netvision
engineered solutions

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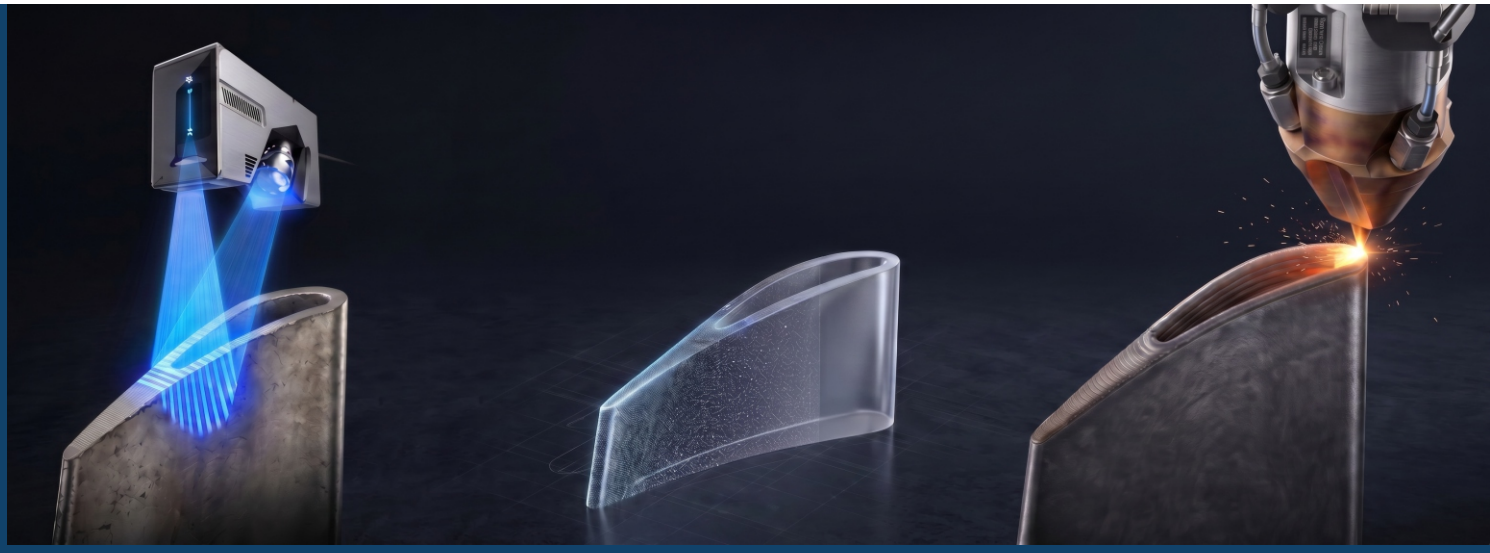
netvision LaserTools LMD for blade tip repair

netvision offers premium machining solutions for experts.

The netvision LaserTools product line offers simple and intuitive solutions for any type of laser processing especially cutting, welding or direct energy deposition such as laser metal deposition (LMD).
Processing of complex parts can be performed quickly, efficiently and with high quality. The netvision LaserTools solutions combine reliable, automated toolpath generation with ease of use. Programs are simulated in the real machine environment and adapted before being sent to the machine, so that collisions with parts, fixtures or machine elements are ruled out.
As an offline programming solution netvision LaserTools reduces time consuming teach-in procedures and therefore minimizes waste of valuable machine resources.
One process in which netvision LaserTools demonstrates its strength is blade tip repair.



Main advantages and benefits of netvision LaserTools LMD for blade tip repair

1. **Integrated scanning for instant repair readiness**
   The direct-to-machine scanner captures the geometry in real time and feeds it seamlessly into netvision LaserTools. High-quality point clouds are automatically cleaned, meshed and refined into repair-ready models, including precise detection of critical wear regions. This integrated scan-to-toolpath workflow delivers maximum accuracy, short setup times and consistently repeatable laser cladding results.

2. **Parametric templates for intelligent process automation**
   LaserTools are build on a powerful parametric engine to define all strategy and process rules for laser cladding repairs.
   These reusable templates enable automatable adaptation of deposition paths, layer logic and technology parameters to the actual geometry, while optional expert adjustments enable fine-tuned control when needed. The result is a consistent, scalable workflow with minimal setup effort and maximum process reliability.

3. **Thermal deposition simulation for process-safe planning**
   LaserTools provide a physics-informed simulation of the laser cladding process, visualizing material deposition, heat distribution and melt-pool behavior in real time. Geometrical layer build-up, dilution as well as thermal effects are predicted directly on the model, enabling reliable strategy validation and early detection of critical areas. This ensures stable process parameters, reduced trial-and-error and consistently high repair quality.

4. **Virtual production environment**
   The integration of the machining environment's digital twin into the netvision LaserTools environment provides a constant overview of the entire manufacturing process.
   Manual toolpath modifications are reflected instantly in the collision analysis. The virtual CNC controller allows immediate updates of the NC program after manual modifications are made.

