Company Newspaper of LASER COMPONENTS (UK) Ltd.

PHOTONICS *NEWS*

FOR HEALING BEYOND BORDERS

To detect cancer cells even earlier, scientists are pushing the boundaries of medical research

No.68 — 2022

CONTENT

IMPRINT

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Concept & Layout __ cyclos design GmbH Münster/Berlin
Implementation & Image Rights __ Laser Components Germany GmbH

——— Dear Reader,

This year is the 40th anniversary of LASER COMPONENTS HQ located in Munich which was celebrated at the recent LASER World of Photonics exhibition, and next year will be the 30th anniversary of LASER COMPONENTS (UK) Ltd. Following on, additional LC offices have formed in Europe, USA and Canada, and a network of distributor partners, creating a global company. With that milestone, the company rebranded using the origins of the previous logo that lasted 40 years to create a new logo and included a new aspiration statement; details are shown on our website.

Despite the global events of COVID-19, the dreadful war in Ukraine causing human suffering, and other conflicts around the world, the impact of the semiconductor component supply shortages affecting anyone using electronic devices, and within the UK making necessary adjustments due to Brexit and political change, LCUK has nevertheless continued to grow year on year. During this period, we have seen a mixture of home workers returning to the office, projects re-started that were temporarily halted in 2020, and new business developments initiated rather than continue to remain static, collectively creating optimism during these ongoing difficult times.

Sharp-eyed readers of this new Photonics News edition will notice that the size, layout, colour and content have all changed, creating the fourth iteration since 1982. This issue includes latest achievements with our APDs and PLDs typically used in LiDAR and TOF applications, laser modules typically used in machine vision applications, photon counters used in quantum applications and laser optics helping to produce 3000 terawatts of optical power!

Some exciting news, I was delighted to be accepted to run the London Marathon on 2nd October, something I have never done before. I am delighted to support the charity Ambitious about Autism, and you too can donate if you wish; for more details please see: https://tcslondonmarathon.enthuse.com/pf/chris-varney

CHRIS VARNEY
Managing Director LASER COMPONENTS (UK) Ltd.

FOR *HEALING* BEYOND BORDERS

RESEARCH TODAY, AND SOON TO BE EVERYDAY LIFE? LASER COMPONENTS BUILDS MIRRORS FOR THE WORLD'S MOST POWERFUL LASERS. WITH QUADRILLIONS OF WATTS, THEY GENERATE X-RAYS THAT MAKE CANCER VISIBLE – SOONER THAN EVER BEFORE.

NEW DIAGNOSTIC PROCEDURE WILL SAVE LIVES

To detect cancer cells even earlier, scientists on the CALA team are exploring new avenues in medical imaging. For this purpose, they are using ATLAS-3000, one of the most powerful lasers in the world: Its ultrashort pulses generate extremely high-energy X-ray light, which is comparable to the intensity of synchrotron radiation. Until it is bundled into a small dot, the laser beam passes through a maze of hundreds of laser optics, including mirrors from LASER COMPONENTS.

FIRST COATING SYSTEM
— With the first coating system, company founder Günther Paul laid the foundation for the in-house production of laser optics in 1986. Today, LASER COMPONENTS solves complex optical challenges in research and technology.

Cancer remains one of the leading causes of death. According to the World Health Organization (WHO), around 9.6 million people died from this disease worldwide in 2018 alone. Everybody knows somebody who has faced cancer. The fight against cancer has, therefore, long been an important area of medical research. Early detection plays a crucial role here because the sooner a potential tumour is discovered, the greater the chance of successfully combating it.

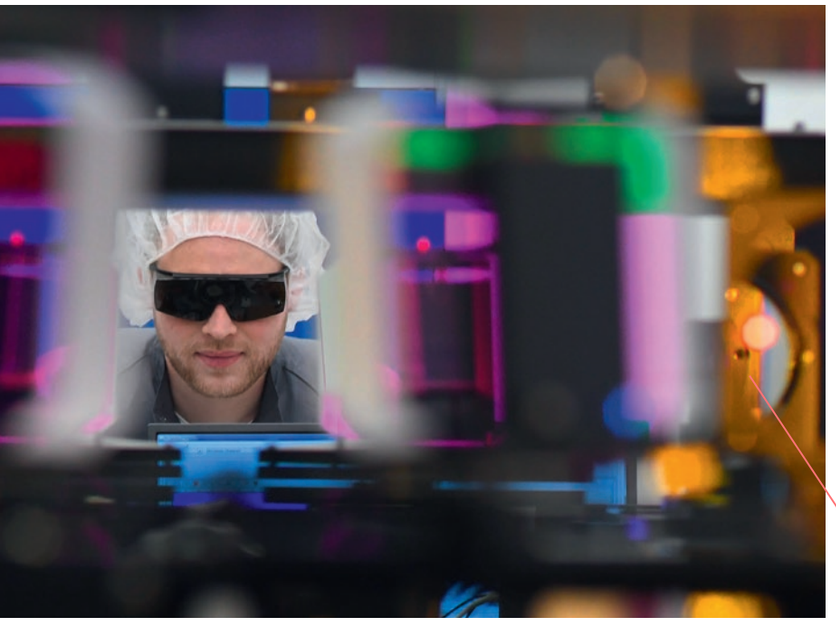
Lasers declare war on tumours
Lasers are providing important therapeutic services, especially when it comes to removing diseased tissue. Laser scalpels can make much more precise cuts than their mechanical counterparts; however, the focussed light beams are particularly useful for microinvasive work inside the body. For example, they are used to literally vaporise individual cell layers.

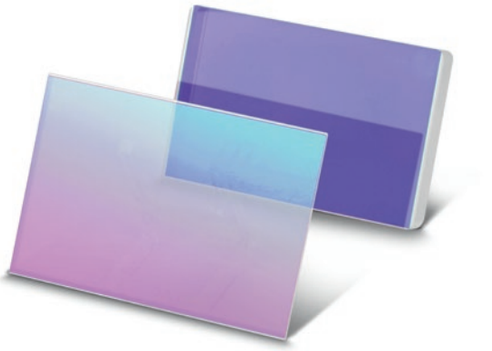
Laser-based methods are not yet well established for the detection of tumours. It is possible to use Raman spectroscopy to distinguish healthy from degenerated tissue. However, a diagnosis on a patient would take several hours, and that is not something anyone can be expected to do. Researchers are currently working to speed up this process and have already made great progress. However, it will be some time before the technology is ready for everyday use in hospitals.

»MODERN FACILITIES PROVIDE US WITH THE FLEXIBILITY TO TAKE ON NEW PROJECTS.«

CHRISTIAN GRUNERT / *Laser optics production manager*

Quadrillions of watts for research
Scientists at the Centre of Advanced Laser Applications (CALA) in Garching near Munich are working on a completely different process. They aim to generate X-rays at an energy level that would normally require a particle accelerator. These beams can be used to make the smallest details visible, including cancer cells at a particularly early stage. They are using a high-energy laser as the energy source.





