

PRISMA

The WILD Group magazine

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HOW MODERN 3D SCANS ARE CHANGING OUR VIEW OF THE WORLD

▼ **WILD**

▼ **PHOTONIC**

Specially developed IVD manufacturing processes for fluidics components.

Bestseller: Photonic's high-power LED modules.

WILD creates unique knowledge platform for 3D printing.



STEFAN WERKL

Head of Optical Technologies WILD GmbH

MEASURING IN THE THIRD DIMENSION.

From the smallest changes of the retina to the measurement of large structural components or entire buildings: optical 3D measurement technology always comes into play when surfaces or entire models need to be measured at high speeds. In Industry 4.0, quality assurance also depends on optical sensors and intelligent measurement systems. What all these application areas have in common is a trend toward higher measurement accuracy. As a consequence, huge amounts of highly complex data are generated in a very short time, which must nonetheless be processed in a simple and quick manner.

The current PRISMA issue uses the occasion of this year's LASER World of Photonics to describe how the WILD Group manages this challenge. Photonic, for instance, has developed F5000-M and F6000-M, two high-performance LED modules that supply ultra-high-speed cameras and 3D imaging systems with extremely high luminous fluxes to analyse quick movements or material behaviour. Using three specific examples, including an innovative intra-oral scanner, we will give you an impression of how WILD establishes an ideal know-how platform for the implementation of sophisticated measurement systems through the development of high-quality optics, precision mechanics, electronics and software.

This issue also explains why modern 3D printing technologies are already changing our way of production for the long run and how we succeed in producing fluidics components that meet the highest cleanliness requirements.

Stefan Werkl

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DEVELOPMENT

IN A STATE OF FLUX.

WILD

The safe transport and distribution of media in IVD devices requires stable serial-produced fluidics components which meet the highest cleanliness requirements.

One of the essential functions of IVD devices consists in safely mixing tiny amounts of liquid samples with media and transporting these to measuring cells. The trend towards more affordable and compact point-of-care devices is forcing developers to design these without complicated tubing. This is the only way to reduce installation space and assembly times. Special distributor blocks are the key to achieving this.

Both these distributor blocks and micro valves and measurement cells constitute the classical bottlenecks in IVD devices. Channels in micro valves, for instance, measure only around 1mm across and the flow-through cell for blood cell measurement is a mere 50 - 100 µm. Swarf in the system may lead to severe errors. When it breaks loose from distributor blocks, it may result in a system failure or distort the results. On the one hand by clogging valves that regulate the further transport of media. On the other by distorting the measurements in the measurement cells", explains Business Developer Stephan Payer.

Safe production of IVD devices therefore requires special know-how in manufacturing and in the handling of fluidics components. "During the production of parts, it must be ensured that no swarf remains in the parts since it is not possible to fully check the branching channels visually for such residues", says Payer. Controls using transmitted light are often not feasible. At WILD, these key parts are therefore manufactured using specially developed, swarf-

free IVD manufacturing processes, are thermally deburred if necessary, cleaned using ultrasound and ultra-pure water, and then individually packaged.

WILD tests additive manufacturing of distributor blocks

"In addition, we are currently examining the manufacturability of IVD distributor blocks using additive techniques", says WILD mechanical designer Christian Wüster. The connection nozzles would then be integrated in the part itself and rounded bends and branches would help reduce pressure loss. Moreover, additive manufacturing would allow for varying channel diameters of up to approx. 50 µm, the integration of functions such as mixing and vortices, and the use of transparent materials.



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➤ PRODUCTION ➤ DEVELOPMENT

EVERY DETAIL COUNTS.

▼ WILD

3D scanning is booming in industrial and medical technology applications. As a pioneer in the field of 3D laser scanners, WILD possesses comprehensive know-how in various applications and technologies. The key to technological improvements and a shorter time to market is cross engineering.

