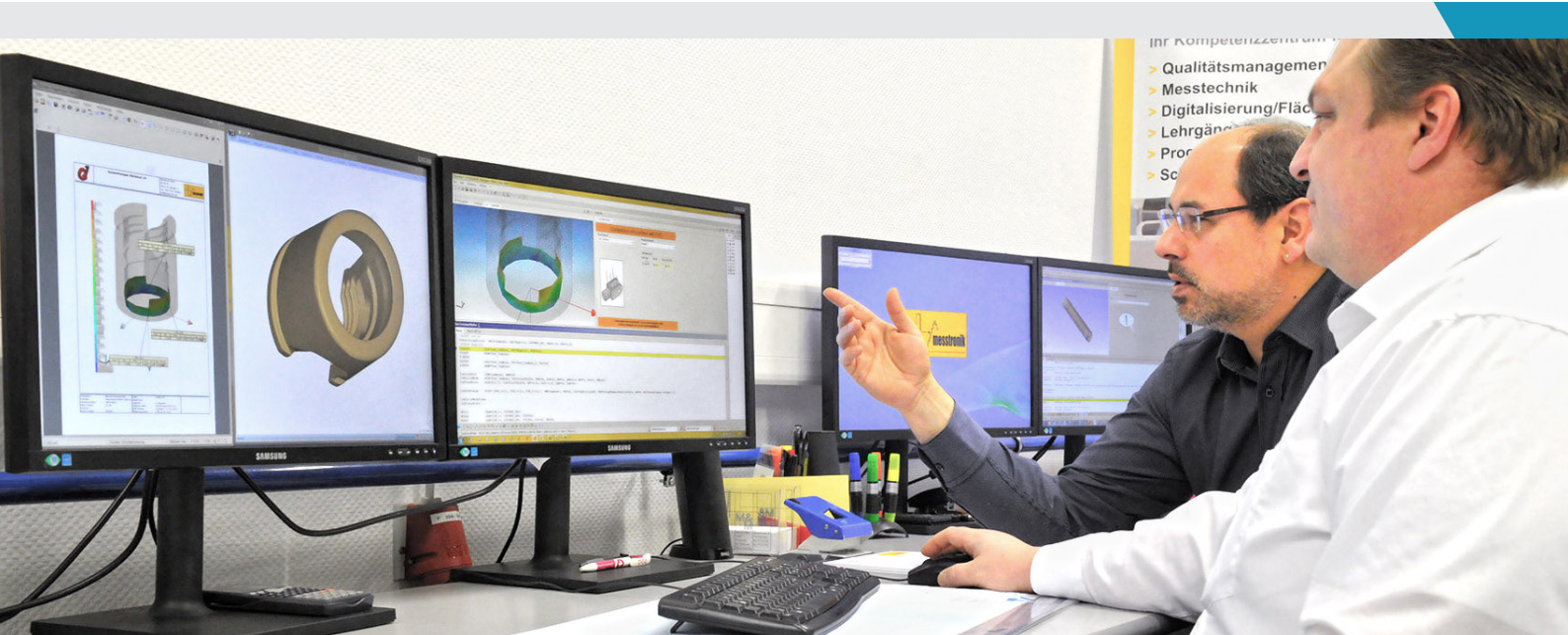


QUINDOS RESHAPER – UNITING MEASURING PROCESSES AND LINKING DATA

Messtronik GmbH, St. Georgen, Germany

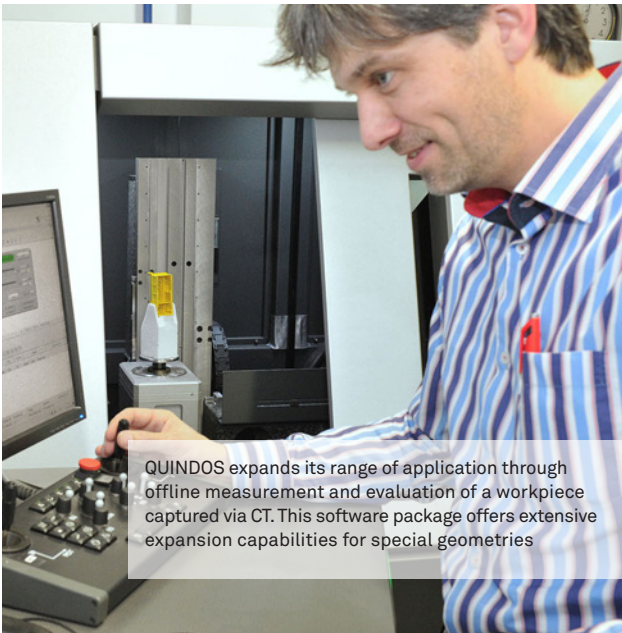


New realms of coordinate measuring technology

By Harald Richter

The Black Forest. Thanks to successful tourism advertisements, this name is associated with cuckoo clocks and the scent of pine trees, but the early birds in the forest and wood carvings aren't the only ones to catch the worm. Traditionally, companies based in this region have also been among the most "bright-eyed" in the country, particularly technology-oriented mid-sized ones. A fine example of this is Messtronik GmbH in St. Georgen, Germany, a service provider who exemplifies how a vision can be transformed into new realities in measurement expertise. QUINDOS Reshaper helps make it happen.