The laser beam is directed to its point of use via more than a hundred mirrors.
The production of these mirrors requires a high level of expertise and special technical equipment.

3000

terawatts produced by the ATLAS laser.

The 3000-terawatt advanced Ti:sapphire laser (ATLAS-3000) generates a laser beam at an energy of around 60 J for a few quadrillionths of a second. This may not seem like much at first glance, but because this energy is released in such an extremely short time, ATLAS achieves a power of several quadrillion watts. In a vacuum environment, this beam is focussed on a small spot using more than a hundred mirrors and lenses. LASER COMPONENTS is one of the few manufacturers of laser optics that can meet the high demands of such projects.

The sun on a pin

»Imagine focussing all of the solar energy that reaches the Earth's surface at any given time on the tip of a pin. That should give you a rough idea of what our laser optics have to withstand,« explains Barbara Herdt, head of laser optics.

The head of process development, Dr. Sina Malobabic, and her team faced several challenges when designing the mirrors for the ATLAS project. First, there was the large diameter of the laser beam. This requires optics of 200 mm to 300 mm. This is very large for laser optics, and absolutely flat substrates with such dimensions are rare.

Experts for long durability

A second challenge was the laser damage threshold. »Substrates are coated with a dielectric layer to optimally direct the laser beam, but even the best layer designs don't last forever,« says Dr. Malobabic. »In ultra-short pulsed lasers like ATLAS-3000, they are destroyed primarily by nonlinear electronic effects such as so-called multiphoton ionisation. This happens when molecules absorb multiple photons simultaneously, converting some of the absorbed energy into kinetic energy. Our task is to develop coatings that can withstand this particular stress for as long as possible.«

New machine for more homogeneity

»As the size of the substrate increases, so do the challenges in the coating process. For the first petawatt laser job, we actually purchased a new machine with an ion-assisted technology that was set up exactly according to our requirements,« reports Christian Grunert, production manager. »It is particularly important that the coating material be applied evenly across the entire surface because the vapour deposition beam is usually stronger in the centre than at the edges. To compensate for this, people often use hemispherical substrate holders when bulk coating smaller optics. The optics at the edges are then closer to the material source than those in the centre, so that in the end they all get the same amount

»TO STAY ON TOP OF THINGS, WE ARE INVOLVED IN THE STANDARDS COMMITTEE AND REGULARLY PARTICIPATE IN THE WORLDWIDE DAMAGE THRESHOLDS COMPETITION.«

DR. LARS MECHOLD
— This is where the threads come together: as technical director, Dr. Mechold coordinates all development projects and production processes at LASER COMPONENTS Germany.

»EACH NEW TYPE OF LASER COMES WITH A WHOLE BUNDLE OF CHALLENGES.«

BARBARA HERDT / *Head of laser optics*

of vapour. Of course, this is not possible for large flat surfaces. That's when you need a special system.«

Six months for one mirror

»To meet all the requirements for ultrashort pulsed lasers, we have had to invest quite a bit,« Barbara Herdt recounts. »But our customer has ultimately always trusted us to deliver the perfect optics. Even now – a few years later – these mirrors are still a challenge for everyone involved. You can estimate six months for development and coordination alone. It can also take a year before being able to deliver the finished product.«

Miniature particle accelerator

CALA uses our optics to direct the beam of the ATLAS-3000 to the point of use. The beam is bundled only at the very end because otherwise this would stress the expensive deflection mirrors too much. Finally, the researchers unleash several quadrillions of watts on various particles. The laser then acts like a miniature version of a particle accelerator. Depending on which particles it hits, the scientists can produce different effects: high-energy electrons generate X-rays with unprecedented brilliance, which is used for imaging. In this way, a high image resolution is achieved that enables a detailed diagnosis of the soft tissue. Accelerated ions could be used to create new, affordable forms of therapy. Laser-induced ion beams, for example, could be used specifically to kill tumours. Until now, such projects have failed because of the amount of energy involved, but with the high-power laser, a new, considerably more powerful source is available.

