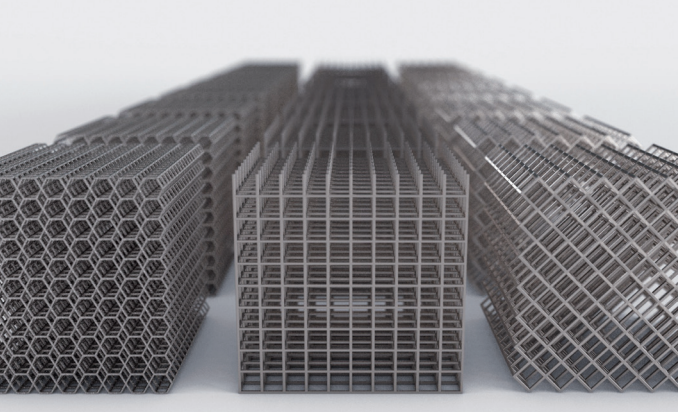




excelliSCAN Series with SCANahead Technology

Process Accelerators for Additive Manufacturing

SCANahead – Innovative Scanner Control



High-End Systems for Additive Manufacturing

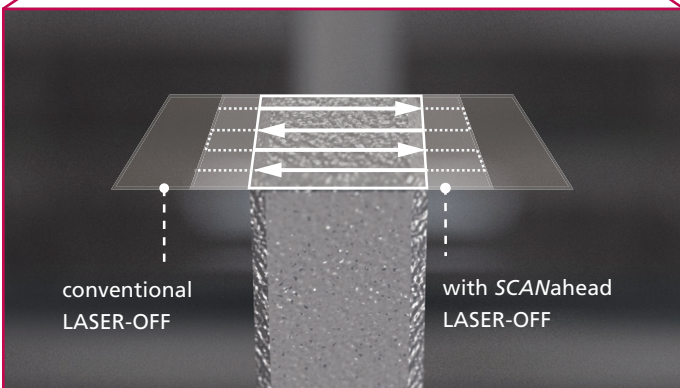
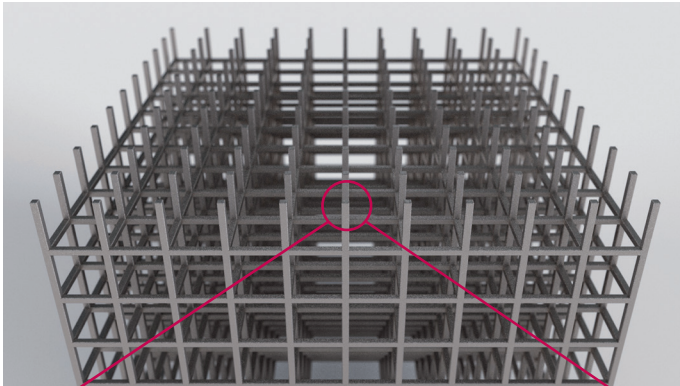
Powder-based 3D printing offers maximum component-design flexibility. Additive manufacturing enables fabrication of modern, lightweight structures, such as used in the automotive and aerospace industries.

Industrial laser processing systems for 3D printing have long relied on SCANLAB scan systems to guide the focused laser beam precisely and with high dynamics across a powder bed, thereby melting defined areas.

SCANahead Control Boosts Productivity

Faster 3D printing throughput is conventionally achieved by utilizing multi-head systems or higher laser power. But additional potential is offered by modern technologies such as SCANLAB's SCANahead servos, which can significantly cut process time via much shorter LASER-OFF periods. This effect is particularly pronounced for filigree component structures.

Grid structures are typically fabricated by guiding the laser focus in bidirectional scan vectors over the numerous small areas to be processed. The large number of short scan vectors requires a high proportion of acceleration and braking periods (LASER-OFF). SCANahead control enables much higher dynamic performance than conventional servos. The result is shorter paths during LASER-OFF times (see figure lower left).



SCANahead control shortens acceleration and deceleration paths

High Throughput Thanks to High Acceleration

SCANahead control allows scan systems to deliver full acceleration independent of the scan speeds (i.e. with minimum acceleration duration t_a). The galvos' dynamic performance potential is optimally utilized.

