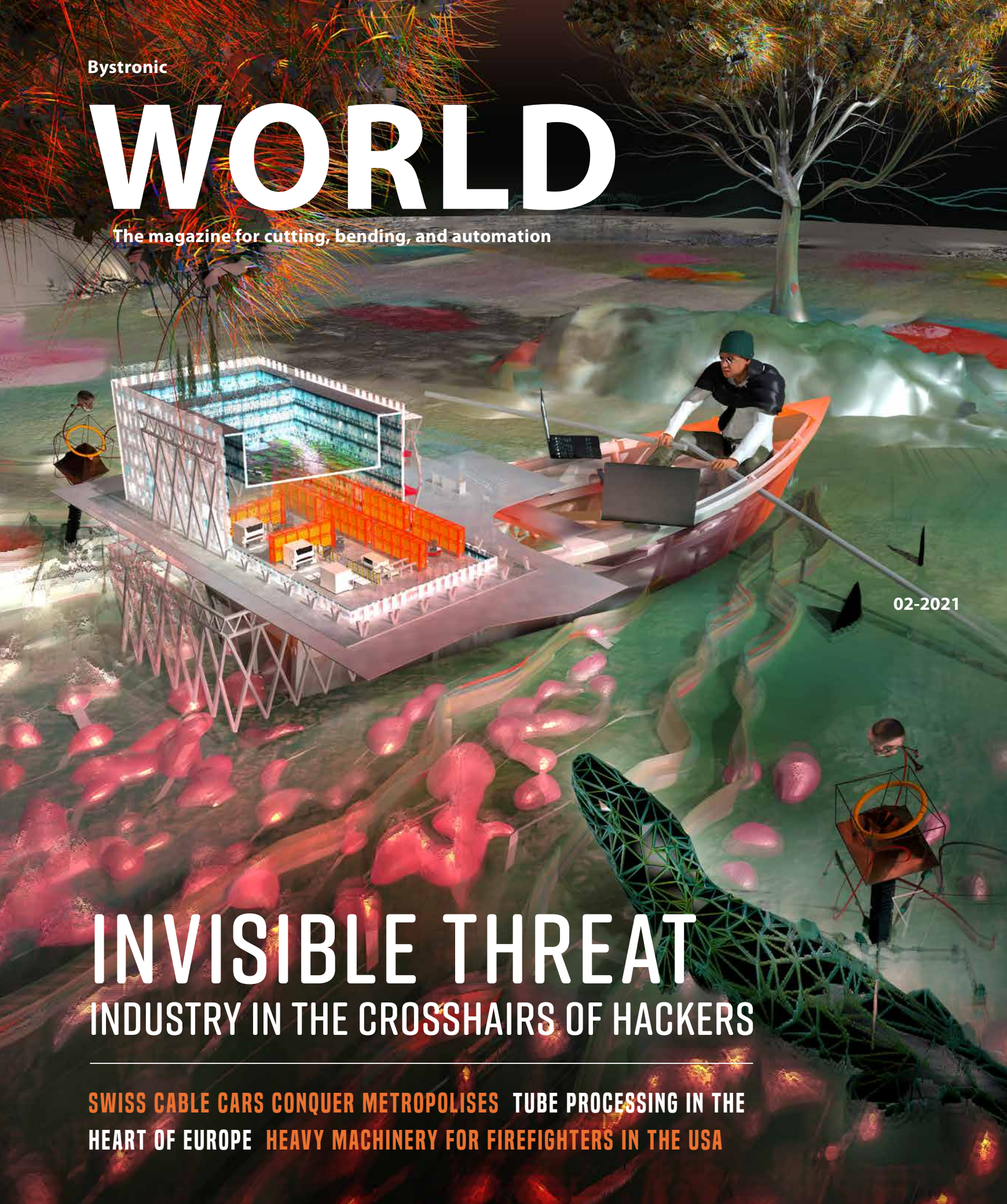

Bystronic

WORLD

The magazine for cutting, bending, and automation

02-2021

INVISIBLE THREAT

INDUSTRY IN THE CROSSHAIRS OF HACKERS

SWISS CABLE CARS CONQUER METROPOLISES TUBE PROCESSING IN THE HEART OF EUROPE HEAVY MACHINERY FOR FIREFIGHTERS IN THE USA

CONTENTS

Dear reader,

Ransomware is making the headlines. It is a real threat to companies in all sectors. Industry is also increasingly coming into the crosshairs of hacker gangs. For Bystronic, the topic of cybersecurity is thus of utmost relevance. We are aware: Networking production processes creates new potential for intrusions. This is why, with regard to the smart factory, data security is also our top priority.

Climate change is an equally hot topic. We are continuously reducing our carbon footprint and helping our customers to achieve their sustainability goals. Many of them are directly involved in making our future a cleaner one. The Swiss company CWA, for example, is rethinking a centuries-old, environmentally friendly means of transport: the cable car. In the Bolivian capital La Paz, the world's longest ropeway network enables the local population to move about freely in spite of congested roads.

Opening up new perspectives – this is a goal we also share. Tube processing is opening up a promising new field for our customers. Initial experience confirms: Expanding the manufacturing spectrum pays off. The German company Leisinger has proven how this strategy can be applied to successfully tap into new customer segments.

Wishing you an enjoyable read,

Alex Waser, CEO

Bystronic

IMPRINT

Bystronic World – The magazine for cutting, bending, and automation

Editor-in-Chief, Art Director: Stefan Jermann
Editors: sda/awp-multimedia, Zurich, Switzerland
Design and printing: Köpflipartners AG, Neuenhof, Switzerland

Circulation: 14,000 (German and English)
Paper: PlanoJet FSC, 200 g/m² and 100 g/m²

Cover: Illustration by Justin Wood
Backcover: Photography by Stefan Jermann

Published by Bystronic, Corporate Communications, Industriestrasse 21, 3362 Niederönz, Switzerland | For reprinting rights and all other queries, please contact Corporate Communications: corcom@bystronic.com. Reprinting without prior agreement is not permitted.
Overall responsiblity: Michael Präger

Bystronic

NEWS

New smart factory software

Bystronic launches the first fully integrated smart factory software. BySoft CAM optimizes production from A to Z: from the design and calculation of parts, to the creation of cutting plans and bending programs, all the way through to production planning and monitoring. In addition, BySoft CAM features performance-enhancing functions for advanced parts sorting management. The new software consists of three modules: Cutting, Bending, and Tube Processing. These can be integrated individually or as a comprehensive package.

Virtual RoboCup

At the Robotics World Championships at the end of June, the world's top robotics teams competed from afar for the first time. The Swiss team, which Bystronic has been supporting for several years, won the bronze medal in the "Logistics League". The team is comprised of students from the Department of Systems Engineering and Mechanical Engineering at the Higher College of Technology (hftm) in Biel, Switzerland.
www.hftm.ch/de/robocup

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FABTECH in Chicago

From September 13 to 16, the Fabtech trade fair will take place in Chicago. Our Bystronic experts from the United States will be there to present the latest technologies at our booth. This year, the largest exhibition for the sheet metal processing industry in North America will again be held physically. We are looking forward to a successful show.
www.fabtechexpo.com

Cutting beyond the limits

With new Advanced Applications, laser cutting systems can now be operated at the limits of what is possible. To achieve this, the cutting head requires enhanced cutting cooling and special cutting parameters. This enables our customers to implement applications that their competitors can only dream about, such as cutting mild steel, chromium steel, and aluminum with sheet thicknesses of up to 50 millimeters. By comparison, a conventional system is able to cut up to 30 millimeters. Our customers can now access these Advanced Applications within the framework of a feasibility study.

Have we sparked your interest? Then simply contact your local Bystronic representative.

