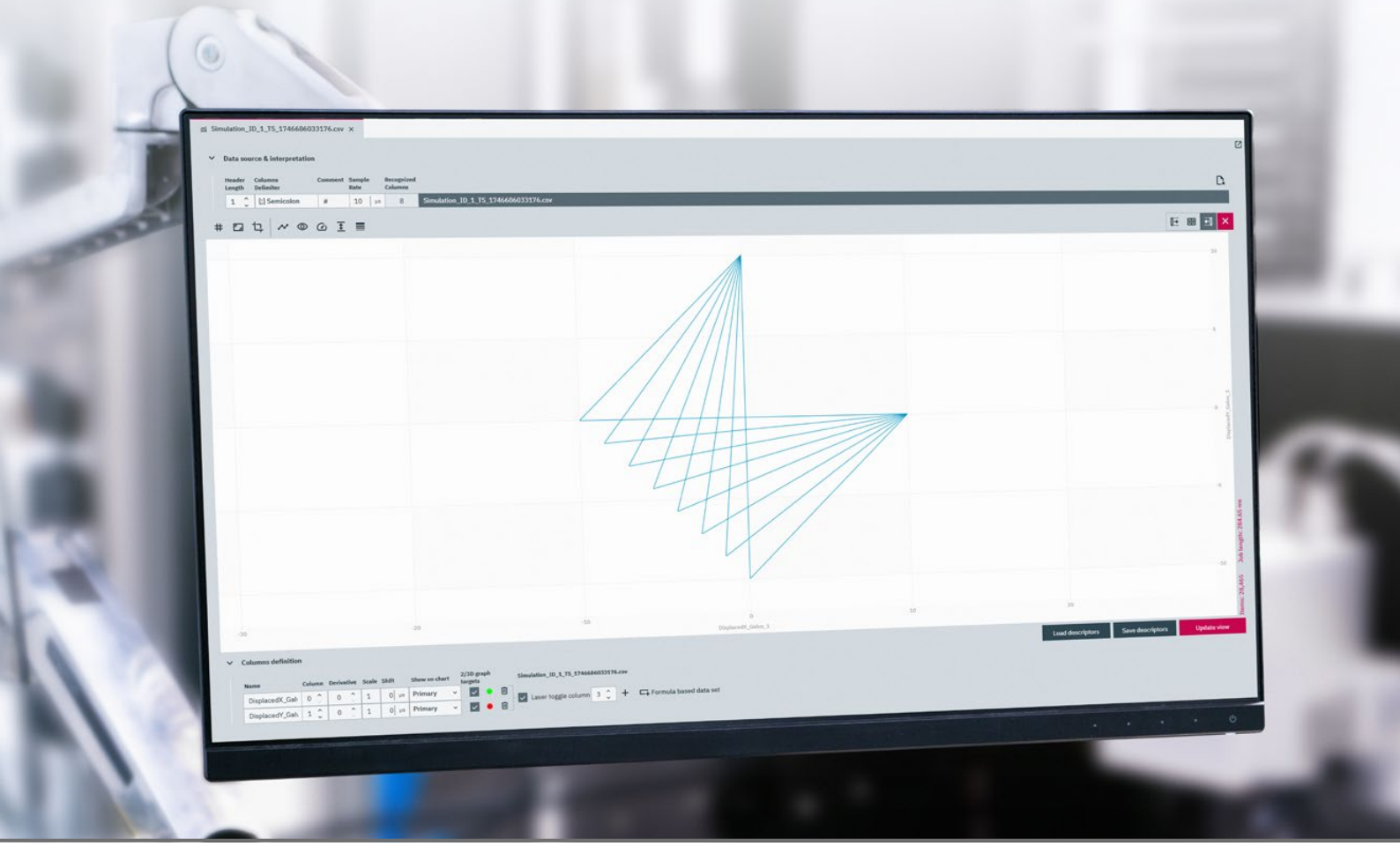


*SCAN*motionControl

Precise Laser Processing – Minimum Development Efforts

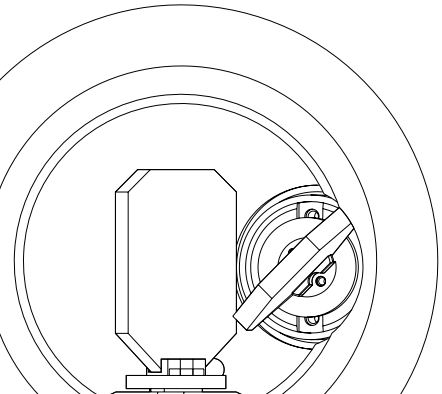
*SCAN*motionControl calculates optimum laser spot trajectories by taking into account the physical limits of the scan system and the defined process parameters. The result? Outstanding processing quality achieved with minimal effort.

The software also offers an offline simulation of marking results and execution time, allowing you to fine-tune parameters directly from your PC, and eliminating the need for time-consuming laser lab testing:

What you simulate is what you get!