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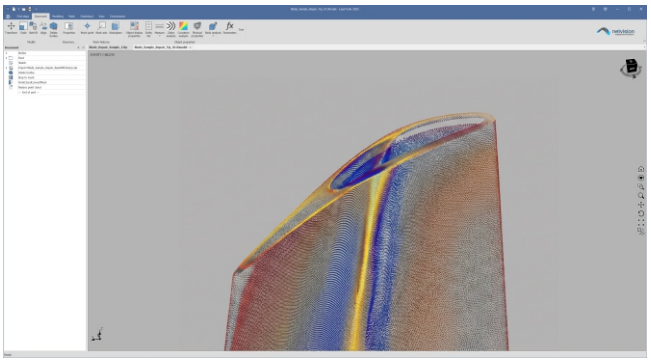
netvision LaserTools LMD for blade tip repair

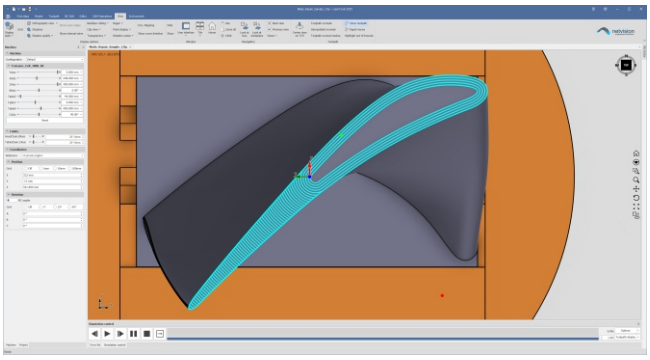
Model preparation

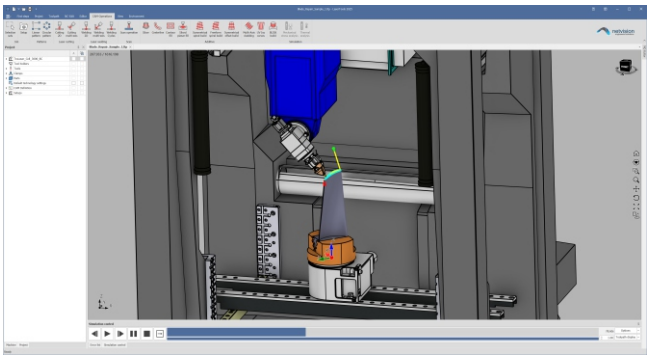
- **Scan-to-nominal comparison (Best-fit)** — Highlighting of deviations and wear
- **High-precision scan import** — Point-cloud acquisition from machine-mounted or external scanners
- **Automated cleaning** — Removal of noise, outliers and holes
- **Point-cloud to mesh** — Triangulation, smoothing and decimation
- **Mesh repair** — Automated repair of gaps, overlaps and geometric defects
- **Surface/Solid reconstruction** — Generation of CAD-ready surfaces and solids
- **Feature extraction** — Detection of edges, contours and repair-relevant regions
- **Offset & trimming** — Automated creation of repair envelopes
- **Curve smoothing** — Automatic or manual refinement of scan-derived curves
- **Supported file formats:** DXF, DWG, STEP, IGES, STL, BREP, IPT, IAM, 3DM



Toolpath planning

- **Seamless CAD interoperability** — Import, modification and preparation of models for automated deposition
- **Scan-to-path integration** — Use of point clouds or meshes for repair-ready toolpaths
- **Geometry-driven path generation** — Automated toolpaths based on repair zones
- **Parametric repair templates** - Reusable process templates for consistent deposition strategies
- **Adaptive layer planning** — Dynamic adjustment of layer thickness, overlap and bead layout
- **Automatic technology selection** — Power, speed and feed parameters tuned to geometry and material
- **Collision-safe motion planning** — Simulation and verification of nozzle, head and machine kinematics
- **Multi-axis deposition support** — 3+2 and 5-axis strategies for complex repair geometries
- **Heat-aware toolpath optimization** — Reduced distortion through controlled energy input



Virtual machine simulation

- **Critical-axis acceleration insights** — Highlighting of dynamic load behavior during motion
- **Operation-to-NC connectivity** — Maintaining of direct links between machining steps and code
- **Deposition process simulation** — Recreation of additive buildup with optional mesh export
- **Best-fit positioning** — Part aligning for optimal geometric accuracy
- **Breakpoint-driven analysis** — Enabling of focused inspection of critical process moments
- **HMI action emulation** — Mirroring of machine-side commands such as fixture operations
- **Subroutine and cycle execution** — Machine logic reflection for realistic program behavior
- **NC version control** — Tracking of program revisions throughout the workflow
- **NC transformation engine** — Adapting and restructuring of NC programs for new setups
- **Integrated NC editing** — Direct in-environment for code refinement
  Digital-twin execution — Mirroring of realistic NC behavior utilizing a fully synchronized virtual twin