Successful début on the stock exchange

Bystronic has been listed on the SIX Swiss Exchange since May 3. Our ticker symbol: BYS. Based on our growth strategy, we aim to consolidate our leading position in high-tech solutions for the sheet metal processing industry by 2025: New smart factory software solutions meet the increasing demand for automation, and digital process solutions support our customers with the networking of their manufacturing processes. As of 2021, we will start publishing our own business reports.

You can find all documents relevant to the stock market under the following link: www.ir.bystronic.com

Trend

NEWS

A drone that actively supports search and rescue operations

Image: ÖAMT/JKU

Drones are more than just tools. Thanks to artificial intelligence, they actively participate in the search for missing persons. Researchers from the University of Linz have developed a system that not only utilizes thermal imaging to locate people even in dense vegetation. The drone is now also able to perform calculations in real time and thus continuously optimizes its flight path.

Hugs on demand

Image: Block et al.

At the latest since the COVID-19 pandemic, we have all come to appreciate just how important hugs are. But what if no one is around to give us a hug? A doctoral student at the Swiss Federal Institute of Technology (ETH) has come up with the solution: the HuggieBot. The robot with its soft, warm hugs is designed to ease loneliness. It is equipped with numerous sensors that adapt the length and intensity of the embrace to how the person being hugged reacts.

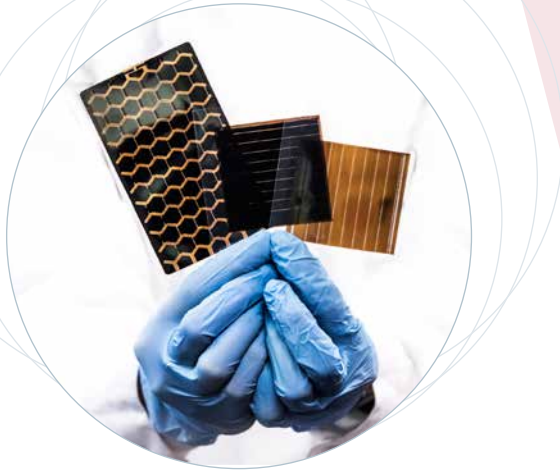


Image: Saule Technologies

Solar cells from the printer

Ultra-thin, flexible, and suitable for virtually any space: Saule Technologies from Poland is the first company in the world to use printers to produce solar cells on an industrial scale. Their process involves printing the mineral perovskite onto flexible carrier films. These can be applied to almost any surface and, according to Saule Technologies, even work inside buildings.

The breathable sensor

Image: Felice Frankel

MIT engineers have developed a sensor patch that reliably monitors the health of its wearer, for example in the case of skin cancer. The secret of this ultra-thin, "electronic skin" is that the sensors also work when the wearer perspires: This is possible because the engineers equipped the patch with artificial perspiration pores that conduct moisture to the outside. The source of inspiration for this was the Japanese silhouette technique Kirigami.

Smartwatch activates insulin production

Many smartwatches emit green light pulses to measure their wearer's pulse rate. ETH researchers have now found a new application for this light: They developed a molecular switch that can be controlled using green light. Coupled with a gene network and integrated into human cells, the light from smartwatches could in the future be used to control the release of insulin at the touch of a button.

Image: Keystone

Cable cars are conquering the cities

In the city of the future, we will take a ropeway to work – as routinely as we do buses and streetcars. In South America, this is already a reality. The cabins for these cable cars are built by the Swiss company CWA in Olten.

Text: Andrea Schmits Photos: Stefan Jermann, CWA

The ropeway network in La Paz spans 33 kilometers, making it the longest in the world.

The streets of La Paz are chronically congested. The only open paths are those high above the rooftops. To escape the chaotic traffic, hundreds of thousands of people use ropeways every day – on their way to work, school, or to the shops. The cable cars reduce commuting times and provide a reliable means of travel.

The urban ropeway network in the Bolivian capital spans 33 kilometers. It comprises ten lines and a total of 36 stations. This makes Mi Teleférico the longest cable car network in the world. It is impossible to imagine everyday life in La Paz and the neighboring town of El Alto without this unusual means of transport. The final section of the network was completed in 2019.

The transition of public transport from the ground to the air has fundamentally transformed mobility in the city. Previously, if you wanted to get from one district to another, you had to squeeze into one of the countless minibuses. But the roads of La Paz and El Alto are narrow, traffic is slow, and the buses are full and notoriously late. Hygiene and safety also leave much to be desired. The city has insufficient space for streetcar tracks, and a subway system is practically impossible to implement due to the many steep inclines.

Climate-friendly and silent

The 1413 cabins that are in service in La Paz come from Switzerland. They were built by CWA in the small town of Olten. "Urban ropeways are the future," says Gian Marinelli, Product Management Team Leader at CWA. For him, aerial transport offers numerous advantages for urban populations: Ropeways are quiet, space-saving, and can traverse any incline. In addition, they are climate-friendly and virtually carbon neutral. This is underpinned by a 2020 study conducted by the University of Applied Sciences Düsseldorf in collaboration with sustainability experts from Vienna: In comparison to both large and small buses as well as to streetcars, the ropeway the study examined had by far the best environmental footprint. And waiting times are a thing of the past. Thanks to the circulating operation, one cabin after another is available for passengers.

Closing the gap to downtown

South America is the global hotspot for urban ropeways. There, the image of the cable car is changing from a means of transport for tourists to an everyday commuting service. The Swiss manufacturer, which is a subsidiary of the market leader Doppelmayr/Garaventa, recently also supplied cabins to Mexico City. An almost ten-kilometer ropeway network has been alleviating road traffic there since the summer of 2021. The network enables the residents of densely populated working-class suburbs to reach the city center significantly faster and more reliably. "This opens up new opportunities for them," Gian Marinelli emphasizes. For example, a job in a neighborhood that would previously have been too far away suddenly comes into reach. The cable car thus also helps break down social inequalities.

"Urban ropeways are the future."

Gian Marinelli, Product Management Team Leader

From Olten all around the globe

The Swiss company has already implemented around 70 urban ropeways in 38 countries. In Singapore, a CWA cable car has been connecting the city with a nearby amusement island since the 1970s. In London, the company's cabins take passengers across the River Thames, and in the German city Koblenz, over the Rhine River. Municipal funiculars in Hong Kong, Lugano, or the Polybahn in Zurich also have their origins in the factory in Olten.

In the Alpine countries, where cable cars are mainly used for tourism, urban cable car projects often have a hard time: "In general, people here tend to have more difficulties with the idea of a cable car cabin floating over their terrace," Gian Marinelli says. For example, a project to improve access to the Zurich Zoo and ease congestion on the roads has been on hold for years due to objections from local residents.

In the mountain regions, on the other hand, it is hard to imagine life without ropeways. Every high-profile holiday resort offers a unique cable car experience: revolving cabins, panoramic windows, open-air terraces or – as in Finland – a sauna cabin. A tour of CWA's vast factory shows: There are no limits to imagination.

OMEGA, the sales hit

CWA produces some 2000 cabins a year. However, more than three quarters of these are not custom-built but are series-produced models. The OMEGA cabin is the company's best-seller: Since 1984, more than 50,000 cabins have been shipped from Olten all around the globe. They can be configured based on the modular principle: size, glazing, seats, and many other details can be flexibly combined. Today, the OMEGA is already in its fifth product generation. "The demands regarding spaciousness and comfort have increased over the years," says Gian Marinelli.

An orange OMEGA is currently being assembled in Hall 5. The glass-floor cabin is designated for a Chinese tourist destination. A production technician is using a BySprint Fiber 3015 to cut a sheet for an outer panel. A few meters away, a press brake is bending fastening lugs for the interior. "We primarily process aluminum," Gian Marinelli explains: "It is easy to machine and is also ideal in terms of weight, strength, corrosion resistance, and price. And what is more, it's recyclable."