Typical Applications

- Additive Manufacturing
- Microstructuring
- Display Production
- Solar Cell Processing
- Battery Cell Manufacturing

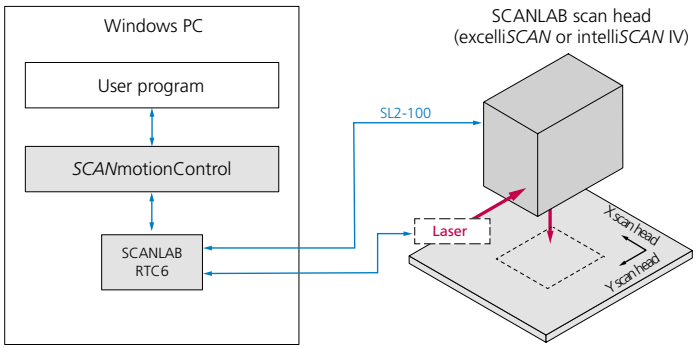


SCANLAB
innovators for industry

Optimal Control of Laser Processes

Define the desired processing patterns for the laser spot on the work piece in your custom application. The SCANLAB software *SCAN*motionControl translates the processing pattern into target position values for the laser scan system, into target values for the laser trigger signals (up to 1 MHz), and the laser power. These precalculated values are transferred to the RTC6 control board, which handles communication with the laser and the scan system's control electronics.

Conventional control systems require complex tuning of various process parameters. *SCAN*motionControl automates this step by optimizing the trajectory based on process-relevant values, such as path tolerance. This leads to better machining results and high process speeds.

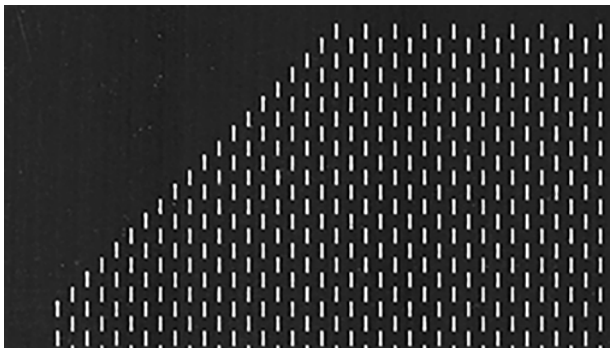


*SCAN*motionControl Features

Sub Cycle Switching

In order to achieve exact positioning and homogeneous energy input for short lines with high scan speeds, exact path-synchronous triggering of the laser is crucial.

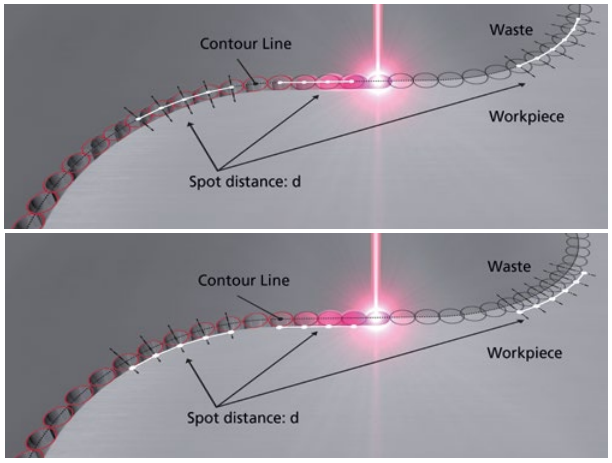
With *SCAN*motionControl and the Sub Cycle Switching function of the RTC6 control board, that enables up to ten switch-on and switch-off events within 10 µs, such processes can be executed extremely quickly and precisely.



Advanced Spot Distance Control

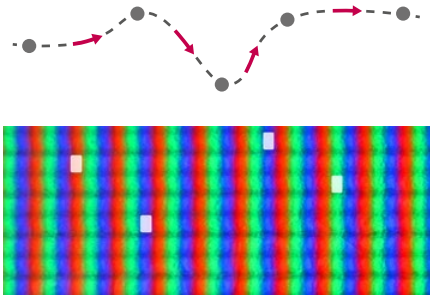
Spot Distance Control (SDC) is an innovative feature of the RTC6 control boards to keep the laser pulse spacing constant along any scan pattern. With a resolution of 64 MHz, SDC triggers laser pulses to maintain the desired pulse spacing.

In combination with *SCAN*motionControl, SDC can be expanded to contour-dependent laser control. The constant distance can be aligned either along the centerline of the laser pulse chain or tangential to the workpiece's side. This means that inhomogeneities or burn-in can be avoided, even on sensitive materials, and a uniform workpiece edge can be achieved.