High-resolution 3D scans deliver exact images of the real world in a digital format. In medicine, they are instrumental for modern, patient-friendly diagnostics and treatment. In the world of industry, they bring greater speed and efficiency. WILD has many years of experience in 3D scanners and, as a systems partner, has been closely involved in the development and manufacturing of innovative products. A current example is the GC Aadvia IOS 200 intra-oral scanner, which WILD's customer GC Europe will be launching onto the market this year. This latest dental scanner generation can produce a digital 3D model of a patient's natural dentition safely and with utmost precision in a very short time. This procedure, in which a slide pattern is projected onto the surface of the teeth, replaces

conventional plaster models. The image of the slide pattern is recognised on the surface of the teeth, allowing for reconstruction of the 3D data.

A paradigm shift in dental medicine

In future, dentists will easily be able to access even hard-to-reach areas using this small, lightweight scanner. Since the system is powder-free, the tedious powdering of the surfaces can be skipped and the scanning process can begin right away. The manual step of dentition alignment is no longer necessary since registration of the natural dentition also takes place in real time. This renders the system far more comfortable for the patient than conventional impressions. Compared to similar systems already available on the

market, this innovative intra-oral scanner stands out with a series of features: its metal tip, for instance, is autoclavable and can be used for more than 500 cycles. The tip is also significantly smaller, thus helping to avoid the gag reflex frequently triggered among patients. Moreover, thanks to the unit's innovative "open-mirror design", it is easy to reach and scan the distal areas of the molars. The anti-fog function guarantees fog-free scans without the need for external mirror heating.

As GC Europe's technology consultant and contract manufacturer, WILD is tasked with the transition of the GC Aadvia IOS 200 intra-oral scanner into serial production. The systems partner has also been able to contribute its optics expertise and its know-how in the areas of procurement and gluing. In future, the hand scanners will be completely assembled at WILD. "Since the scanner will be glued and it will no longer be possible to open it and perform any adjustments, there is an absolute zero error tolerance. In addition, the multitude of small parts and adjustment tasks requires a high level of dexterity to achieve the best possible performance", says WILD Project Manager Dieter Trampusch, explaining the particular requirements involved.

A new dimension of diagnostic image quality

3D scans are also an indispensable element of modern diagnostics and follow-up in ophthalmology, e.g. for the evaluation of the retina. Especially the ever-increasing pixel density of generated 3D images, which can be viewed from any angle, guarantees that diagnosis and surgical interventions derived therefrom are done more precisely than ever before. The condition for generating these optimised images is a higher scanning speed which both accelerates the work processes and improves patient comfort as a result of the significantly shorter exposure time. One of WILD's customers is currently working on a substantial increase in imaging speed. As a system partner, WILD is capable of quickly transitioning such quality leaps to serial status. "We expanded the standard change process to consider changes from the perspective of our manufacturing experts already in the development phase. As a result, we no longer suffer delays in the transition to serial production and we contribute significantly to maintain-

ing or improving our customers' technological edge", explains Manfred Gallé, Head of Medical Technology at WILD GmbH.

New 3D laser scanner generation

In applications such as architecture, the construction industry, product design, archaeology, and even in forensics, 3D scans ensure that complex spatial structures can be digitalised in high detail and displayed as three-dimensional images on a computer screen at the push of a button. WILD is working for a leading supplier in this area and, among others, manufactures the optics module for a series of 3D laser scanners. These can be used both indoors and outdoors and are characterised by an extremely high stability against temperature

and humidity variations. The portable devices are significantly more compact and affordable than previous models and achieves impressive ranges of up to 350 metres. "The creation of

