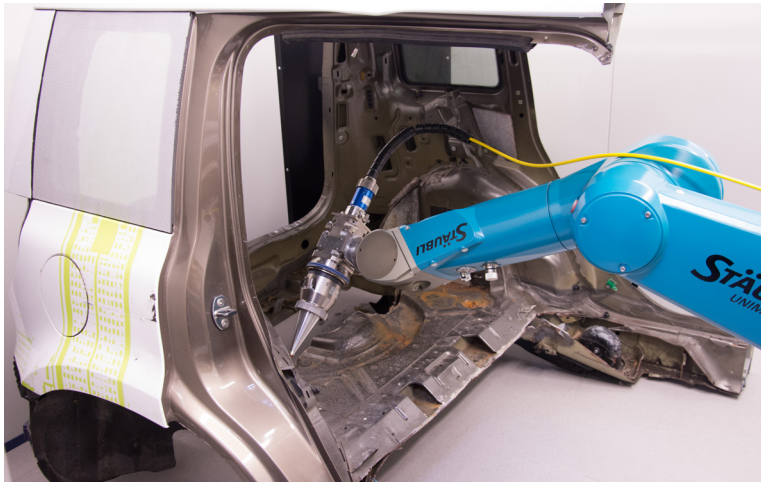


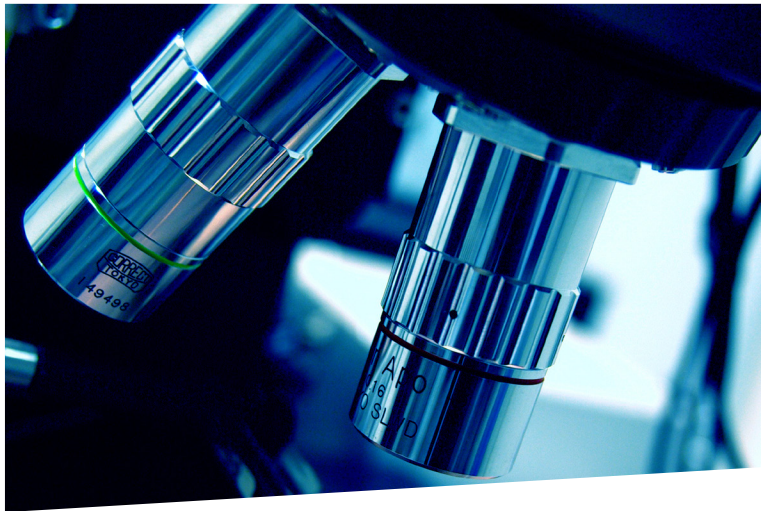
Laser Micromachining

Technical equipment

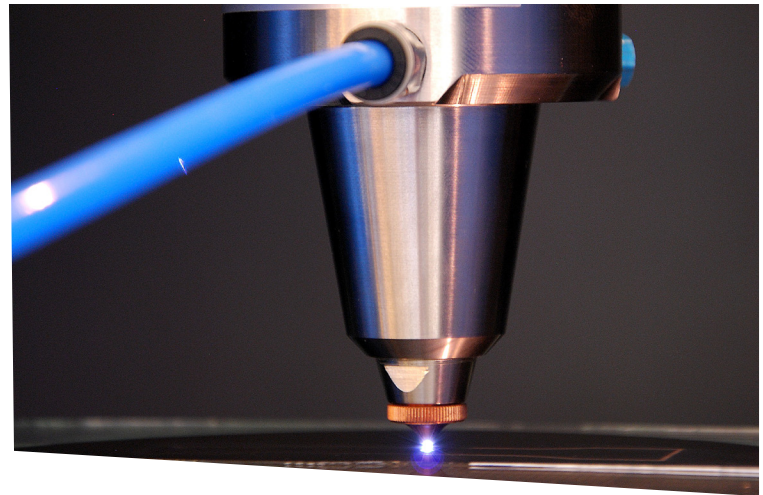
6 axis robotic arms



Laser system for micromachining



Measuring microscope

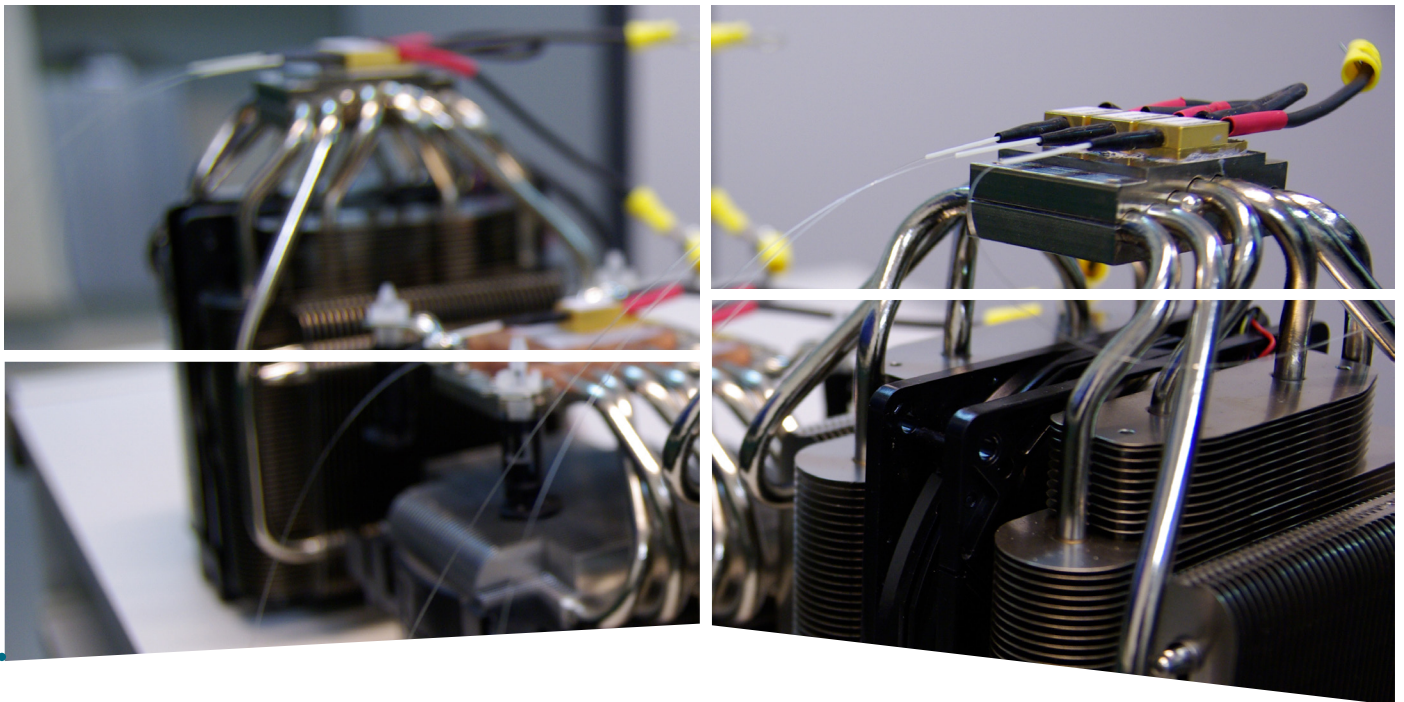


Micro head cutting

ALPhA **NOV**
Optics & Lasers Technology Center

LASERS

- Femtosecond 300 W @ 1030 nm, 30 μ J, < 500 fs
- Femtosecond 100 W @ 1030 nm, 330 μ J, 350 fs
- Femtosecond 40 W @ 1030 nm, 40 μ J, 350 fs
- Femtosecond 35 W @ 1030 nm, 200 μ J, < 350 fs
- Femtosecond 20 W @ 1030 nm, 100 μ J, < 350 fs
- Femtosecond 5 W @ 1030 nm, 10 μ J, 350 fs
- Sub picosecond 57 W @ 1030 nm, 76 μ J, < 1 ps
- Picosecond 2 W @ 1064 nm, 50 μ J, 10 ps
- SHG/THG module for femtosecond
- YAG, 10 W @ 1030 nm, 0.5 J, 100 Hz, 10 ns
- Diodes fiber continuous wave 1 KW @ 915 nm
- Fiber, 20 W @ 1070 nm, 100 ns
- Fiber CW/QCW 300 W @ 1070 nm, 30 J, 100 μ s @ 10 ms
- Fiber CW/QCW 1200 W @ 1070 nm, 120 J, 100 μ s @ 10 ms
- Continuous wave 10 KW @ 1070 nm
- Fiber continuous wave, 25 W @ 1090 nm
- CO2 300 W @ 10,6 μ m