Industrial manufacturing methods

As OMEGA evolved, the manufacturing process was also redesigned. A robotics system now helps to manufacture the series-produced cabins even more efficiently. "Pre-assembled components are put together by a robot, and the glass panels are also assembled automatically," Gian Marinelli explains. The latter in particular makes life easier: Because customers and passengers increasingly demand better views, the ever-larger windows could no longer be fitted by just one person.

CWA's solution that has been in operation in Zermatt since the end of 2020, is also fully autonomous. The AURO (Autonomous Ropeway Operation) ropeway from Doppelmayr/Garaventa runs completely autonomously – requiring just a single employee to supervise it. Cameras and sensors monitor the system and detect any anomalous situations. If, for example, a passenger's ski boot gets caught in the cabin door, the system immediately responds and automatically shuts down the ropeway. ▶

Many processes are manual: CWA manufactures eight OMEGA cabins a day.

Mode of transport of the future

"CWA has always championed innovation, from the first automatic door to the revolving cabin," Gian Marinelli says. However, the future lies less in sensational designs and more in solutions that are suitable for everyday use in the metropolises around the world. Because sometimes the solution is closer than you think: "Ropeways have stood the test of time for decades in all weather and topographical conditions," Gian Marinelli emphasizes. Having conquered the mountains over the past century, they are now set to make their mark on cities. ■

CWA'S FLAGSHIP PROJECTS

- **Engelberg, Switzerland (1992):** The world's first revolving cable car cabin glides up the Titlis mountain. The cabins were replaced in 2014.
- **Ha Long Bay, Vietnam (2016):** The Ha Long Queen Cable Car breaks two world records in one go. The two giant aerial tramway cabins can each carry 230 passengers. In addition, the 189-meter-high ropeway support pillar is the tallest in the world.
- **Morschach, Switzerland (2017):** 744 meters in elevation with a gradient of up to 110 percent – the Stoosbahn is steeper than any other cable car.
- **La Paz, Bolivia (2019):** After five years of construction, the world's largest urban ropeway network connects the cities of La Paz and El Alto.
- **Zermatt, Switzerland (2020):** The first autonomous cable car is put into service on the mountain. But in the future, it will also be deployed in cities.

1 *The customers want ever better views – and the windows are growing ever larger.*

2 *The floor panels of the cabins are cut using a BySprint Fiber 3015.*

3 *Like most of the parts, the fastening lugs for the interior are made of aluminum.*

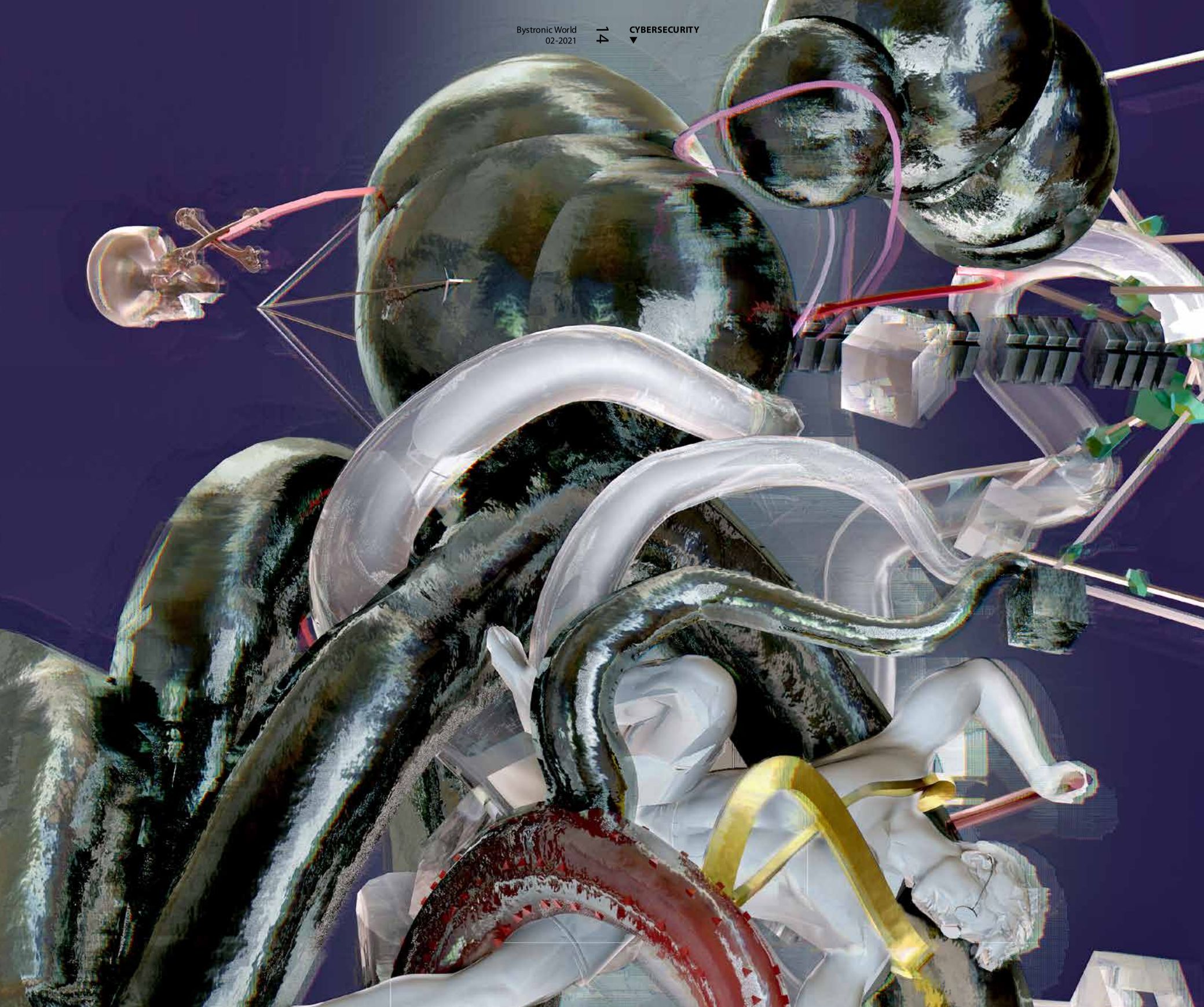
4 *The first model of CWA's best-selling OMEGA cabin was launched in 1984 and seated six passengers.*