Founded in 1983, Messtronik GmbH have since become one of the most experienced, versatile and innovative measurement service providers in Germany. Customers include suppliers and manufacturers in the fields of



automotive engineering, aerospace engineering, model and tool engineering, mechanical engineering, injection moulding, microelectronics, energy systems and medical technology. Around 80 percent of the company's measurement orders are in the particularly demanding fields of mechanical engineering and medicine.

As a centre of expertise, Messtronik cover an impressively broad spectrum of services, from measuring technology and digitalisation/reverse engineering to quality management and measuring program creation to on-site user training and support.

Interdisciplinary thinking is thus an essential component of entrepreneurial behaviour here, both with respect to a diversified customer topology and a broad product range.

A wide variety of measuring technology sources

"Combining expertise to develop new opportunities. Enabling every industry to utilise knowledge obtained from a variety of different sources. This ambition, Messtronik's ambition, feeds our vision of future-oriented measuring technology." This is how Managing Director Jörg Weisser defined his company's credo.

And the company's modern headquarters in St. Georgen is indeed home to a variety of sources. They've got the full gamut of measuring technology covered, from tactile CMDs, contour and surface measuring devices, laser scanners, white-light scanners, profile projectors, measuring microscopes and, since 2006, computer tomography.

By expanding their machine park to include computer tomography, Messtronik also put themselves in a position to guarantee fully non-destructive digitalisation of plastic and lightweight metal components. They could carry out X-ray image analyses, capture internal geometries and inaccessible features and generate 3D CAD models from the CT data obtained.

Technical components which are unsuitable for tactile measurement or clamping for optical measurement due to their complexity or material sensitivity are also ideal for measurement using tomography. These include plastic parts for the medical industry and connector housings, for example.

"Laser scanner and CT technologies represented an enormous advantage in measurement potential, but they also came hand-in-hand with enormous volumes of data, that is, point clouds," explained Jörg Weisser. The great challenge was in analysing and evaluating these large data volumes in accordance with the measurement positions and functional characteristics involved. A very exciting idea came up alongside this challenge:

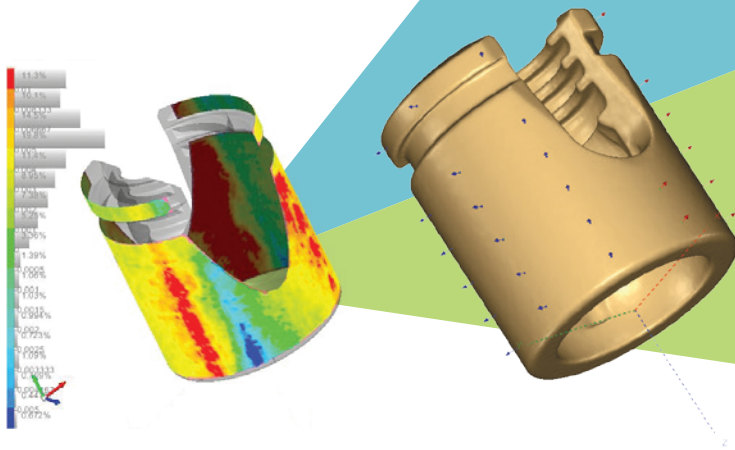
direct, sensor-independent 1:1 comparison of measurement data

"From the very beginning, we were fascinated by the idea of one day comparing this enormous body of data 1:1 with the measurement results of our other sensors, such as tactile sensors for example. Or maybe even to be able to process measurement data from different sensor and device sources with a single program! This would save us from having to consider the plethora of software tools available for individual measuring processes," said Messtronik application engineer Ralf Neubauer of the company's vision at the time.

This vision has since become a reality thanks to the "Reshaper" option of the QUINDOS measuring and evaluation software from Hexagon Metrology.

Messtronik have been relying on the QUINDOS application software since the early 1980s, making them some of the most experienced users of this high-performance measuring technology measurement platform in Germany. With the new QUINDOS Reshaper option, Messtronik are now able to implement a fully consistent measuring and analysis concept.