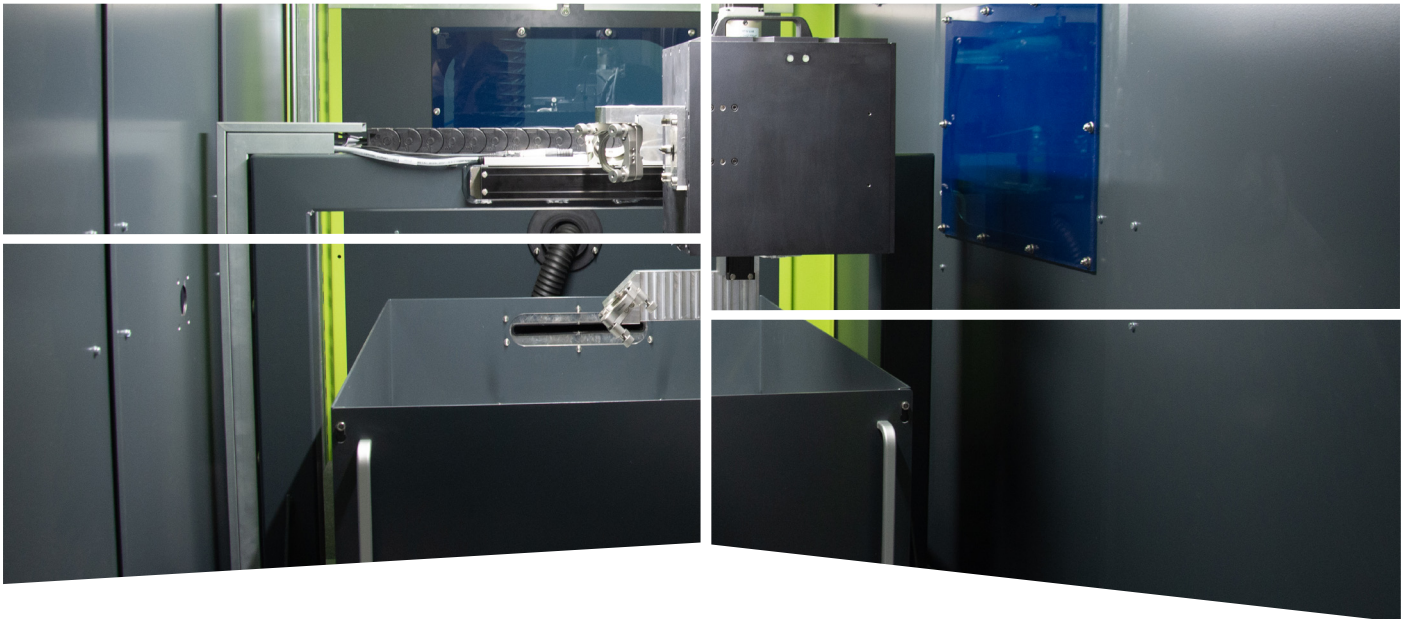
NEW TECHNOLOGIES 2022

Lasers

- Nanosecond laser 30 W @ 515 nm, 300 μ J, 2-20 ns ajustable
- Nanosecond laser 20 W @ 343 nm, 200 μ J, 2-20 ns ajustable