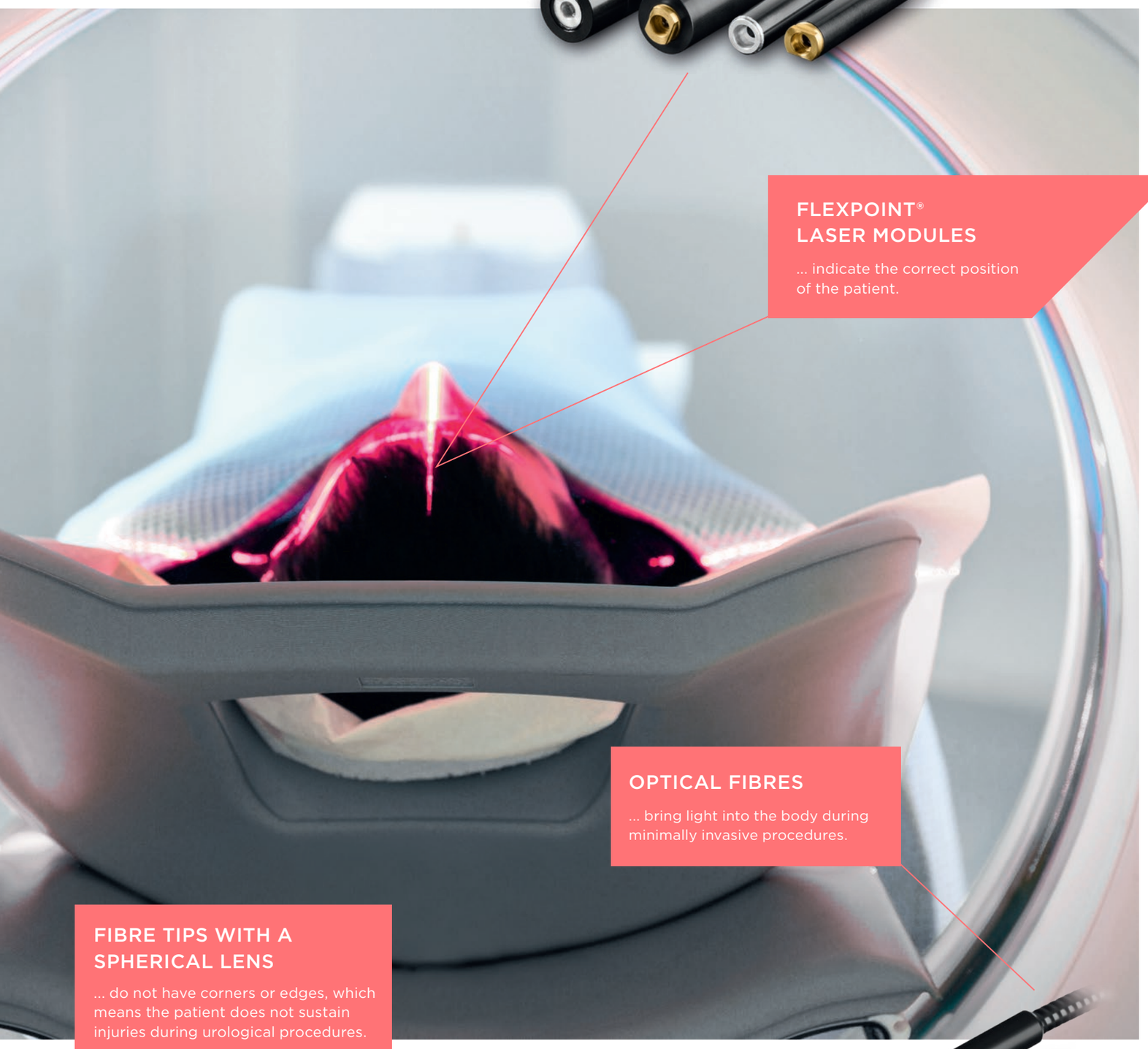
Previously not even possible in dreams

When the first optics were coated at LASER COMPONENTS in 1986, petawatt lasers and high-power mirrors were still unthinkable. The triumphant advance of laser technology has since changed the world – and the company along with it. »There is hardly an area of life in which a laser is not used somewhere,« summarises the general manager, Patrick Paul. »Accordingly, there are many different types of lasers today, and each of them places different demands on the components. That's why we now have numerous different technologies in-house. With this equipment, we work out the optimum solution for the customer's application in close consultation with the customer. After forty years, this still makes our work as exciting and varied as it was in the early days of LASER COMPONENTS.«

LASER OPTICS

… in a swivel arm ensure that the laser beam is guided to the right place during tattoo removal.

Cancer detection with terawatt lasers is still a thing of the future, but today you encounter our products in hospitals every day.



FLEXPOINT® LASER MODULES

... indicate the correct position of the patient.

OPTICAL FIBRES

... bring light into the body during minimally invasive procedures.

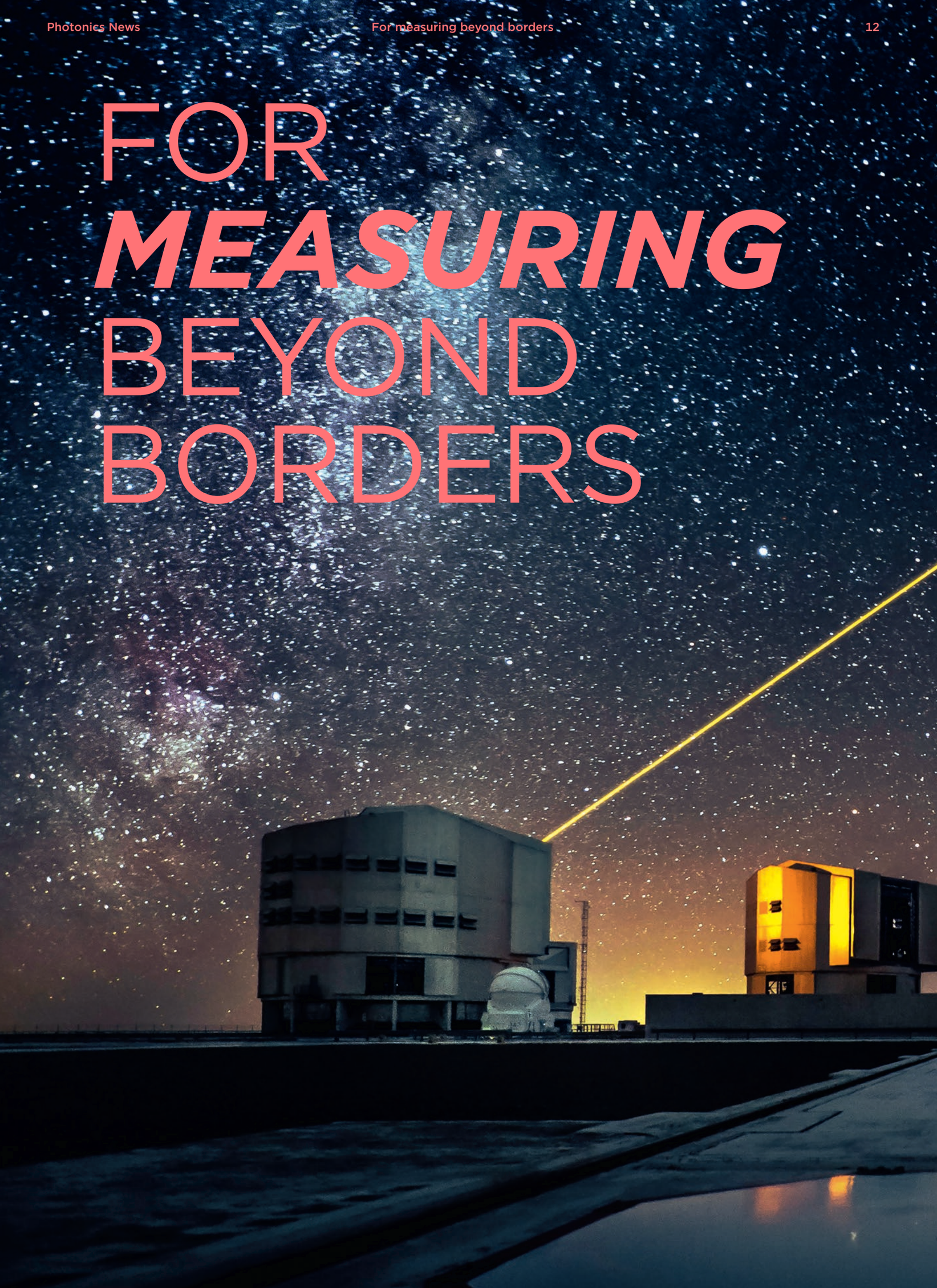
FIBRE TIPS WITH A SPHERICAL LENS

... do not have corners or edges, which means the patient does not sustain injuries during urological procedures.

»HEALTH IS A VALUABLE ASSET. I AM PLEASED THAT PHOTONICS IS PUSHING THE LIMITS IN THIS AREA AS WELL.«

SVEN SCHREIBER / *Head of sales at LASER COMPONENTS Germany*

FOR *MEASURING* BEYOND BORDERS



HARDLY ANY OTHER TOOL CAN MEASURE DISTANCES AS PRECISELY AS A LASER. WHAT BEGAN IN SPACE SOME 50 YEARS AGO, CAN NOW BE FOUND IN EVERY CAR.

384.403 KM TO THE MOON

When Theodore Maiman introduced the first laser in 1960, he described it as a »solution in search of a problem.« Just a few years later, the first laser beams were used to monitor the trajectory of satellites. Reflectors from those early days are still in use today – on the Moon!