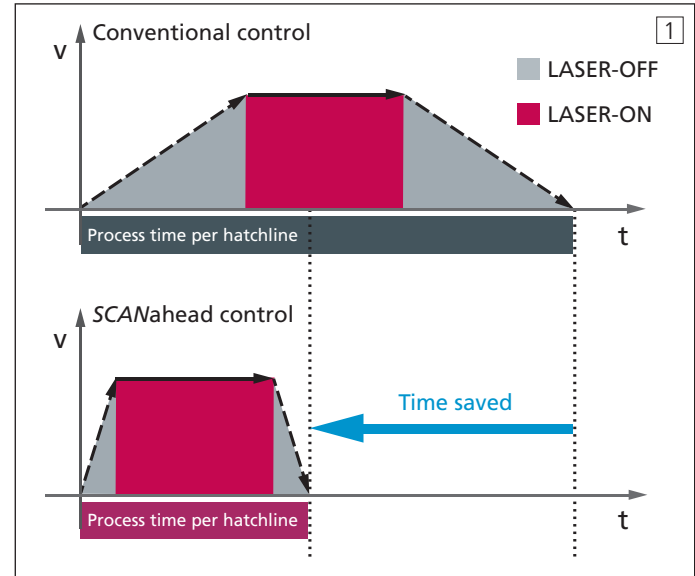
The rapid accelerations sharply shorten acceleration periods and braking periods. This significantly reduces the time during which the laser remains switched off at each hatch line (see diagram 1).

This cuts process time and also boosts productivity, without requiring changes to process parameters (process speed, laser power etc.).

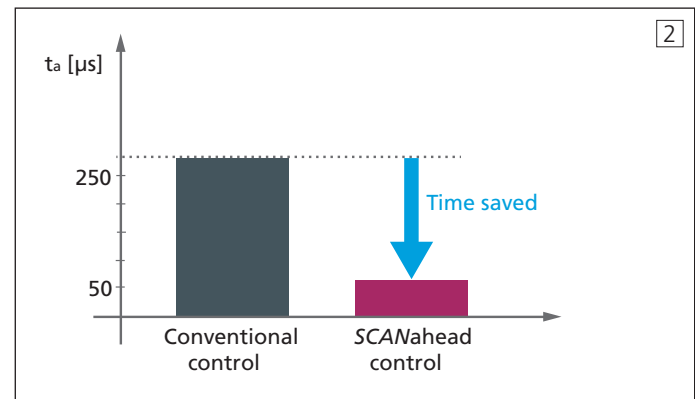
Compared to conventionally controlled scan systems, SCANahead servo control can reduce LASER-OFF time (= acceleration time t_a) by approx. 80% at a scan speed of $v_{\text{scan}} = 1\text{m/s}$ (see diagram 2).

SCANahead Control's Advantages in 3D Printing

- Boosts productivity via significantly shortened acceleration times
- Reduces process time with no need to change process parameters
- An universal tuning assures maximum user friendliness – no delay adjustments necessary!
- Highest accuracy (contour fidelity) and long-term stability thanks to the latest digital encoder technology – even for challenging scan jobs

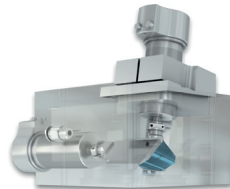


With unchanged LASER-ON times, SCANahead control significantly shortens LASER-OFF times (acceleration and braking).

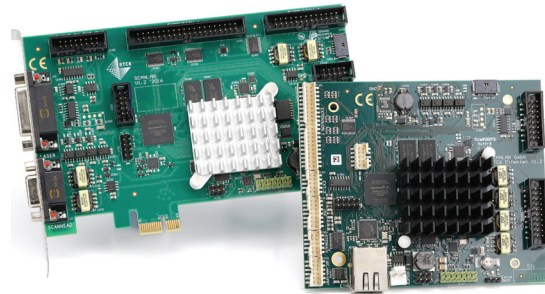


Reduced acceleration time with SCANahead control*

*Simulation results are based on system with 14 mm aperture and $f=500\text{ mm}$.



New!



excelliSCAN 20 – Highlights

- New mechanical design with strict spatial separation of optics and electronics
- Air-cooled mirrors allow usage even at high laser powers
- Optional integrated sensors provide mirror and system temperature monitoring for enhanced process safety

Additional excelliSCAN family advantages

- Digital galvanometer scanners with 20-bit technology for maximum positioning accuracy and long-term stability
- Digital output stages deliver ultimate performance and efficiency
- Optimized mechanics and cooling for improved long-term stability
- Convenient and simple commissioning (setup and parameter determination) thanks to universal tuning and automatically defined scanner and laser delay settings

RTC6 – Control Board for SCANahead Systems

SCANLAB's powerful RTC6 control board supports all excelliSCAN scan system features, and offers the following additional advantages:

- Ethernet variant
- SCANalone functionality (available Q1/2020)
- Improved processing-on-the-fly functionality for ultra-precise processing of moving workpieces
- New Spot Distance Control (SDC) function allows precise laser processing even during acceleration and braking phases when used with pulse-on-demand lasers

11/2019 information is subject to change without notice.
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