The Reshaper option enables users to process large point clouds from laser scanning sensors and measuring devices with white-light scanner technology and STL computer tomography data sets.



Measuring a virtual component (STL) in QUINDOS Reshaper – Measuring strategies from single-point probing to scanning in CNC mode; graphical representation of the evaluation using a CAD model (colour gradient and histogram display)

From point cloud to polygon mesh – Using the Reshaper option in measurement work

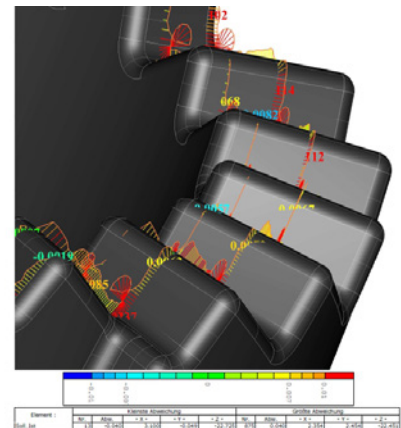
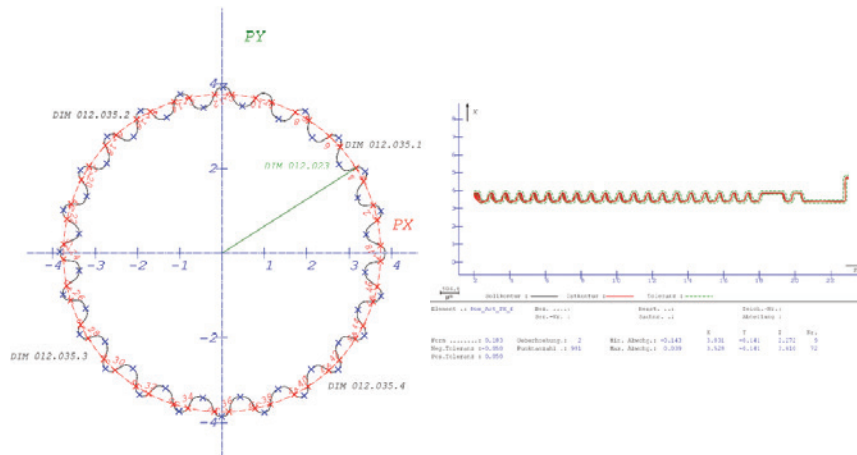
Reshaper converts the point cloud captured by the measuring system into a mesh, which is then effortlessly measured and evaluated with the QUINDOS software package using the digital map of the actual component.

QUINDOS and 3D Reshaper communicate using the standardised I++DME interface here. Data exchange between packets occurs in the same way as with a CMD.

“What this means for us is that Reshaper has suddenly given us the ability to uniformly evaluate and analyse

components digitalised using different sensor technologies at a single workstation, using a single program and with immediate 1:1 comparison,” said Jörg Weisser enthusiastically.

“And what’s more,” added application engineer Ralf Neubauer, “we are now able to take measuring programs created for tactile CMDs and use them to measure virtual components from a CT with no problems whatsoever. All it costs us is two additional program commands and less than five minutes to make the adjustment, and it doesn’t constrain the measurement strategy in any way. Not only that, but this transferability works in every direction between the measuring processes. This is flexibility on a whole new level.



Evaluating special geometries down to the smallest dimensions (contour cross section, gearing with a root radius of 0.2 mm) with the same high degree of professionalism.

Quindos® Reshaper



I++DME Server



3D RESHAPER® The 3D scanner software



A measuring device park with a wide array of sensors, but only one program for professional handling of special geometries: QUINDOS. "With QUINDOS Reshaper, measurements are taken directly on the surface of the workpiece. Unlike tactile measurement, radius compensation is not required for this reason. This makes everyday work incredibly easier."

“
” ...at a single workstation, using a single program and with immediate 1:1 comparison...