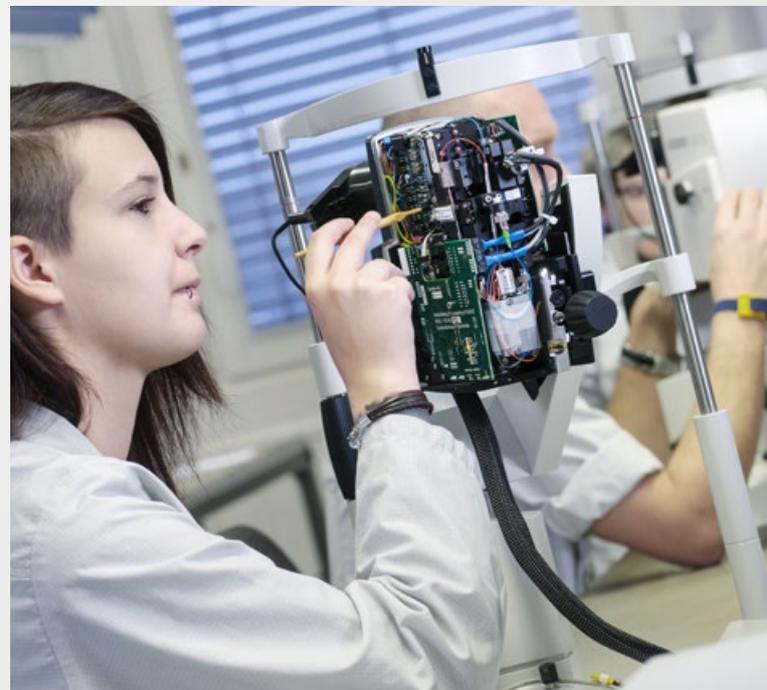
these 3D laser scanners demanded utmost mechanical and optical precision", says Stefan Werkl, Head of Optical Technologies at WILD GmbH. "We developed the adjustment processes and the test equipment together with the customer and even set up an automated measuring circuit. An additional plus for the customer was our guaranteed serial stability at an extreme quality level."

To find out more about WILD Group's core competencies in 3D scanning, visit us at the Laser World of Photonics (hall B1, stand 640).

“We expanded the standard change process to consider changes from the perspective of our manufacturing experts already in the development phase, explains Manfred Galle.

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UNIQUE INSIGHTS.

▼ PHOTONIC

Photonic showcases high-power LED modules at the LASER World of Photonics. The lighting specialist specifically adapts these to customer requirements so they may be integrated into any existing lighting system. This makes them attractive for both industrial and medical applications.

