



# TECprocess presents the first automatic tool changer for ultra-short pulse laser machining

Anzeige



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**T**ypical applications of ultra-short pulse (USP) laser technology include engraving and cutting for watchmaking and jewelry parts, texturing of micro-molds for miniature optical systems, engraving and cutting in medical devices, including black-marking applications, micro-machining by laser turning, etc. The inherent upcoming challenge to address increasingly complex demands is combining laser technology, flexible optical setup and metrology on a single platform in order to achieve improved parts of unprecedented quality in the shortest possible time.



## State-of-the-art

USP laser technology offers great advantages in terms of quality and flexibility, but the rapid on-going evolution of laser and optical systems and the

relative youth of the technology still holds it back due to several hurdles: complex setting-up of new recipes, time-consuming manual and empirical process optimization, result consistency, large-scale acceptance of combined optics machines, accessibility to metrology equipment for data acquisition on machined part. The resulting conservative approach when investing in new equipment makes thus the decision often lean towards conventional, widely spread and mastered processes despite the intrinsic advantages of USP laser technology.



## The Innovation

The proposed solution is a novel hardware system enabling the combination of several optics, metrology and other devices in a single process setup. The patented RAYVOLVER is an automatic tool changer based on a high-repeatability reference clamping mechanism. It meets both the ambition for optical versatility and the need for integrated metrology by allowing optimization without constant human intervention and paves

the way towards efficient use of the full capabilities of USP laser machines. This triggers phenomenal productivity benefits by combining it all on the same machine without compromising operation simplicity or part accuracy. Resulting assets like timesaving and reliability are unique by simply eliminating risky repositioning and recalibration of semi-finished and potentially expensive parts.



## Integrated Laser Scan System

The core component for the laser beam deflection is a scan head. SCANLAB's compact SCANcube or the high-end excelliSCAN were chosen for process accuracy and dynamic performance reasons. The deflection of the laser beam occurs at the scan mirrors, which are quickly and precisely positioned by galvanometer scanners. The broad choice of coatings, including multi-wavelength coatings to adapt to various laser wavelengths. For 2D applications typically an F-Theta lens is used at the scan system's beam exit to focus the laser beam. For executing different processing tasks, it can be

necessary to change between differing focal lengths or laser coatings of the F-Theta lenses. Traditionally this lens change needs to be done manually by a trained person/operator. Thanks to RAYVOLVER, optimizing this workflow with an automated solution leads to additional productivity and to more flexibility.



## Outlook

The RAYVOLVER, in combination with the outstanding performance of SCANLAB scan-heads, unleashes the full potential of high-quality USP laser processing and allows product designers and production specialists to go beyond the boundaries set by conventional solutions. The implicit evolutivity of the process, starting from a simple engraving operation up to the full combination of probe-sensing, vision, engraving, cutting, texturing, finishing, quality control, handling, etc. enables total process control. Discover the game-changing solution NEXELAN, the future for large-scale, accessible and affordable integration of USP laser systems.



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