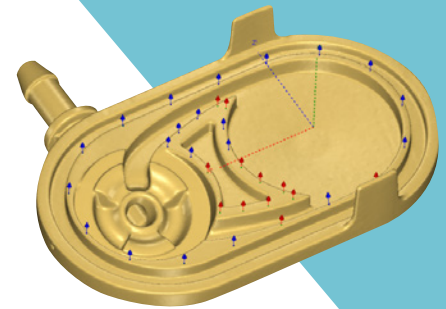
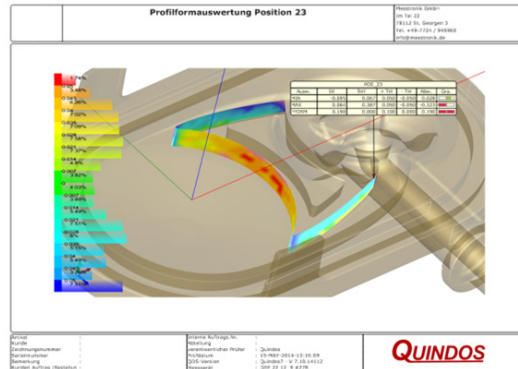
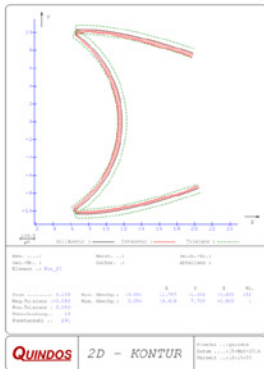
This quantum leap towards an integrated, cross-sensor measurement concept is highly advantageous not only for Messtronik, as it enables end-to-end workflows and considerably faster throughput as well.

Immediate advantages to the customer

Thanks to QUINDOS Reshaper, the individual advantages of different measuring processes meld together in a cohesive way for Messtronik customers. This makes it possible, for example, to determine the ideal measuring points of a virtual component created via CT for subsequent serial tactile testing, with immediate creation of the tactile measuring program based on the CT point cloud or the mesh (STL) generated from it.

Manual single-point probing is carried out on the screen using the mouse. Reshaper returns the actual points, and the defined probing points are immediately sent to the tactile measuring program and processed there.

“This moves us into the range of 10 µm accuracy. With certain workpieces, glass cylinders for example, we are even able to achieve accuracy of 2 to 3 µm, depending on the sensors. This is generally much more precise than our customers' specifications require,” said Ralf Neubauer.



Time- and location-independent evaluation

It doesn't end there, though, as yet another of Messtronik's visions has been made a reality: freedom from space and time thanks to time- and location-independent evaluation with professional measurement strategies and traceable measurement results.

"The decoupling of measurement from subsequent evaluation in QUINDOS Reshaper gives us enormous freedom," explained Managing Director Jörg Weisser, who sees this as an extremely important factor. "Consequently, this means that we can move measurement and analysis from the measuring room to the conference room or anywhere else in the world. The only thing we need for this is the virtual map of the workpiece from the CT or scanner and QUINDOS Reshaper."

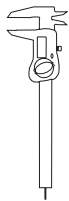
"Time is a factor which has also taken on a whole new dimension," said Jörg Weisser in looking toward the future. "Theoretically, a digital part can be 'stored' on a hard disk for an unlimited amount of time and potentially re-evaluated again years in the future using newly developed evaluation strategies.

Even the ravages of time, like ageing caused by environmental influences on real components, lose their bite when it comes to digital workpieces. They have the

advantage of indefinitely retaining their shape, geometric form and surface texture in the original condition in the form of measurements.

Jörg Weisser sees his company as being ideally equipped for the future with Reshaper in yet another way: "From gearing measurement to turbine blade evaluation, the software can be expanded with over 50 different options. This opens up an array of interesting prospects. Against this background, as well, you can expect plenty of pioneering new services from Messtronik in the near future."

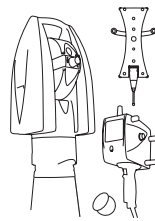
As much as Block Forest folk may insist on the precision of their cuckoo clocks, they are very much ahead of their time when it comes to measuring technology.



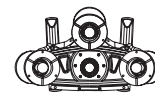
PRECISION MEASURING INSTRUMENTS



PORTABLE MEASURING ARMS



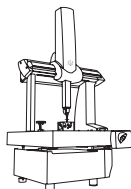
LASER TRACKERS & STATIONS



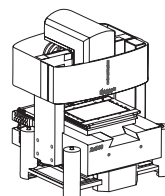
WHITE LIGHT SCANNERS



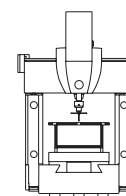
SENSORS



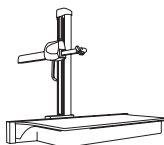
BRIDGE CMMs



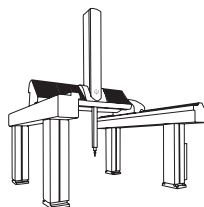
MULTISENSOR & OPTICAL SYSTEMS



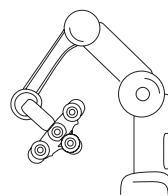
ULTRA HIGH ACCURACY CMMs



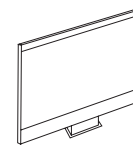
HORIZONTAL ARM CMMs



GANTRY CMMs



AUTOMATED APPLICATIONS



SOFTWARE SOLUTIONS



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