When Neil Armstrong and Buzz Aldrin set foot on the surface of the Moon on July 21, 1969, they carried with them a piece of luggage that continues to provide valuable services to science today: a retroreflector with a hundred individual prisms. To this day, it stands some 384,403 km from the Earth in the Sea of Tranquility. We know this precisely because its only task is to measure the distance between our planet and its satellite. In technical jargon, this is called lunar laser ranging (LLR). Even more than 50 years after the first Moon landing, scientists regularly send laser beams to the Moon and the reflector dutifully sends the light back again.

Only a few photons make it »home«

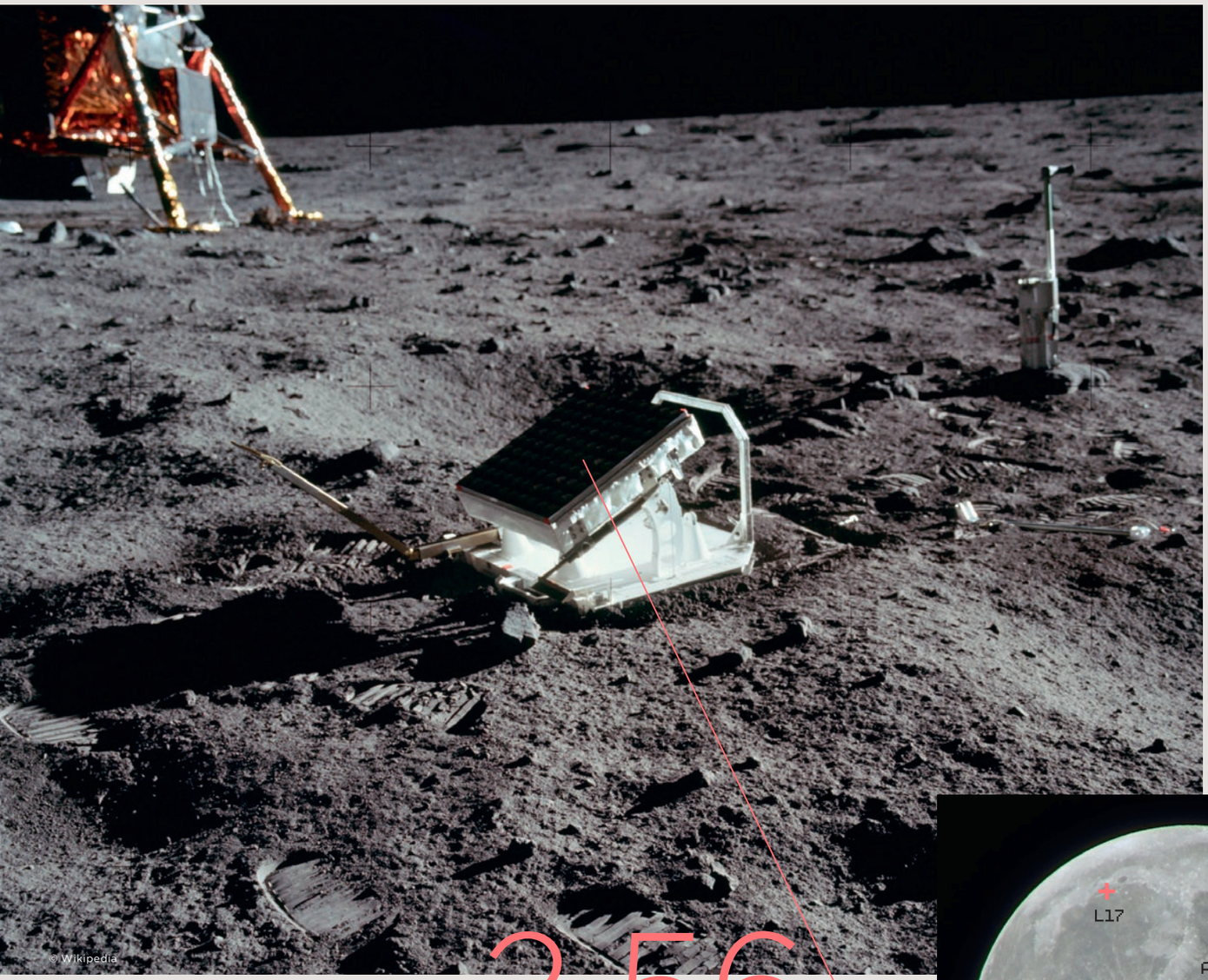
With the retroreflector, scientists were able to determine the distance to the Moon to within a few centimetres in 1969. The basic principle is relatively simple: the researchers stopped the time between the generation of the laser pulse and the moment when the reflected beam hit the sensor. Since light always travels at the same speed, they were able to determine the distance using simple fractional arithmetic. This method is still used in all laser distance meters today. However, the whole thing is not quite so trivial because the laser passes through the atmosphere twice on its way. In the process, the light is scattered quite a bit. Ensuring that at least one of the hundred quadrillion photons makes it back requires a correspondingly large amount of laser power, as well as a detector that is sensitive enough to detect this lone photon. Therefore, there are only a few telescopes world-wide with which it is possible to achieve such measurements.

… and Einstein was right after all!

Many are now asking, »Why go to all the effort?« As it turns out, lunar laser ranging has given researchers valuable insights into the interactions in the Earth-Moon system. For example, we now know that the Moon moves about four centimetres away from Earth each year. … and LLR was even able to provide practical proof of Einstein's theory of relativity. According to this theory, the Earth and the Moon would have to move through the Sun's gravitational field with identical acceleration, even though their own gravitational fields differ greatly. This is exactly what the measurements confirmed, and for this reason alone the trip to the Moon was worthwhile.

»LUNAR RANGING WAS THE STARTING SIGNAL FOR LASER RANGE FINDING TODAY.«

WINFRIED REEB / *Head of the active components business unit*



1.

2.56

seconds for light to bounce off the moon and back.

1. The first retroreflector was installed on the lunar surface in July 1969 by astronauts on the Apollo 11 mission. Astronomers from around the world use it to measure the exact distance between the Earth and the Moon.

2. Locations of the retroreflectors of the Apollo 11, 14, and 15 missions and of two Soviet missions on the Moon's surface.

Miniaturisation makes it possible: modern LiDAR systems provide more comfort at home and more safety in road traffic.

LiDAR creates a three-dimensional image of the environment.

LASER COMPONENTS CANADA
— The general manager, Jeff Britton, and his team are working on pulsed laser diodes for self-driving cars. The challenges can be met with two different approaches: either with ever-shorter pulse durations, as in QuickSwitch® PLDs, or with arrays that house four to twelve emitters on a single chip.

Yesterday on the Moon – Today in the hardware store

LLR was only the beginning. The real triumph of the laser began shortly afterwards, when in 1970 semiconductors were used for the first time to generate laser beams. This success set in motion a miniaturisation trend that continues to this day. Today, you can buy a handheld device in any hardware store that basically does nothing more than the giant lasers of 1969.

