ability of adapting the sensor individually to the customer's needs. If there are special requirements on the wavelength, sensitivity, or the dynamics, a module optimized for these parameters can be developed without having to change the complete sensor electronics.

Today, already a specially adapted version of the processobserver is being used for 3D printing processes by the company EOS.

Outlook

In such an innovative branch as laser processing, you have to think about the future today. Currently, a version of the processobserver with photodiodes sensitive in the near infrared range, is being worked on and will be released in 2019. This means that thermal process emissions can be measured even more accurately.

In the future, more and more intelligence and processing will be transferred from the software to the sensor which makes closed-loop control of processes much easier.

It allows the early recognition of trends and thereby the avoidance of rejects. This helps to optimize the process, hold it within specified limits, and in the end to achieve the ultimate goal to "Produce Quality. Always."

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Fig. 3 Plasmo Quality Suite

Improved Laser Technology for Producing Plastic Molds

Joint research project "eVerest" to enable efficient machining of surfaces in the automobile industry

The dashboard is nice and shiny; the steering wheel feels like soft leather – and yet is made of plastic. The furniture grain looks deceptively real, even though the desk is not made of wood. And the keyboard on the desk is simply more visually appealing and easier to use when the surface is structured. "The structure of an object's surface is indicative of how we perceive its level of quality," remarked Prof. Ulrich Wittrock from the Department of Engineering Physics at Münster University of Applied Sciences. "Surface structures play a key role in enhancing optical and haptic properties. They are gaining importance as a sign of quality."

The steering wheel alone has four differently structured surfaces, creating a high-quality impression of the car and its fittings. (Source: Münster University of Applied Sciences)

This knowledge can be capitalized upon for many applications – after all, everything has a surface. In the case of the joint research project "eVerest", it is used to the automobile industry's advantage. In this field, finely structured surfaces are created to give vehicles and their interior fittings an elegant, high-quality appearance, a great feel and, ideally, a longer life.

"Surface structures are created by what we call injection molds," explained Sven Verpoort, supervisor of the project in the Photonics Laboratory. "The material is pressed into the structured mold and, when removed, the pattern is visible on the surface." However, producing molds is a very complex and expensive process, particularly when creating new structures. "This is where our partners come in: they are developing an innovative machining technique that uses a laser to process injection molds quickly and precisely." Not only will this technology halve production times – compared to the current state of the art – the machining technique will also involve a completely digitalized process and can be used without any knowledge of laser ablation processes and techniques.

The Photonics Laboratory team's task is to develop a mirror that enables laser precision on a micrometer scale. "We have already completed the first prototype," stated Wittrock. The team has now presented its prototype at the latest meeting of the eight project partners – intense exchanges are extremely important for successful collaboration.

The eight partners in "eVerest" are: Volkswagen, Scanlab, Amphos, Precitec, Sauer, Münster University of Applied Sciences, RWTH Aachen, and Fraunhofer ILT. The project is funded by the German Federal Ministry of Education and Research (BMBF) and the KIT.

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