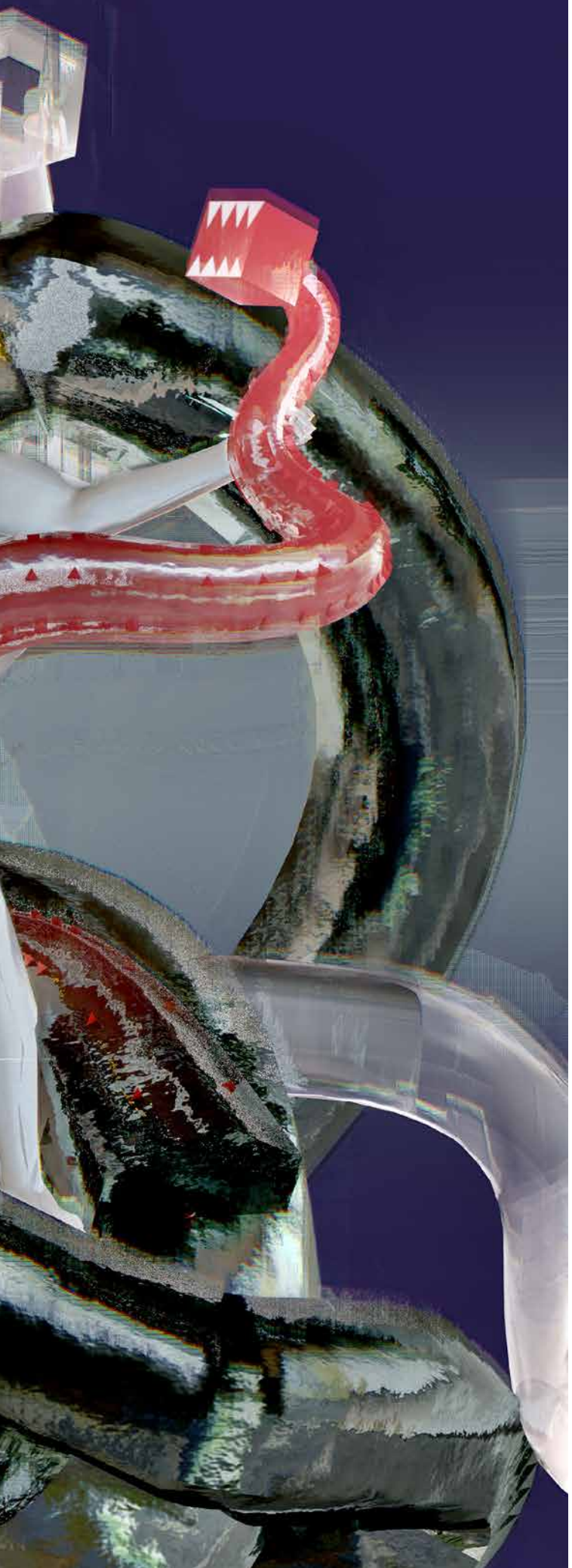
No traffic jams, no delays: 1413 cable car cabins are suspended above the streets of La Paz and El Alto.

PROFILE

CWA, member of the Doppelmayr Group

Founded:	1939
Bystronic customer since:	1999
Business model:	Development and production of ropeway cabins and funiculars including on-site maintenance services
Production location:	Olten, Switzerland
Number of employees:	approx. 170





In the crosshairs of hackers

Cyber-attacks are on the rise all around the globe. Hackers focus particularly on companies that network their machines, devices, and business processes. This is why investing in cybersecurity pays off.

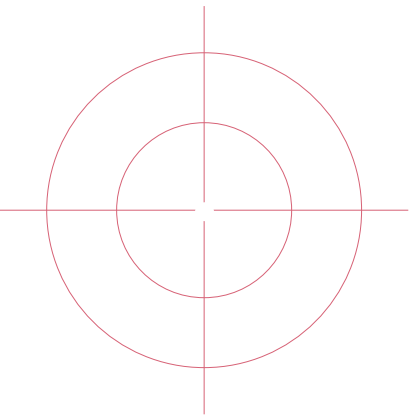
Text: Laurina Waltersperger, Stefan Jermann
Illustrations: Justin Wood

It was the largest ransom hackers ever demanded after launching an attack on a company: 50 million US dollars. In July 2020, the hacker gang REvil attacked the US software manufacturer Kaseya. The ransom demand was made after the hackers crippled Kaseya's systems – thus shutting down thousands of other companies that relied on their software.

Digitalization entails risks

Hackers have emerged as the mafia of the digital age. They disable systems, steal sensitive data, and extort money. They have long since ceased to operate as individuals in back rooms, and are now professionally organized gangs equipped with cutting-edge technology. Their targets include international corporations, but also medium-sized and small companies.

Nowadays, any business can become a target of hackers. This is especially true for companies that are driving forward the end-to-end digitalization of their operations. In such companies, devices, machines, and computers increasingly communicate with each other autonomously. In addition to the many benefits of digitalization, this also heightens the risk of cyber-attacks. Because even a single device that is connected to a network via the Internet can cause major damage.



This is illustrated by an example from Las Vegas: Cybercriminals hacked the supposedly well-secured financial department of a casino. It turned out that fish were to blame – or rather, the Internet connection of their aquarium. It was equipped with an application that controlled the feeding of the fish and monitored the water quality via the Internet. This system had a security vulnerability that allowed the hackers to gain access to the casino's data network.

The aquarium is not an isolated case. According to researchers from the US-based security company Forescout, millions of web-based devices around the globe – known as Internet of Things (IoT) applications – have security vulnerabilities. Under the moniker "Amnesia: 33", they identified the 33 most widespread vulnerabilities in 2020. Their conclusion: Roughly half of all investigated cases involved IoT devices such as cameras, sensors, smart light switches, barcode scanners, printers, or audio systems.

Industrial companies in particular are increasingly relying on IoT devices. In the age of Industry 4.0, the Internet of Things is networking ever more shop floor processes with IT systems.

Hackers have emerged as the mafia of the digital age.

Digital technologies have penetrated the heart of industrial companies. They are found in the controls of machines and plants, in monitoring systems, and in building technology. This means: The systems, sensors, and software of all devices and machines communicate via common networks. This creates many new interfaces that present an avenue of attack for cybercriminals.

IoT devices are prime hacking targets

What makes IoT devices so vulnerable is that they are online around the clock, often poorly maintained, and rarely monitored. A study by the US software company Symantec illustrates what precisely this means: It concludes that today, two-thirds of all Internet-enabled devices are still set up with default user names such as "admin" and passwords such as "12345". In addition, people often forget to install updates for devices such as printers.

Such vulnerabilities play into the hands of hackers. For industrial companies, which are increasingly using IoT devices to digitalize their operations, these security gaps can have serious consequences:

- **Production standstills:** If cybercriminals gain access to a networked manufacturing system, they can install malware and bring production to a standstill. Until the infected device has been identified, services are unavailable, resulting in downtime.
- **Intellectual property theft:** Hackers steal patents and intellectual property. If they sell this data on the darknet, for example, the company can suffer substantial financial damages.
- **Publicizing sensitive data:** Cybercriminals are constantly on the lookout for sensitive data that they can threaten to make public. In particular companies with sensitive personnel data bear a high risk of suffering economic and reputational damage with possible legal ramifications.

GLOSSARY

Malware
Malware stands for "malicious software" and refers to computer programs that are capable of causing damage. By installing malware – which frequently goes unnoticed – attackers gain access to systems and data.

Phishing
The practice of using deceptive websites, emails, or text messages to gain access to a user's personal data is known as phishing. The term is derived from "password" and "fishing", i.e. "fishing for passwords".

Ransomware
Ransomware is a form of malware that intruders use to block access to data and computer systems. Usually the purpose is to extort a ransom from the owner of the system.

Social engineering
Social engineering is used to trick victims into disclosing data, bypassing protective measures, or installing malware themselves. The attackers manipulate their victims by exploiting human weaknesses such as curiosity or fear.

The examples demonstrate: Companies are very vulnerable. This is why cybersecurity is increasingly becoming vital for companies. But while it is clear to those responsible for security of a company that there is a need to protect the premises against physical intruders, many businesses often lack effective digital security defenses.

Intrusion followed by extortion

Failing to erect digital defenses makes it is easy for hackers to extort money. They usually proceed as follows:

Step 1: Intrusion
First, cyber criminals pick their target. Once selected, they try to penetrate the company's network. The most common method is to send employees phishing emails. A study conducted by the international cybersecurity company Proofpoint reveals: Two-thirds of the companies surveyed in Germany, France, the United Kingdom, Australia, Japan, and the United States were targeted by phishing attacks in 2020.

Phishing emails usually contain a link or a file. If the employee clicks on it, malware is downloaded and installed onto the computer in the background – allowing the attackers to gain access to the company's network. There, they search for data that could be used to blackmail the company. They are particularly interested in sensitive customer data, intellectual property, or other confidential documents.