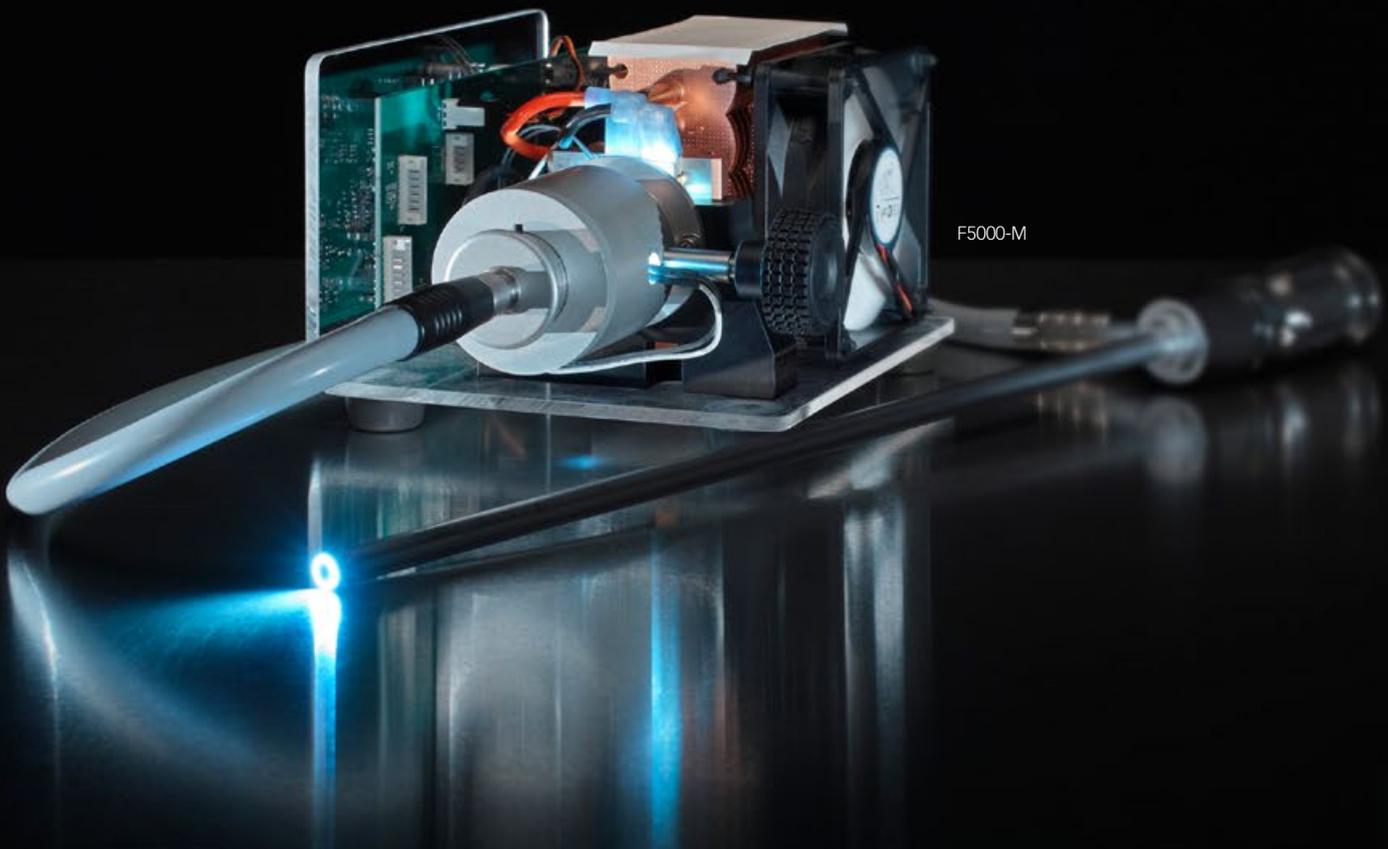
Bladder cancer is the fourth most frequent form of tumour disease among men. What makes this form of cancer particularly dangerous is the fact that the small and flat-growing carcinomas are extremely difficult to see during normal inspections using conventional white light. Fluorescence techniques, on the other hand, can make even the smallest changes in the bladder visible. Fluorescence diagnosis recently made a quality leap with the **F6000-M** by Photonic. It is currently the brightest endoscopy module on the market.

“In combination with the cascaded current drivers for extremely high LED currents, the high-end cooling system and the optical light coupling, we managed to achieve light fluxes of over 2,300 lumens at the fibre optic output. This outshines even 300-watt xenon light sources”, explains Photonic Product Manager Christoph Csekö. As endoscopes are becoming increasingly thinner, the F6000-M also stands out with its high light density for small fibre diameters.

The particular strengths of the F6000-M as well as the **F5000-M** are in great demand both in medical and in industrial settings. Ultra-high speed cameras and 3D imaging systems used for analysing quick movements or material behaviour rely on extremely high luminous fluxes. “The frames are sometimes exposed only for a few microseconds. If too little light hits the object during this time frame, the image is useless.

On the other hand, if you extend the illumination interval, quick movements will appear blurred. Therefore, when coupling light in light guides, it is necessary to push the physical limit, the so-called etendue, to the extreme”, says Christoph Csekö.

The etendue implies that one cannot change beam size and angle of a light source independently of each other. Optics developers at Photonic are bringing both modules very close to this physical limit, thus offering customers the advantages of outstanding brightness and reliability. Customer-specific requirements such as, for example, synchronised flashing, a feature critical in automation





F4000-M

applications, can be quickly implemented on the basis of Photonic's modules.

In the development of the **F4000-M**, Photonic focused on another important aspect: compact size. As a result, this all-rounder is predestined for small illumination areas. Its possible applications range from treatment units for ENT or dental clinics to portable cameras in industrial and medical endoscopy or installation in the support arms of surgical microscopes. Depending on the configuration, their brightness is comparable to 150W halogen or 100W xenon light sources and thus significantly higher than in existing systems of this size.