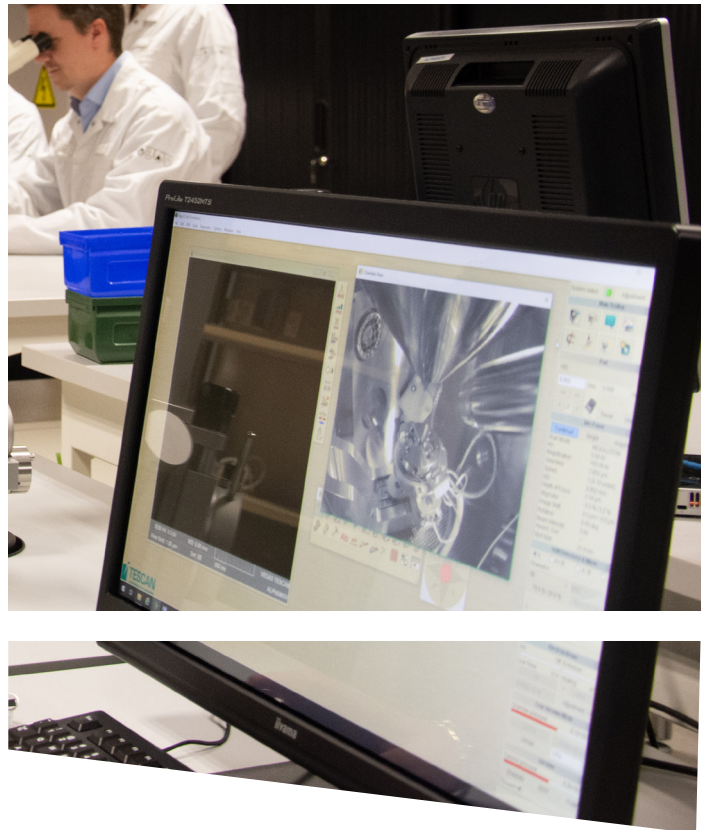
WORKSTATIONS

- Machines and workstations for 3D micromachining
- Machine for high precision micromachining 900 x 600 cm
- Machine for high precision micromachining roll to roll, spool width 500 mm
- Machine for precision machining (focalisation < 5 μm) equipped with a hybrid hexapode ALIO
- Galvo-scanner ExcelliSCAN 1030 nm and 515 nmh and 343 nm
- Galvo-scanner Intelliscan 1030 nm, 515 nm and 343 nm
- Galvo-scanner Hurriscan II and III 1030 nm
- Polygonal IR and Green scanner, scanning speed up to 100 m/s
- Polygonal IR scanner scanning speed up to 300 m/s
- Scan solution for synchronously controlling a scan head and translation stages / Scanlab XLScan
- Dynamic focus module
- IR, Green and UV cutting and drilling heads
- Cutting-edge optical components for beam shaping (top-hat profile, polarization converter, DOE, SLM)
- 6 axis robotic arm KUKA, STAUBLI, FANUC field of 1 x 1 m²
- Caterized on-the-fly drilling platform
- Blackbird unity for robotic arm and scan mirrors synchronisation



RELATED METROLOGY

- Scanning electron microscope (SEM) Tescan Vega 3 with EDX
- 3D reconstruction module for scanning electron microscope
- Atomic force microscope Nanosurf flex-axiom
- Optical microscope with image analysis system
- Optical system for 3D surface measurement
- Measuring microscope with calculator
- UV-VIS-NIR beam diagnostic
- Desktop scanning electron microscope
- 4-point measuring stand for resistivity measurement
- Measuring arm 3D FARO arm edge
- Measuring microscope with analysis measurements
- Geonimeter for contact angle measurements
- Colorimeter in the visible range
- Spectrophotometer equipped with integrating sphere
- Chainsaw, wrapper and polisher for metallographic analysis
- Camera IR Telops FAST L200 (MCT, 7,7 μm @ 9,3 μm)
- Pyrometer (from 200 °C to 3 300 °C)
- Reflectometer
- Traction / compression bench
- Optical profilometer Zeiss Smartproof 5
- Fast camera (1 000 ips)
- Blackbody (from 500 °C to 1 200 °C)



NEW TECHNOLOGIES 2022

Lasers

- Phase contrast imaging with wavefront sensor SID4 PHASICS
- Bright field microscope transmission / reflexion 10x-20x40x-60x et 100x