New dimensions

The next step is referred to as light detection and ranging (LiDAR). As the name suggests, LiDAR adds a crucial element to classic distance measurement: detection. LiDAR detects objects and determines where they are in a space. Instead of just measuring the distance between two points, thousands of laser pulses scan the entire environment in a fraction of a second. They create a cloud of points that a computer transforms into three-dimensional images. Due tothe individual pulses following one another quickly, LiDAR can also detect movement and use it to calculate the speed of vehicles, for example.

LiDAR makes roads safer

The best-known example of such speed measurements is the »speed gun« used by the police. Strictly speaking, most speed traps today are LiDAR traps. The effect is the same and if we are honest, they make a significant contribution to road safety, as does another LiDAR system, which is housed in the car itself: emergency brake assist.

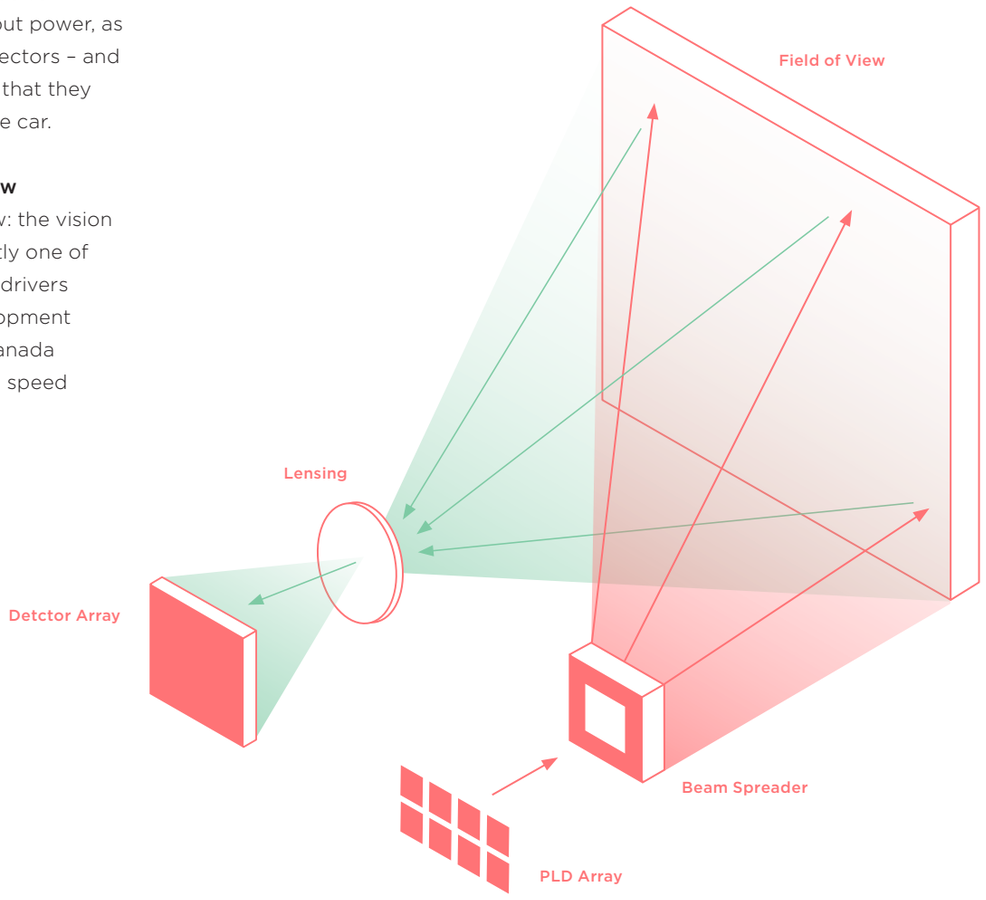
This is where LiDAR's capabilities really come into their own, as the vehicle independently detects obstacles, measures the distance, and initiates braking if necessary. Insurance companies predict that these assistance systems will reduce the number of traffic accidents by 20% to 30%.

The challenge of the future

Many see driver assistance systems as the first step toward self-driving cars, and indeed it is not only car manufacturers who are currently working on this vision of the future. LiDAR will certainly play a crucial role in this development, but the requirements are enormous. First of all, the range and resolution of these systems must increase. For component manufacturers such as LASER COMPONENTS, this means the following advancements are necessary: laser diodes with even shorter pulse durations and even higher output power, as well as even more sensitive detectors – and both should ideally be so small that they can be installed anywhere in the car.

Creative solutions for tomorrow

Creative solutions for tomorrow: the vision of the self-driving car is currently one of the most important innovation drivers in the laser industry. The development engineers at our locations in Canada and the USA are working at full speed on creative solutions to make this dream come true. At LASER COMPONENTS Canada, for example, they have achieved a breakthrough in micro production that has enabled them to significantly improve the efficiency of our pulsed laser diodes (see pg. 27). Tiny »trenches« between the circuits of the emitters avoid annoying interference currents and thus ensure higher output power. This will enable LiDAR systems to »see« even further in the future. This is another important step toward autonomous driving, but the goal is far from being achieved. Further innovations are already in the pipeline.



Flash LiDAR: with powerful emitters and highly sensitive detectors, LiDAR systems can be implemented without moving parts.

»WE ARE WORKING TO MAKE ONE OF THE GREAT FUTURE VISIONS OF OUR TIME A REALITY.«

JEFF BRITTON / *General Manager of LASER COMPONENTS Canada*

FOR *PROJECTS* BEYOND BORDERS

WHETHER IN DEEP-SEA RESEARCH, SLICING CAKE,
OR INDUSTRY 4.0 – WITH LASERS, MACHINES LEARN TO SEE.

3D SCANS: TRACKING THE OCEAN FLOOR

Impenetrable darkness prevails on the ocean floor. Yet even here, researchers can detect the smallest details. LASER COMPONENTS supplies the appropriate laser modules for this unusual location.

1.

How do you repair an underwater pipeline at a depth of several thousand metres? How do you explore a wreck on the ocean floor? For humans, this is only possible in special pressure capsules. And even then, nothing can be seen without technical aids. Even high-energy violet light only penetrates to depths of up to 430 metres. After that, we are in total darkness. These are not good conditions for underwater research!

3D images from a depth of 3,000 metres

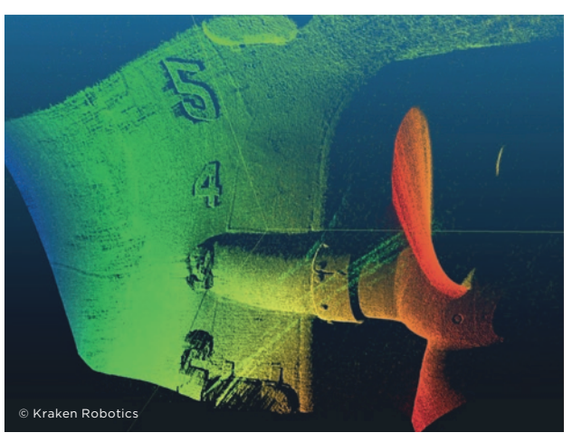
Robots, on the other hand, can be designed to function without limitations even at depths of 3,000 metres. But how do they recognise what they are supposed to do? The Canadian manufacturer Kraken Robotics provides a solution with its SeaVision 3D laser imaging system. Three particularly powerful laser modules from LASER COMPONENTS – one red, one blue, and one green – scan the environment with lines thinner than a human hair. At the customer's request, we adapted their output power to the light conditions of the deep sea. The reflections captured by special deep-sea cameras are then assembled in the computer into detailed 3D models. From short distances, a resolution of 0.1 mm can be achieved, allowing even the finest damage to underwater structures to be detected.