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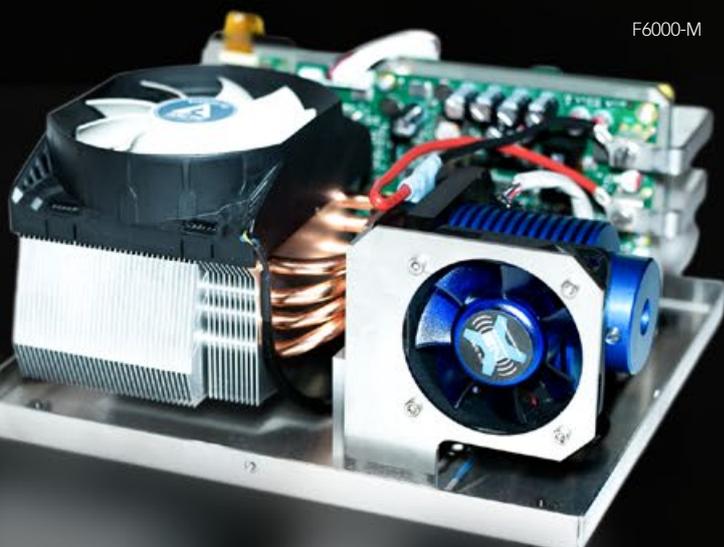
Modular setup

To properly highlight the various applications of its systems, Photonic offers its customers a series of development and production services ranging from application

consulting and system integration support to interface definition and front-end/back-end design. The technological substructure for customer-specific developments is a modular setup. The latter allows all LED modules by Photonic to be specifically adapted to customer requirements

and be integrated into any existing lighting system.

The company's highly skilled developers in its optics, mechanics, software and electronics divisions are capable of delivering every bespoke solution.



F6000-M

MEETING POINT: LASER WORLD OF PHOTONICS

For more details on Photonic's expertise, come and talk to the WILD Group experts at **stand 640, hall B1**. We look forward to seeing you there!



↗ PRODUCTION ↗ DEVELOPMENT

A HOLISTIC APPROACH.

▼ WILD

From the development and printing of new components to the production of complete 3D-printing systems based on different technologies: WILD is creating a unique knowledge platform for 3D printing.

In order to design components that can be manufactured economically, developers must be able to take an “additive” approach from the very beginning. At WILD, this rethinking process has been under way for years as part of its Technology Roadmap. “We are currently training our developers in the so-called ‘AddManu Knowledge’ programme, which was put together in collaboration with universities. During their training, they study all of the possibilities of 3D printing and we are encouraging a new way of thinking in engineering”, WILD Group CTO Wolfgang Warum explains.

In addition, the teams have direct access to three printers for the production of components using stereolithography and fused filament fabrication technologies. The company recently purchased a 3D printer for components measuring up to 500 x 400 x 510 mm. Flexibility is also a given when it comes to the choice of materials. The result are prototypes,

small series and gluing or assembly instruments made from e.g. polyamide with carbon fibre, ABS and resins with varying elasticity and rigidity. The company also plans to print using materials such as PEI, PPT, TPE, steel filament, and the flame-resistant filament ABS-FR (UL94 V0), which is used where special fire safety standards apply.

“Together with the WIN partner network, we effectively offer all interesting printing technologies and have access to the countless years of experience of our partners. This helps us both in construction and in the best possible design of the printing process”, says WILD Group CEO Josef Hackl. WILD is thus always able to provide the best-suited solution for a customer, without having to give preference to the techniques available within the company.

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The WILD Group

The WILD Group comprises the WILD brands based in Völkermarkt, Wernberg (Austria) and Trnava (Slovakia), and the Vienna-based Photonic. We are your reliable partner on a path of continuous growth. We generate an annual group turnover of 95 million euros with a staff of 451 highly qualified workers and employees.