Step 2: Extortion
Frequently, the attackers extract sensitive data from the company network, encrypt it, and then demand a ransom. If the company pays, the extortionists provide an application that allows the company to decrypt the data. As the Swiss National Cybersecurity Center noted in its latest report, the methods of the extortionists are growing increasingly brazen: Many of them use encryption trojans, also referred to as ransomware. To increase the pressure on their victims, the cybercriminals also resort to phone calls. For example, they reportedly call the targeted companies and threaten to inform journalists of security vulnerabilities within the company network or to publish sensitive data on data leak sites.

Apparently, these methods have an effect on the victims: According to Proofpoint's international study, more than half of the companies blackmailed in 2020 paid the ransom in order to regain access to their systems and data.

THE MOST COMMON CYBER-TRAPS FOR COMPANIES

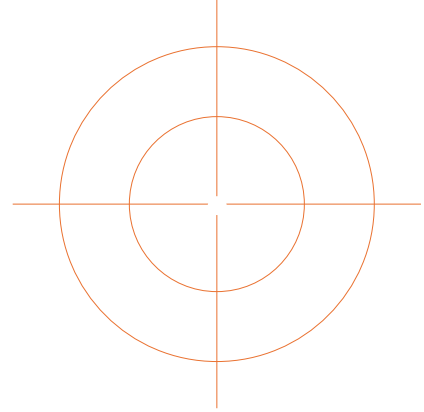
- Malware can infect control components of machines or other devices within the corporate network
- Malware can infiltrate the corporate network via external data carriers or external software
- Social engineering: Hackers use phishing emails to target the company's employees in order to install malware via a link or a file
- Human factors: Employees can attempt to sabotage the company's operations
- External infiltration: Hackers can gain access to the corporate network via Internet-based maintenance gateways operated by external service providers

Simple protective measures

There are some basic measures to protect against cyber-attacks that medium-sized and even small companies can implement without requiring a great deal of time and money:

- **Raise awareness:** Training employees to recognize phishing emails as what they are and not to open them is important. In order to ensure that corporate data is handled as securely as possible, it is essential to raise awareness across all areas of a company.
- **Adhere to security standards:** Although this may sound obvious, it is not always the case, even in large companies. Many employees keep using the same password for years. This makes it easier for devices to be hacked.
- **Conduct a risk analysis:** An analysis reveals digital security flaws. Particularly companies whose IT network has grown organically can benefit from such an analysis – given that cybersecurity is frequently not addressed from the outset of the growth process. This provides a basis for the company to establish a security concept (see box "Security in the smart factory").

Effective digital security defenses are imperative for any business.



- **Cybersecurity is a matter for the top management:** To ensure that a company can implement security measures across all business processes, there must be a strong commitment from the top management. They should make cybersecurity an integral part of the corporate culture.

SECURITY IN THE SMART FACTORY

Companies that intend to intelligently and securely network their machines, employees, and applications should factor in cybersecurity from the outset. Experts refer to this as "security by design" – an approach that aims to avoid as many security gaps as possible.

The following security measures are advisable for industrial companies:

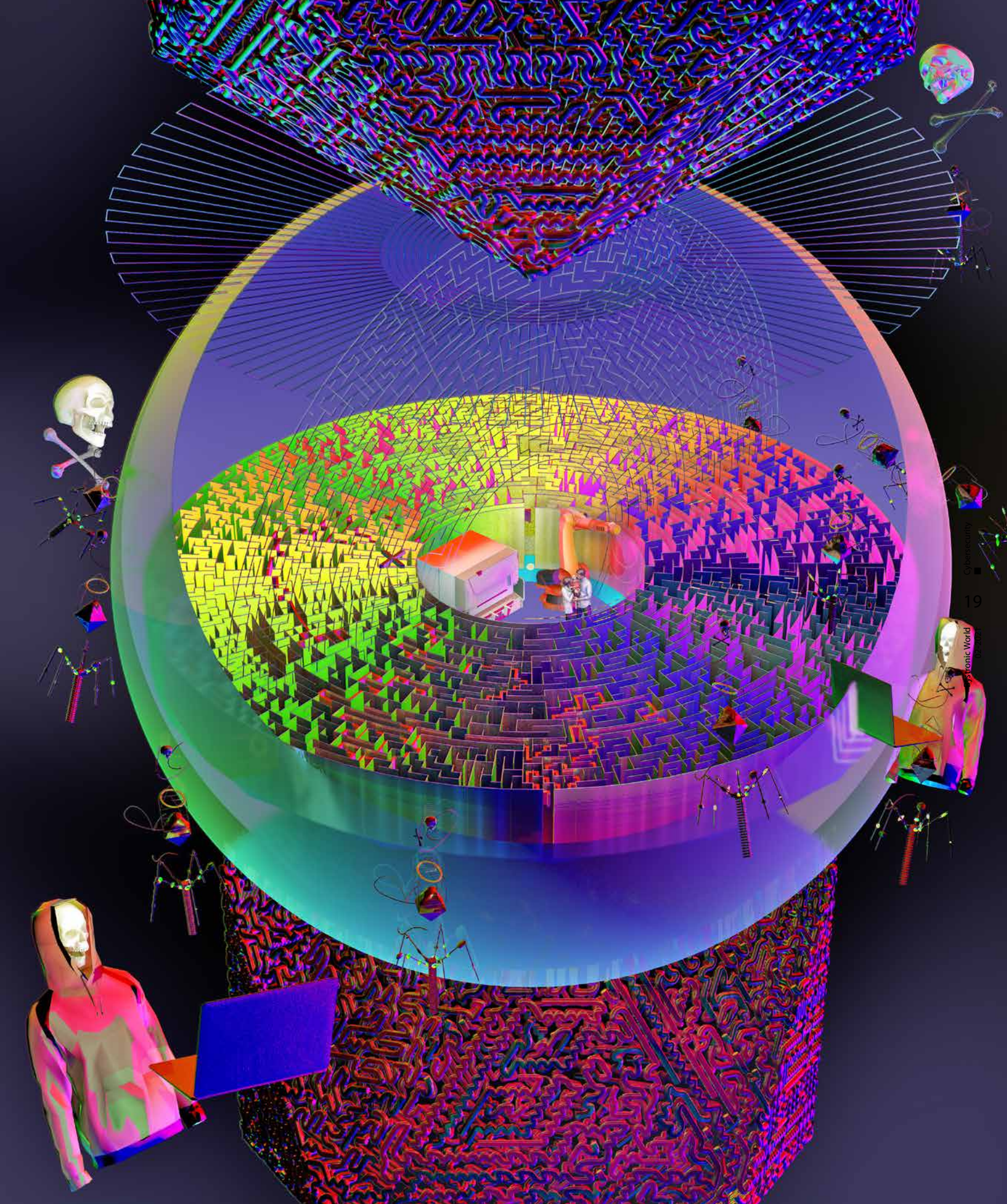
- **Centralized management tool:** The centralized control of all machines and systems offers companies an overview of all their applications at all times. This makes it possible to determine at a glance when and from where any part of a network is being accessed. In addition, this allows a business to manage and monitor all IoT devices via a single application.
- **Division of access:** Each employee, machine, and system should have individual user accounts and access rights. This means that each network user has access only to the data that is relevant to their area of responsibility. This helps minimize potential damage in the event of cyber-attacks.
- **Data monitoring:** A centralized management tool allows companies to collect, visualize, and analyze all their data. This helps expose suspicious incidents. Security-related events that can be identified include incorrect password entries, resource overloads, unauthorized access, or the modification of configuration files.

Effective digital security defenses are imperative for any business – as is demonstrated by the worrying trend in cyber-attacks. Faced with the new reality of cybercrime, the primary concern for businesses should be to establish a digital security concept that reliably addresses the risks from the web. In particular, this includes ensuring that all employees are aware of the dangers and exercise appropriate caution.