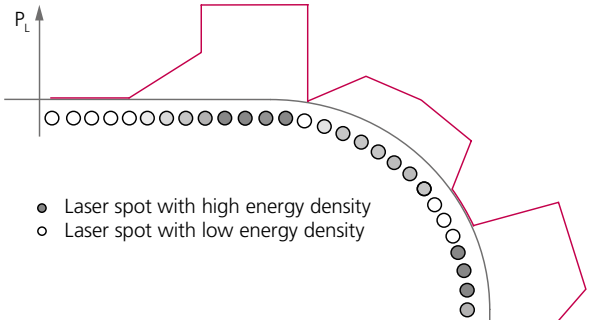
Shot Sequence

Enables the calculation of time-optimized trajectories between irregularly distributed points. The individual laser pulses can be set ‘on the fly’, while dynamically switching between jump and marking speeds. Compared to conventional ‘jump-and-shoot’ methods (which slow to zero before each point), Shot Sequence reduces vibrations and significantly speeds up process times. Shot Sequence is already used, for example, in display processing to remove defective pixels.



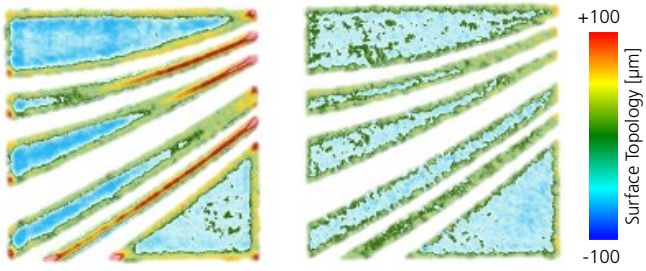
Power Ramping

Additional flexibility is provided by the position-accurate variation of the laser signal (power ramping). Depending on the requirements, an analog signal profile for laser power control can be defined along the trajectory. Even multiple parameter changes and jumps for individual vectors are possible.



High-Precision Laser Control

*SCAN*motionControl enables precise synchronization of the scan path and laser parameters. When used with a compatible laser, users can define not only maximum and minimum scan speed limits, but also position-dependent pulse spacing and laser spot energy density. By dynamically adjusting laser power in conjunction with scan speed, the system delivers a consistent, well-defined energy input.



Bulging effect on part edges in conventional laser powder bed fusion (LPBF) processes due to local overheating as a result of excessive energy input.

*SCAN*motionControl ensures consistent energy input with its precise, position-synchronized control of laser power and spot trajectory.

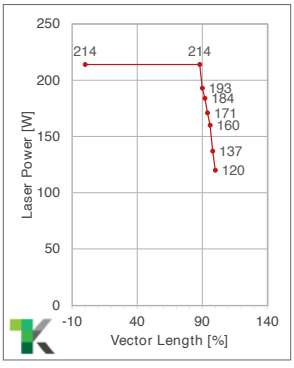
High-Resolution Parameterization

In additive manufacturing, precise control of the laser power is a key element for high component quality. The cooperation with 1000 Kelvin GmbH and its physics-based AI AMAIZE shows how *SCAN*motionControl can be parameterized with high resolution (100 kHz). This allows accurate execution of AI-optimized power profiles along the scan path, delivering unmatched results.

AMAIZE optimization

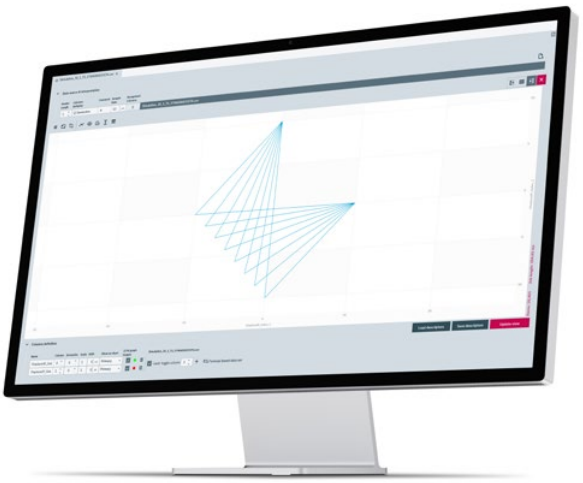
AI-calculated energy distribution for each part layer
Hatch vector in black

Power Profile



Power profile along the hatch vector

*SCAN*motionControl:
Increases quality and reduces costs



- **Exceptional Precision**
  Automatically optimized motion profiles with maximum conformity to the processing pattern.
- **Short Laser Process Times**
  Efficient scan path planning, optimum use to the scanner dynamic, and minimized laser-off times through time-optimized jump movements.
- **Simplified Workflow**
  Effortless job setup, simulation, and evaluation via *SCAN*motionStudio and *SCAN*assist. The execution time can be estimated during simulation.

Watch the video for more information about *SCAN*motionControl

Ready for *SCAN*motionControl

SCANLAB Scan Heads

All scan heads of the excelli*SCAN*- and intelli*SCAN* IV series with *SCAN*ahead tuning are fully compatible with *SCAN*motionControl. They can follow dynamically constrained trajectories without tracking error.

Integration into existing system architectures requires only a software update.

Contact us to learn more about the possibilities!

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