Deep-sea explorers do not even get their feet wet

Kraken Robotics has developed this system primarily for use with remote-controlled miniature submarines. The control personnel sit comfortably on dry land and steer the underwater drone to the site of operation »classically« with a spotlight and camera.

1. SeaVision systems in black cylinders withstand the pressure at a depth of 3,000 metres.

2. Remotely operated submarines are also used to explore wrecks.



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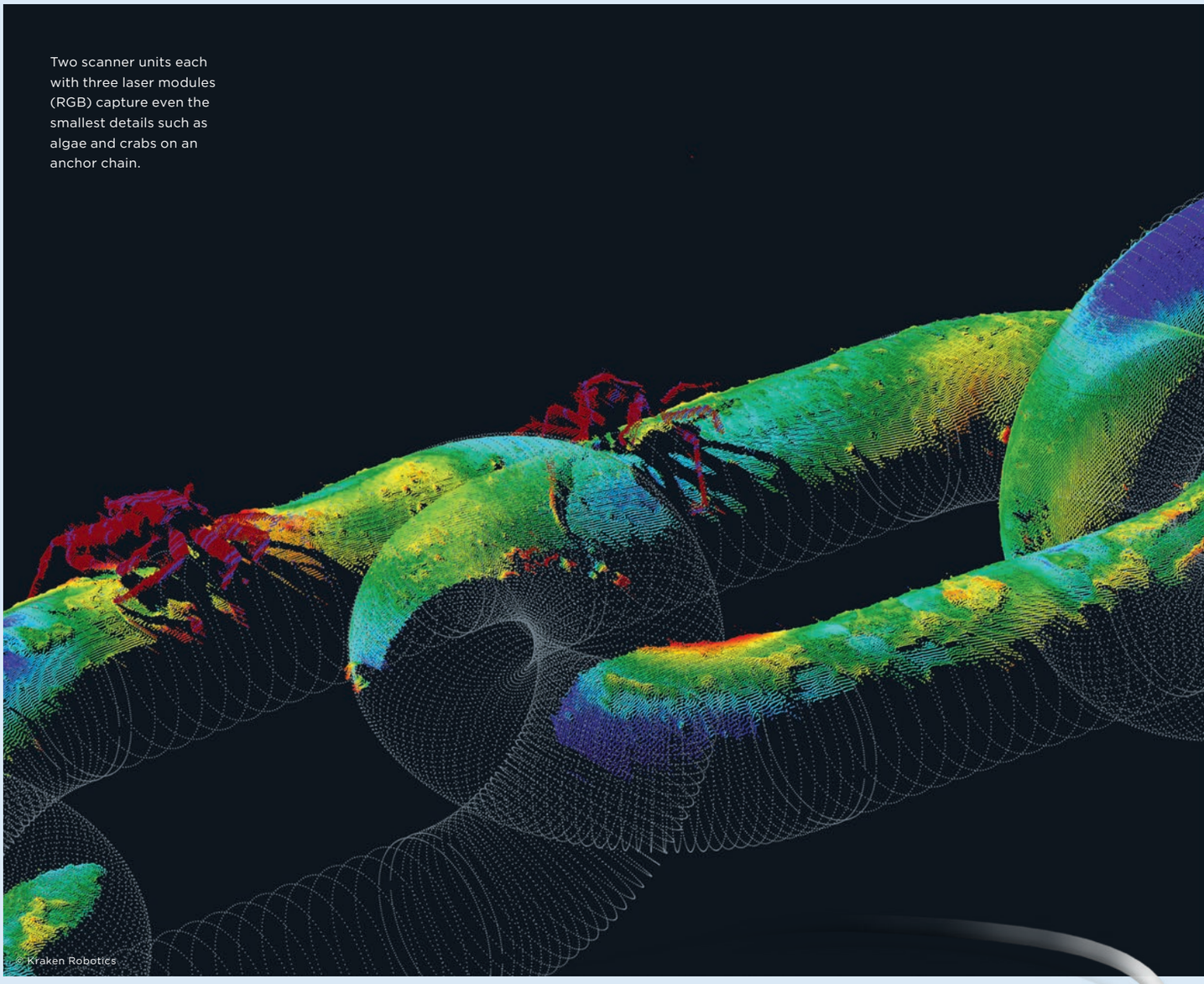


Two scanner units each with three laser modules (RGB) capture even the smallest details such as algae and crabs on an anchor chain.

© Kraken Robotics

»THE DARKNESS OF THE DEEP SEA REQUIRES ESPECIALLY STRONG LIGHT.«

JOCHEN MAIER / *Head of the Optosystems business unit*

This is where things get exciting because even though the scanning process only takes four seconds, the submarine and the object under investigation must remain absolutely still for this short period of time. It is a good thing that the designers have thought things through: they immediately integrated an algorithm that detects the movements of the vehicle and adjusts the measurement results accordingly.

SeaVision has already proven its worth in many projects – be it in the maintenance of pipelines, the search for sunken ships, or when it comes to monitoring the growth of corals.

0.1

-mm resolution under water? No problem for FLEXPOINT® MVnano!

DEEP WITHIN THE MOUNTAINS

+ One of the most spectacular projects using FLEXPOINT® cross-hair laser modules is up to 2,300 metres below the main ridge of the Alps. To enable maintenance work to be carried out in the 57km long tubes of the Gotthard Base Tunnel, the supply of fresh air must be ensured in the respective tunnel sections. For this purpose, special trains with »mobile maintenance gates« travel to clearly defined track locations where the tube is then sealed. To ensure that the 8-metre gates fit perfectly and that the valuable breathing air is not lost, every centimetre counts. The 55 ton, 22 metre long rail vehicles must be precisely aligned in the direction of travel and height so that the gate fits perfectly. To do this, the laser module projects a green cross onto the tunnel wall, where a permanently installed marker is located. If the two are congruent, the vehicle has reached the desired position and the gate sits perfectly. Workers can then enter the track section through a door embedded in the gate.

55 tons

... heavy rail vehicles are positioned to within the centimetre.

10 µm

With this accuracy, the GapGun detects deviations in a 3m turbine blade.

