

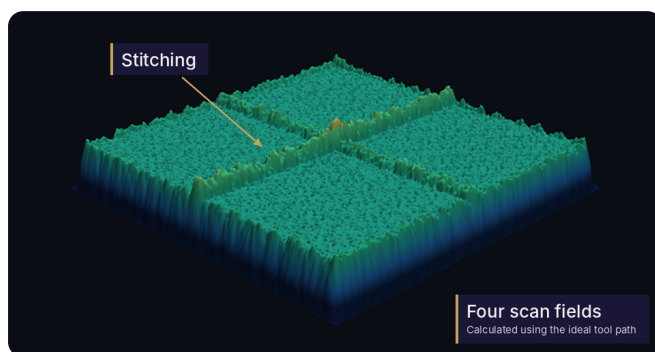
See the effect of every parameter before the first pulse

lpi.tool makes the effect of process parameters visible: energy distribution, beam path and ablation geometry. Before the first pulse, not after the next test series.

THE PROBLEM

Every parameter change in scanner ablation needs new tests: mark speed, pulse spacing, hatching, scan-field seams. The effect shows only on the workpiece under the microscope, and each iteration costs machine time, measurement time and material.

lpi.tool uses the scanner manufacturers' own path planning (SCANahead, SCANmotionControl, XL SCAN) to show what really happens. Application engineers develop and optimise processes faster.



Ablation prediction across 2×2 scan fields: the stitching seam shows before the first test.

YOUR BENEFIT: BETTER DECISIONS

lpi.tool gives every application engineer the calculation that otherwise only well-trained specialists do with many spreadsheets, or very experienced engineers hit by intuition.

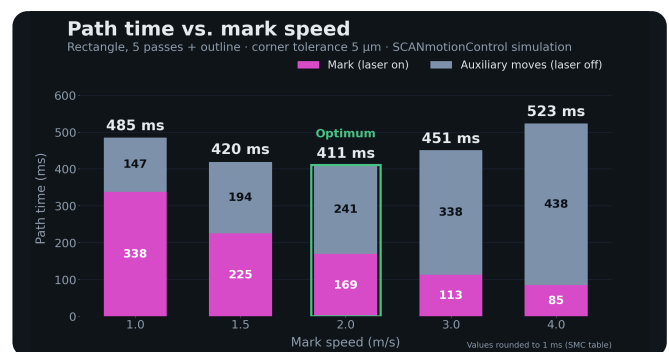
- **Fewer test loops:** the first parameter choice lands closer.
- **Throughput:** the fastest mark speed is a chart, not a gut feeling.
- **Knowledge stays in house:** calibrations and setups stored with their origin.

HOW TO START

A calibration on your material and machine with your existing measured fields. You see the prediction on your own data before you buy a licence.

WHAT LPI.TOOL MAKES VISIBLE

- **Energy distribution:** how pulses and energy are spread over the surface for the chosen parameters.
- **Beam path:** as drawn and as the scanner really runs it, with speed drops at corners and the time lost.
- **Ablation geometry:** depth and shape with a new proprietary approach, on calibrated material, including the seams between scan fields.



Path time over mark speed, from the scanner's own simulation: above the optimum, a higher mark speed makes the job slower, not faster.

WHY LPI.TOOL

Experience shows: a validated calculation is more accurate than intuition. Calculation plus intuition is unbeatable.

The prediction is calibrated and checked against measurements: in a pre-study on an industrial production machine it reached $R^2 = 95.6\%$ with 5 % scatter ($0.25\ \mu\text{m}$). The tool also flags setup values that do not fit the data.

Function	What it delivers	Status
Hatching and pulses	Hatch pattern, spot, overlap, pulse spacing on the ideal path; scan-field tiles with seams	Available
Ablation prediction	Depth and shape from the path with a new proprietary approach, on calibrated material; seams between scan fields	Available
Calibration	Model from your own measured fields; three fit quantities; origin of every number stored	Available
SCANmotionControl	Path time over mark speed; laser on vs. off; path coloured by speed; optimisation for path fidelity or path + speed fidelity	Available (simulation, SCANLAB licence)
XL SCAN	Special scanner/axes split mode provided by SCANLAB and ACS; split by adjustable threshold, both paths in the picture	Available (simulation)
RTC6 direct path	Sending to the scanner card without intermediate layer	Programmed
Measurement import	WLI raw data (Heliotis), masking, roughness to ISO 25178 / ISO 21920	Available as a separate tool

Path sources. Ideal tool path (as drawn, without dynamics) · SMC simulation (precomputed by the scanner) · Measured (recording on the hardware). The source is stated on every result.

Component	Supported
Scanner card	SCANLAB RTC6; SCANahead scanners via SCANmotionControl
XL SCAN	SCANLAB RTC6 with ACS SPiiPlus and the ACS SLEC synchronization node
Laser source	Light Conversion Carbide (connection, interlock, emulator for simulation without laser)
Measurement device	Heliotis WLI (.hdat); other formats via export
Computer	Windows 10/11, .NET; licence dongle for the SCANLAB simulation

VALIDATION

- Pre-study on an industrial production machine: $R^2 = 95.6\%$, scatter 5% ($0.25\ \mu\text{m}$).
- Further validation project including a pilot, funded by Innosuisse, just started.
- Ongoing testing of hardware and software features.

AVAILABILITY

Ready for installation on your machine. Talk to us about your machine configuration, application and materials.

Demo videos: laserintelligence.ch/demos

COMING NEXT

- **Ablation prediction from the SMC simulation:** the prediction follows the path the scanner actually plans, including speed drops and corners.
- **Ablation prediction from real scanner data:** the path recorded on the scanner becomes the basis of the prediction.
- **Planned, simulated and measured side by side:** for path and ablation, in one view.

More features, more applications and more materials to come.