Working together for security

Nevertheless: There is no such thing as one hundred percent security against attacks. Companies must also be fully aware of this. Rather, it is a matter of establishing the necessary defenses in parallel with the technological upgrades they implement to digitalize their operations.

Within the context of Industry 4.0 companies will succeed in this if, in addition to the internal cultural transformation towards a security-centered mindset, cybersecurity also becomes a focus of their external decision-making. In other words: On the one hand, companies should already consider cybersecurity in their choice of partners. On the other, IoT manufacturers have to integrate cybersecurity into the development of their solutions. Smart networking will only be a success if in addition to performance, the security of the digital infrastructure can also be guaranteed. ■

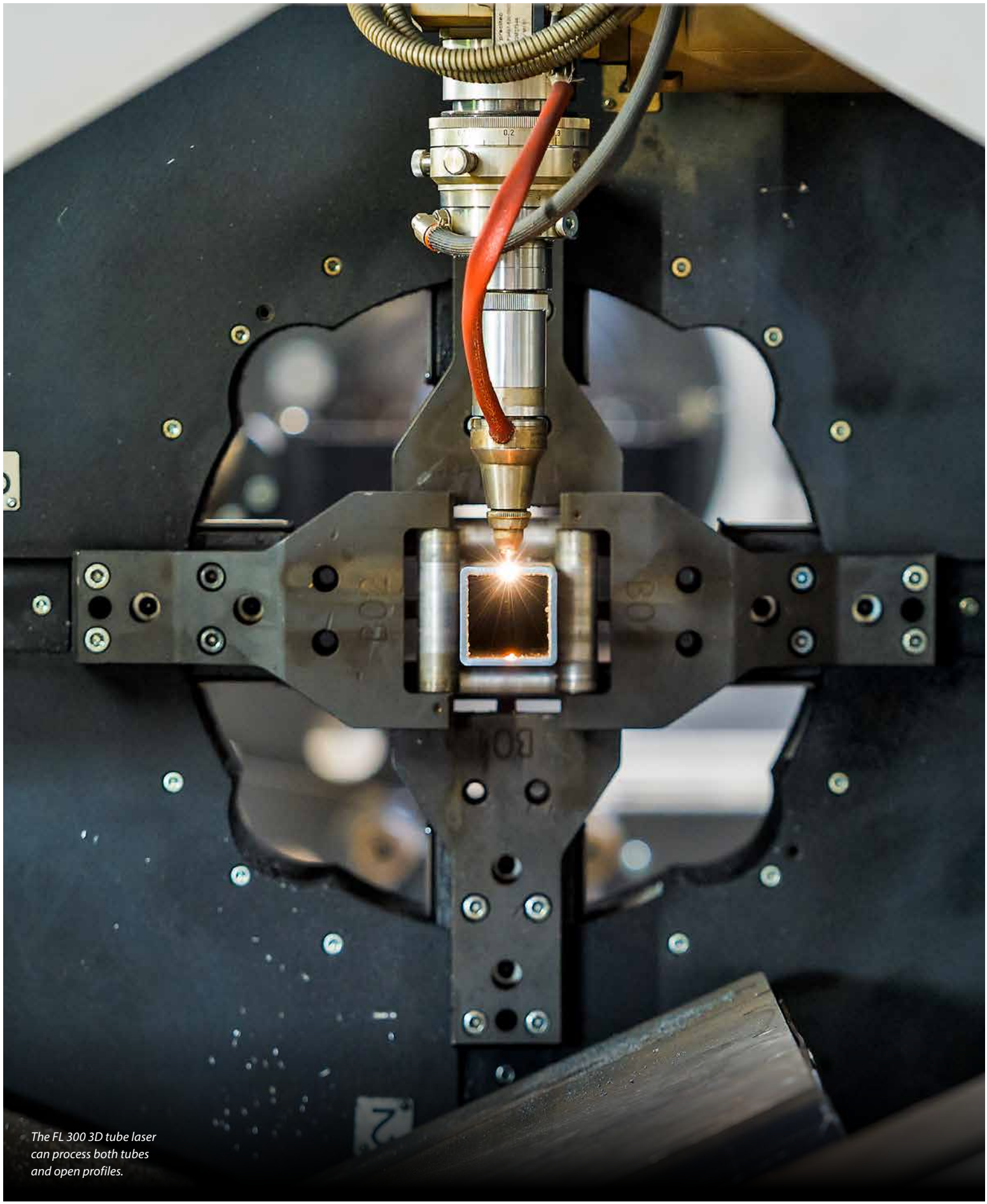


Everything in flow

From a small family enterprise to a modern industrial company: At Leisinger, the digital era has long since dawned. The company, based in the German Black Forest region, is driving forward modernization with the help of a 3D tube laser. The impressive machine helps them retain existing customers while simultaneously opening up new markets.

Text: Dorothea Dörner Photos: Daniel Schoenen

In the heart of Europe: The Rhine is only a stone's throw from Leisinger's headquarters. Across the river lies France.



The FL 300 3D tube laser can process both tubes and open profiles.

The nearby mountain peaks are still glistening with a sprinkling of snow. Just a few kilometers away in the production hall of Leisinger Deutschland GmbH, sparks fly as soon as the laser beam touches the steel. The company is headquartered in Neuenburg am Rhein, a small town at the foot of the Black Forest, southwestern Germany's most popular tourist region.

The company's owner and Managing Director Alexander Eyhorn is standing next to a gigantic machine. The FL 300 3D tube laser cutting system towers in the middle of an 1800-square-meter factory hall. It whirs and clicks and clatters. "Adam, is everything running smoothly?" Alexander Eyhorn calls out to the operator. Adam Draeger gives a thumbs-up: "All good!" The 50 or so employees and their boss are all on a first-name basis. "It simply worked out this way, even though it's somewhat unusual in our industry," Alexander Eyhorn explains. "I also know many of my colleagues personally, so calling everyone by their first name makes things much less confusing."

From firefighting ladders to roller coasters

Piles of square tubes speckle the shop floor, because a customer – an international manufacturer of fire trucks headquartered in Karlsruhe, Germany – stores the material for its ladders here. It is delivery day, so there is a lot of hustle and bustle. A truck is ready for loading, cranes are moving thick bundles of tubes back and forth along the ceiling. "These ladders certainly need a lot of tubes, because they can be extended like a telescope," Alexander Eyhorn explains. Currently, the laser is mainly used to cut square tubes, but it is extremely versatile: In addition to tubes, the machine can also process open profiles such as steel beams.

"Depending on the number of parts to be processed, the tubes can be transferred to the laser's working axis either from the bundle loader or the chain loader," explains Axel Berg, Sales Manager for Tube Laser Systems at Bystronic Germany. Then a chuck grips the end of the tube and positions it under the cutting head. During laser processing, rollers and two additional chucks provide stability. "Thanks to the third chuck, tubes with an unloading length in excess of eight meters can be processed without causing any problems with flexing," Axel Berg explains. The machine unloads the processed parts automatically and reliably.

Leisinger has been operating the approximately 360-square-meter tube laser processing system since the fall of 2019. "Our main customer approached us and asked us to invest in this machine. They could not purchase it themselves because they would not have been able to operate it at sufficient capacity," Alexander Eyhorn says. "By purchasing the machine, we were able to earn the customer's long-term loyalty." The Managing Director is confident that the 4-kilowatt CO_2 laser system will also bring in many new orders. "We can now attract companies that never even thought of laser processing their products before." Alexander Eyhorn points to the food industry and roller coaster construction as examples.

Success in spite of a rocky start

In 2008, at the age of 32, Alexander Eyhorn took over the company, which at that time had ten employees, from the Leisinger family. He had previously worked as a development engineer for Daimler in the United States. He was eager to build up something of his own in his home country. At that time, he had no previous experience with mechanical engineering.