HUGE BLADE, TINY GAP

+ The gap between the end of the turbine blades and the casing is considered the main cause of inefficiency, unreliability, and noise in aircraft engines. Here, every millimetre counts. With the GapGun, even the slightest deviations can be detected in seconds. For its handheld measuring device, the manufacturer Third Dimension uses the compact all-rounder laser module FLEXPOINT® MVnano, which can also be integrated into small devices (e.g., in the variation with separate optical and electronic elements). For customers for which space is at a premium, we can supply just the laser and dispense with the control electronics altogether.

THE EYES OF INDUSTRY 4.0

+ Machine vision (MV) systems are taking over the role of visual organs in Industry 4.0. This has decisively changed the world of line lasers because for MV to work precisely, the light must be evenly distributed across the entire line. Our FLEXPOINT® MV line lasers achieve this homogeneity with Powell lenses from our own company group. For use in Industry 4.0, this means optimal results in triangulation. For example, the machines can perform quality checks for electronic components faster and more precisely than a human ever could.

35.000

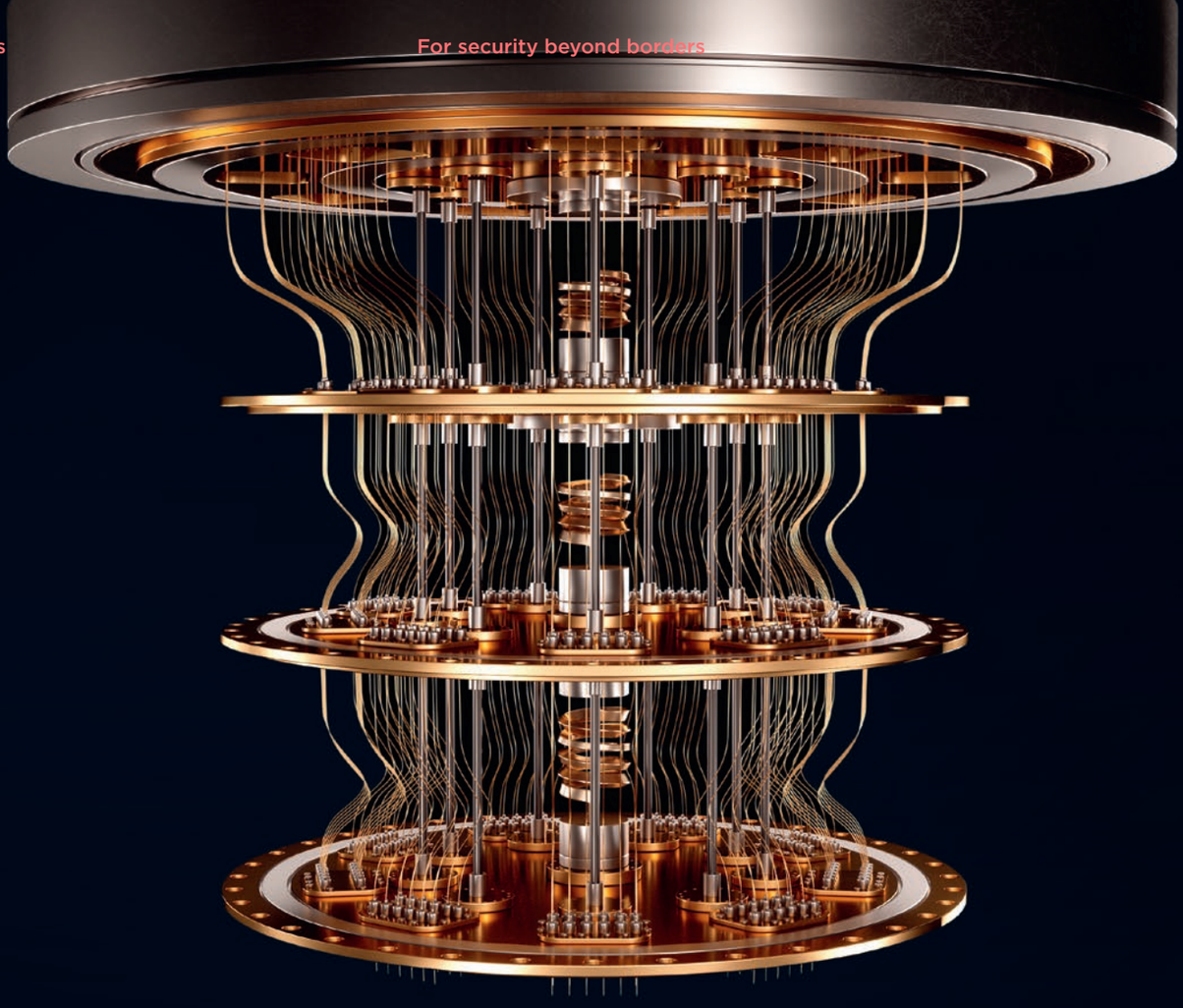
... 3D profiles can be captured by a machine vision system per second.

116.6 g

... is how much each individual piece of cake weighs – no more, no less.

SPLASH PROTECTION IN THE CAKE FACTORY

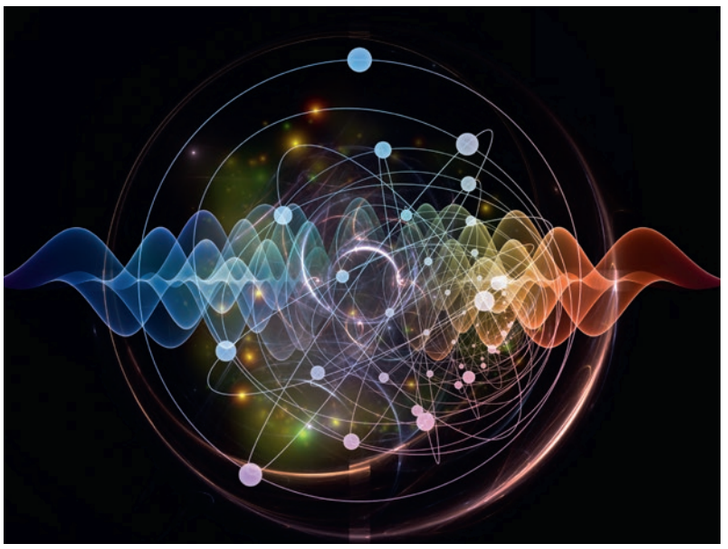
+ In the cake factory, laser lines indicate where the knives need to be positioned so that all pieces are cut the same size and that no guest is disadvantaged at the coffee table. For this purpose, large confectioners like to use the compact, cost-effective ILM12IP laser module. Its stainless-steel housing is not only robust but also waterproof according to protection class IP67. It must be waterproof because to meet the hygiene standards of the food industry, the machines are regularly hosed down and cleaned.



FOR ***SECURITY*** BEYOND BORDERS

The laser itself is one of the most prominent examples of applied quantum physics. For Einstein, it was just a theoretical possibility. Resourceful minds turned it into a functioning technology, and today it is impossible to imagine our everyday lives without it. With our help, researchers are working on quantum applications that seem as fantastic today as the laser did in Einstein's day.