"It was a rocky start," he recalls. Not long after Alexander Eyhorn signed the purchase agreement, the 2009 financial crisis kicked in – and with it one of the most severe economic downturns for the mechanical engineering industry. "We had to watch out that we didn't simply get swept away." On top of this, there were also smaller challenges: "When I worked for Daimler, if I wanted to book a flight, all I had to do was call the in-house travel agency. Now I had to do everything myself. It took a while to get used to this," he admits. But he has never regretted his decision.

Over the years, his company has transformed from a small-scale subcontractor for custom vehicle manufacturing into a modern industrial enterprise. Alexander Eyhorn introduced robot welding systems, 3D designing, and SAP. He upgraded Leisinger's CNC machine shop and purchased an optical shaft measuring machine. Now, production data is recorded centrally. The company also had to keep pace with digitalization in order to enhance its planning capabilities: "Our customers want to know what our capacity planning for any given machine looks like," the Managing Director says. ▶

"Thanks to the tube laser system, we can now also attract companies who never even thought of laser processing their products."

Alexander Eyhorn, Managing Director and company owner

1 *Managing Director Alexander Eyhorn (r.) and his brother Daniel, the Technical Director.*

2 *Digital processes: The tube laser blends in seamlessly with the state-of-the-art manufacturing environment.*

1

2

3

1 *The countless square tubes will ultimately become firefighting ladders.*

2 *The bundle loading system separates the individual tubes and transfers them to the tube laser.*

3 *Getting ready for shipping to the customer: a fire truck manufacturer.*

Lunch breaks with the family

Leisinger is located in the heart of Europe. The highway runs just beyond the company's headquarters, and the River Rhine with its many freight ships is also close by. "We live and work where others spend their holiday – and the infrastructure here meets all our needs," Alexander Eyhorn says. Meanwhile, in the factory, the tubes and profiles that are ready for shipping are being loaded onto the truck. "We are operating at a very high level of capacity utilization," the Managing Director says with visible satisfaction. The key factor here is the technology. It always has to function flawlessly. Alexander Ehyhorn's brother Daniel, who also used to work as an engineer in the United States, has been in charge of this since 2017.

It is not just the warmth and friendliness of the locals that lured Alexander Eyhorn back home. He also appreciates the proximity to France, Switzerland, and the Black Forest. "Just like me, people here are very attached to their roots," the 45-year-old explains. He lives just two kilometers from the company headquarters. At midday, he always drives home to spend the lunch break with his family. His wife Beatrice is in charge of the marketing and human resources department – a key function given the company's current growth phase. At its core, Leisinger has remained a family business. The Managing Director sees the family-based working environment as a key success factor.

Sights set on own products

"The right people are what is most important to us, particularly with equipment as complex as this tube laser," Alexander Eyhorn emphasizes. Adam Draeger has been working for Leisinger for five years. And with a great deal of pleasure, as he tells us. He is responsible for the tube laser processing system – a new dimension for him even though he originally trained as a toolmaker: "I have never worked with such a large machine before," says the industrial mechanic, glancing at the screen to check the machine status. The versatile system can cut tubes up to a length of twelve meters and also create holes or incisions. In addition to straight cutting edges, it is also capable of cutting bevels of up to 45 degrees. This means that it can be used to create cuts in preparation for V- or Y-welds.

Processing square tubes for firefighting ladders is not the only reason Leisinger purchased the machine. Soon, the company also wants to start manufacturing its own products. We are currently in the prototype phase. "In this process, we are cooperating very closely with Bystronic's technicians," Alexander Eyhorn explains. The company's latest investment is positioned just a few meters from the tube laser. A press brake, also from Bystronic. Here, too, tests are being carried out to determine which applications are suitable for the manufacturing of in-house products.

Leisinger has built up five main lines of business: electromobility, vehicle construction, elevator drives, the automotive industry, and laser technology. Their production operations are located exclusively in the industrial park of Neuenburg am Rhein. "As far as possible, we want to keep everything in one spot, and only grow to a scale that is manageable for us," Alexander Eyhorn explains. They will continue to rely on the efficiency and flexibility of the tube laser to help drive forward their healthy growth. ■

PROFILE **Leisinger Deutschland GmbH**

Fields of business:	Vehicle construction, contract manufacturing (drive technology for elevators, steering columns, rescue platforms, roller coaster construction)
Founded:	2008, after the takeover of the previous Leisinger company
Employees:	approx. 50
Revenue (2020):	6.5 million euro
Headquarters:	Neuenburg am Rhein, Germany
Customer since:	2019

Pioneering its industry: FWD Seagrave from Clintonville, Wisconsin, can look back on a rich history.

Rescuers on wheels

FWD Seagrave is the oldest manufacturer of fire trucks in the United States. Today, after a 140-year corporate history, an ever increasing array of electronics integrated into modern fire trucks is creating unique challenges in Seagrave's manufacturing process. But one component has remained untouched throughout all this time: pride in one's own work.

Text: Christian Fahrenbach Photos: Mark Hertzberg

Clintonville used to be the stronghold of US fire truck manufacturers – FWD Seagrave is one of the remaining few.

The "FWD" in the company name originates from the Four Wheel Drive Automobile Company, which merged with Seagrave in 1963.

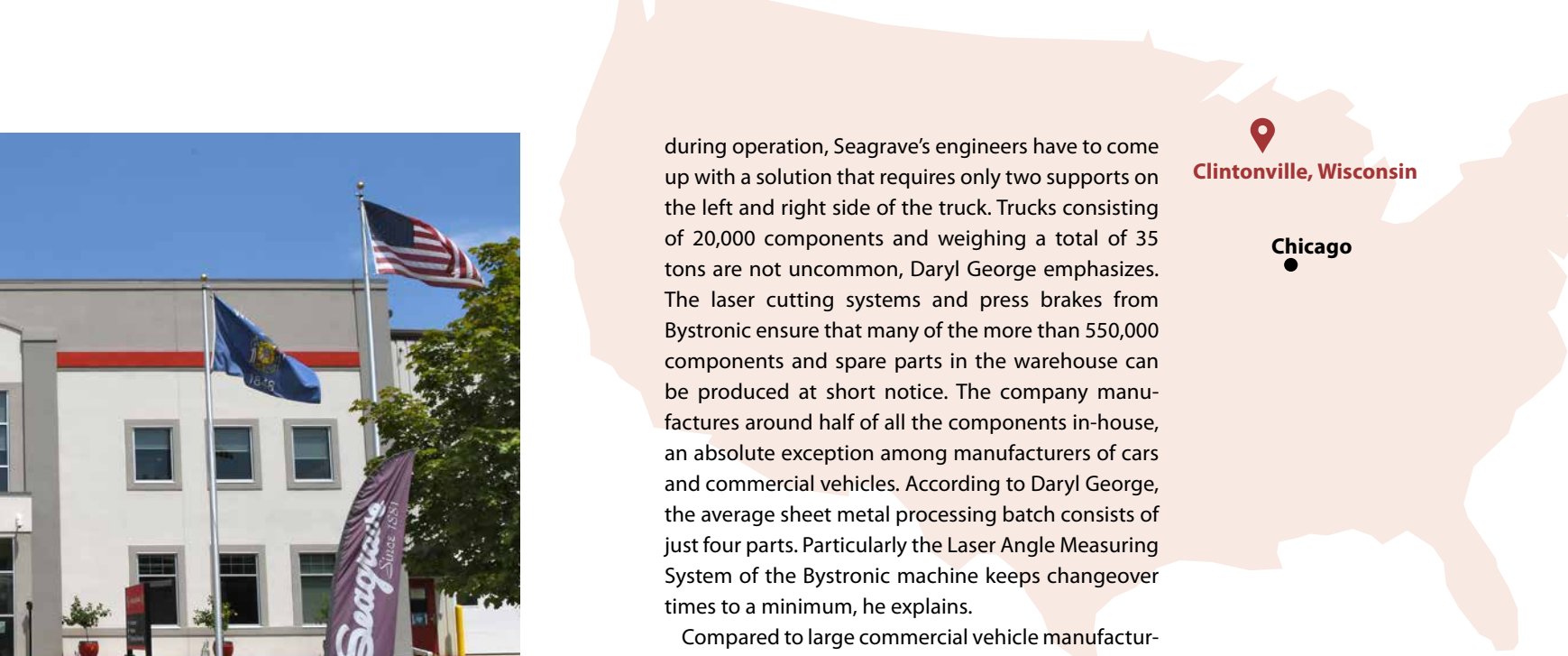
One day, when driving home from his cabin in the north of the United States, Daryl George passed a gardening supplies store. His eye was caught by some red outdoor flower pots on display there: almost waist-high, with a round belly, encircled by a wreath consisting of small embossed rings. Daryl George thought: "They would fit perfectly in front of our office building!" – and he immediately ordered twenty of them. Anyone who spends some time with Daryl George realizes how typical of him this is: A keen eye for detail combined with constant reflection on what could be improved in any small way around his workplace.

Daryl George is Facilities Director at FWD Seagrave, the oldest fire truck manufacturers in the United States – founded in 1881, five years before Carl Benz patented the world's first automobile in faraway Germany. Since 1963, the company has been headquartered in Clintonville, a small midwestern Wisconsin town roughly three and a half hours' drive northwest of Chicago. The meadows there are lush and sprawling, vast stretches of land separate houses and villages, and on the approach to the factory, the front yards are equally dotted with banners for Joe Biden and Donald Trump. For many decades, the region has been known throughout the US because it was once home to half a dozen manufacturers of fire trucks and other emergency vehicles.

A pioneer with an eye to the future

One of the few manufacturers to have survived is FWD Seagrave, born out of the merger of the Four Wheel Drive Automobile Company – which produced the first all-wheel drive chassis in the US in 1908 – and Seagrave, another pioneer who in 1881 invented the first modern firefighting ladders with transverse struts in the lateral guide rails. There is a sense of this long history throughout the company's premises. Some buildings still have massive wooden roof rafters, on the outside wall of one building, a huge mural features, among other things, snowmobiles, Indy 500 racecars, and Luella Bates, the first woman to be granted a commercial driver's license in the US in the late 1920s.

Today, some 350 employees work at the company headquarters in Clintonville. And Seagrave trucks are operated in many major cities throughout the United States. Anyone picturing a polished bright red New York City, Washington, or Philadelphia fire truck is probably thinking of a model from the factory where Daryl George, as Facilities Director, is responsible for the workflows and safety. Among other things, he and his team handle safety protocols, air extractors, and the layout of the machines, which include two laser



during operation, Seagrave's engineers have to come up with a solution that requires only two supports on the left and right side of the truck. Trucks consisting of 20,000 components and weighing a total of 35 tons are not uncommon, Daryl George emphasizes. The laser cutting systems and press brakes from Bystronic ensure that many of the more than 550,000 components and spare parts in the warehouse can be produced at short notice. The company manufactures around half of all the components in-house, an absolute exception among manufacturers of cars and commercial vehicles. According to Daryl George, the average sheet metal processing batch consists of just four parts. Particularly the Laser Angle Measuring System of the Bystronic machine keeps changeover times to a minimum, he explains.

Compared to large commercial vehicle manufacturers, Seagrave's business model is unusual. According to Daryl George, the company only sells somewhat upward of 100 vehicles a year, and the prices for the large trucks range from $600,000 to $1.7 million. But business is better than it has been in a long time: It normally takes eight to 14 months from the order to delivery – currently somewhat longer because of the order backlog. ▶

cutting systems and press brakes from Bystronic as well as a ByTrans 4020 Extended automation solution. In the same way that the long-established manufacturer has to increasingly consider digitalization and electronics for the operating of its fire trucks, new processes are finding their way into the manufacturing environment.

Digitalization of the truck and of the production processes

For Daryl George, the flexibility of the machines and the ease of use of the graphical interface were the main reasons he convinced his company's executive management to invest in Bystronic machines. "Back when I joined the company, we were able to feed just a single sheet of metal into the machines," he recalls. "Now, we simply set up the Bystronic systems, and then they work their way through a ten-inch stack consisting of varying thicknesses and materials – be it aluminum, steel, or stainless steel."

This versatility is essential for the industry: Every Seagrave fire truck is practically a custom piece, based on the individual specifications of the cities and organizations ordering it – for example for the narrow streets of New York, where it is frequently impossible to extend all four outriggers to stabilize the truck

"Bystronic is one of our partner companies with whom we have built a real relationship."

Daryl George, Facilities Director FWD Seagrave

In addition to the existing employees at the factory, the company is currently in a position to hire 160 extra staff, but these are hard to find in the region. In the wake of the 2008 financial crisis, some cities switched to low-cost manufacturers, Daryl George explains. But since their trucks required more frequent maintenance, many public-sector buyers are now attaching greater importance to the total life-cycle costs.

A recipe for success: long-term partnerships

Seagrave also pursues such a long-term perspective with its suppliers. "Bystronic is one of our partner companies with whom we have built a real relationship," Daryl George says. Seagrave trucks are not the least expensive on the market, he says, and neither is the equipment in the factory: "All our forklift trucks are Toyotas, our welders are from Miller, and the yard equipment is from John Deere. In 1999, when we were on the lookout for a laser cutting machine for sheet metal processing, we saw a Bystronic model at a local factory. We gave it a lot of thought before making the purchase, but its wide range of applications convinced us – and in 2003 we installed our first Bystronic laser cutting system," he recalls. Since then, the familiar operation, training, and maintenance processes of the additional machines have reduced training and downtime – another advantage of the company's long-term philosophy.

The 26 years Daryl George has been working for Seagrave are an extraordinarily long time by US standards. After stints as a shipbuilding engineer, and working for a manufacturer of airplane avionics, he returned to the heavy machinery of the firefighting world. Six years after he joined Seagrave came the watershed moment that changed the firefighting world forever: September 11, 2001. "Since then, the solidarity within the fire departments throughout the country has grown even stronger. Every fire chief takes great pride in the equipment and his team," Daryl George explains. At that time, Daryl George's wife suggested he join the voluntary fire service, he recalls. After many years as a voluntary firefighter, he recently retired, but he continues to lead the company's small in-house emergency medical services.

In search of an answer as to why Daryl George thrives on fulfilling all these responsibilities, perhaps the simplest reason is found on a ride through the factory on a small golf cart. He nods engagingly, briefly greeting his many colleagues operating the machines, asking them how things are going, or enthusiastically pointing out the details of the machines, components, and the ultimately completed gleaming red trucks. And while he expansively gestures in all directions, he says with a broad smile: "You asked why I enjoy working here. Look around you! THIS is fun!" ■

PROFILE **FWD Seagrave**

Field of business:	Fire trucks, bodywork, and turntable ladders
Founded:	1881
Employees:	400
Revenue:	75 to 100 million USD
Headquarters:	Clintonville, Wisconsin, United States
Bystronic customer since:	2003

1 *A sturdy steel frame guarantees maximum safety for firefighters.*

2 *Keeping the customers' requirements in mind: Virtually every vehicle is a custom build.*

3 *Bystronic's systems offer the flexibility required for very small series.*

4 *Ready for action: More than 100 vehicles leave the factory each year.*

5 *In the company museum, vintage trucks gleam in all their glory.*

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Giving Tech a Soul

A digital magazine at the intersection between technology, society, and culture

www.naratek.com

Published by Bystronic Group