Global corporations are currently engaged in a race to build the fastest quantum computer, keeping legions of researchers and scientists on their toes. Their experimental computers are huge. Much of the technical effort is still spent on cooling because the underlying quantum effects currently exist only at temperatures close to absolute zero (-273.15°C). The first commercial quantum computers are, therefore, more likely to replace data centres than laptops. However, a quantum laptop will probably be superfluous anyway because the new computers are so fast that we will only need access terminals at home. Computing power will be completely outsourced to the cloud of a few supercomputers.



2.

1. Quantum computers will change the world.

2. The quantum world holds many secrets.

»QUANTUM CRYPTOGRAPHY KNOWS NO CODES.«

DR. OLGA STROH-VASENEV / *Active Components Product Engineer*

What about privacy?
Where does data protection fit in with the global quantum cloud? Research is already in progress to address this challenge – using quantum technology, of course. In their 2016 Quantum Manifesto, European scientists defined four research fields that should allow us to tap into the quantum future: communication, simulation, sensing, and computing. In this context, quantum cryptography will play a crucial role in the »communication« research field.

Secure transmission without codes
One widely used approach is to use the states of entangled quanta to establish a secure connection. Any eavesdropper would be detected immediately because he would change the states of the quanta during his attempt at eavesdropping. Even the fastest computer is of no use here because quantum cryptography knows no codes. In the search for further possibilities of quantum cryptography, it is crucial to capture every single quantum. LASER COMPONENTS supports researchers by providing highly sensitive photon counters from its COUNT® series.

The applications described here are still the dreams of the future. Our task is to change that because our components help make possible what seems impossible today.

75%

quantum efficiency is achieved by LASER COMPONENTS' COUNT® photon counters.

VISIONS COME TRUE
— Dr. Olga Stroh-Vasenev is the expert at LASER COMPONENTS for the future markets of quantum technology and UV LEDs.

NEW PRODUCTS

Pyroelectric Detectors and IR Emitters

COMPLETE PACKAGE 55+

+ Most IR applications focus on transmission measurements for CH_4, CO_2, and CO detection in the wavelength range between 3 µm and 5 µm.

For an optimal signal-to-noise ratio at more than 5 µm, LASER COMPONENTS offers you a matched and complete package that consists of a broadband emitter, a pyroelectric detector, and a filter for measurements beyond this limit (e.g., for moisture measurement or the characterisation of organic compounds in the fingerprint range).

/ Wavelengths starting at 5 µm
/ Frequency range starting at 5 Hz
/ Broadband emitter, pyroelectric detector, and filter

Web
UK68-0010

Contact me!
Edward Williams:
+44 (0) 1245 491 499
e.williams@lasercomponents.com

Robust, Highly Reflective Broadband Mirrors

BROADBAND, 98% REFLECTIVITY

+ In terms of reflectivity and durability, dielectric mirrors are superior to their metallic counterparts: they last longer, require less maintenance, and reflect more light.

For its new IBS coater, LASER COMPONENTS invested in a broadband monitoring (BBM) system that covers the IR range. This is in addition to the usual BBM system for the visible spectrum. This makes it possible to produce broadband dielectric mirrors. For optics with diameters up to 300 mm in the wavelength range from 390 nm to 950 nm, we achieve an average reflection of 98%.

/ High reflectance for greater efficiency
/ Diameter up to 300 mm
/ Broadband spectrum: Vis to NIR

Contact me!
Samuel Thienel:
+44 (0) 1245 491 499
s.thienel@lasercomponents.com

Mobile Laser Protection with Transport-Friendly Swivel Arm Frame

HIGHEST LASER SAFETY WITH MAXIMUM FLEXIBILITY

+ To effectively protect your employees when using mobile high-power lasers, the laser protection must also be mobile. LaserSafe from JUTEC offers the necessary flexibility.

With its swivel arm frame made of aluminum, this laser protection system is easy to transport and can be set up and dismantled quickly. The advanced version has quick-release clamps, no installation tools needed. LaserSafe is available with a passive laser protection curtain or with JUTEC's active laser protection textile, which automatically deactivates the laser above a certain threshold, ensuring employees are safely protected even with a laser power of up to 12 kW.

/ Mobile laser protection
/ Swivel arm frame
/ Available with passive & active laser protection textile

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Detailed 3D Model from the Inside of the Pipeline

ROBUST PIPES THANKS TO RING LASERS

+ How can you ensure that the pipes of high-pressure pipelines have a perfectly round cross-section and therefore withstand the highest stresses during operation?

The FLEXPOINT® radial laser module developed by our partner Blau Optoelektronik together with MSG Maschinenbau GmbH offers a helping hand. To generate the ring-shaped beam, the laser light is directed onto a cone-shaped mirror body, which reflects it evenly in all directions.

/ Detects irregularities of up to 50 µm
/ Continuous homogeneity of 80% at 50 mW of power
/ To create a detailed 3D model of the inside of the pipe

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Pulsed Laser Diodes with Trenched Chip Technology

LiDAR FOR THE HIGHEST DEMANDS

+ Through further development of proven multi-junction technology, LASER COMPONENTS Canada has significantly increased the performance of 905 nm pulsed laser diodes (e.g., for a longer range of LiDAR systems).

Through a process change in the microfabrication of laser chips, two V grooves (»trenches«) are embedded into the chip's surface parallel to the resonator. This gives system designers more flexibility, even with arrays, because the individual elements can be controlled separately.

/ No disturbing lateral modes
/ Conversion of more electrical energy into laser light
/ Increase in efficiency from 2.6 W/A to 3.2 W/A

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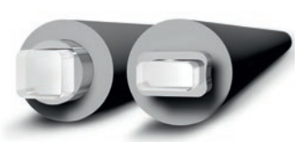
Fibre Assemblies with a Square Beam Profile

FOR MORE EFFICIENT DIODE LASERS



+ Square fibres ensure the highest output power and a homogeneous beam profile by uniformly absorbing the power of the diode beam – even without expensive optics.

At LASER COMPONENTS you can obtain customised assemblies with all standard connectors (e.g., D80, SMA, and SMA high power). Precise manual work and control measurements guarantee consistently high quality.

/ No power loss
/ With a D80 connector: always optimally aligned
/ Cost-effective solution for material processing and medical technology

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LASER COMPONENTS®

TRADE SHOWS AND EVENTS

JUNE – DECEMBER *2022*

June 27 – 29, 2022
Sensors Converge 2022
San Jose, CA, USA

July 04 – 08, 2022
OPTIQUE Nice 2022
Nice, France

August 23 – 25, 2022
SPIE Optics + Photonics
San Diego, CA, USA

August 31 – September 01, 2022
Photon 2022
Nottingham, UK

September 12 – 16, 2022
FLAIR 2022
Aix-les-Bains, France

October 04 – 06, 2022
VISION
Stuttgart, Germany

October 11 – 13, 2022
The Vision Show
Boston, MA, USA

December 07 – 08, 2022
SPIE Photonex
Birmingham, UK

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beyond borders