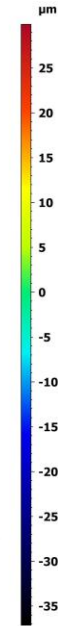
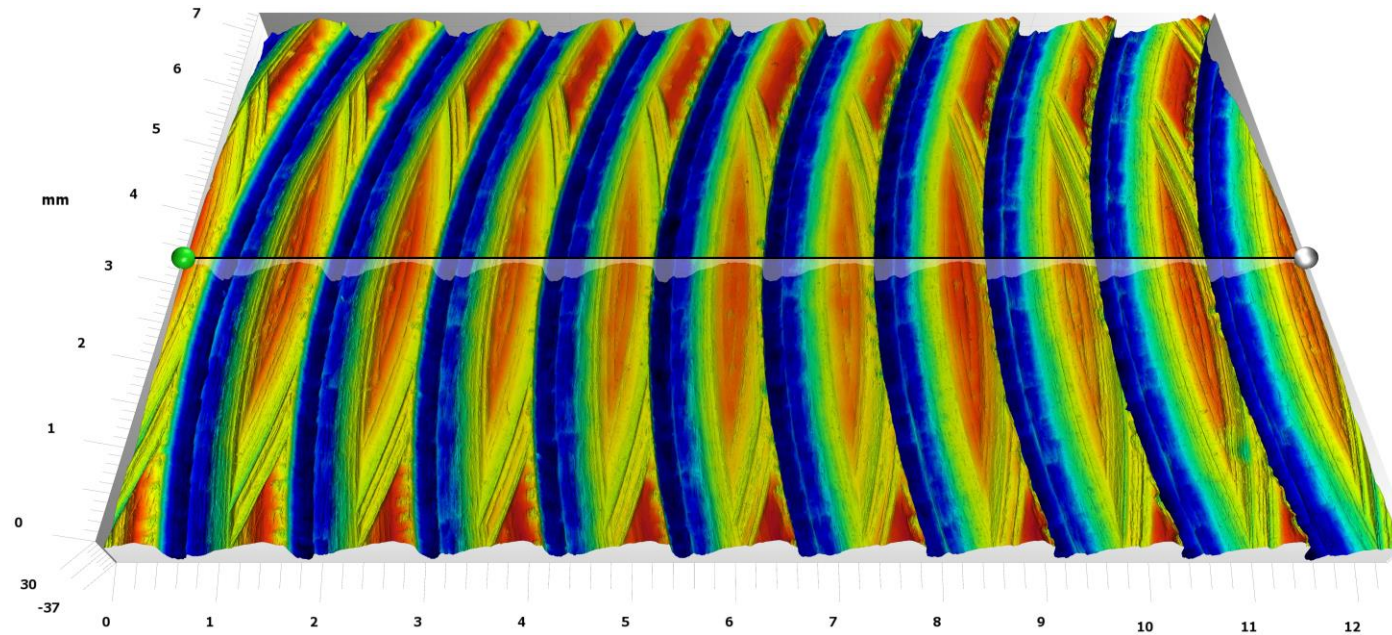


high speed sensor



with manual exchangeable objective



advantages and applications

high speed sensor
with 10GigE Camera and 935 fps combined with real time calculation of 3d data

inline application

The speed of the data acquisition shortens the cycle times and reduces the impact of vibration.

- inline roughness measurements
- measuring of micro geometries
- without anti-vibration systems

large area measurements

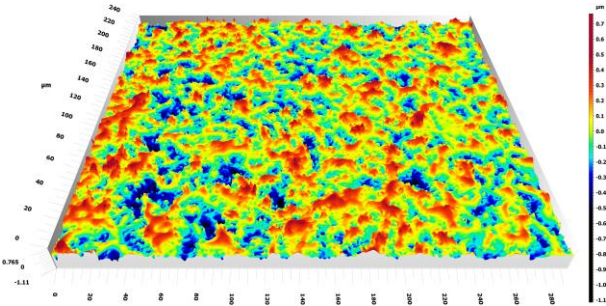
Fast single scans accelerate the high resolution measurement of larger areas.

- scanning of objects up to several cm²
- roughness measurements and large area control of small defects

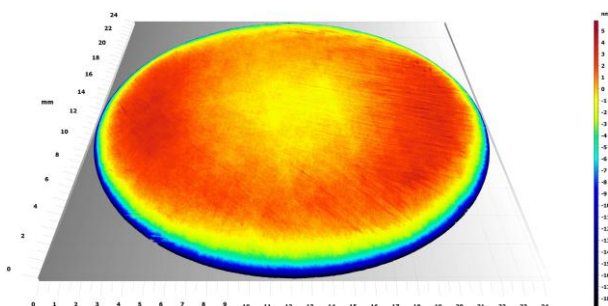
high resolution measurements

The speedy acquirement of many images out of the interference zone to reduce the sensor noise.

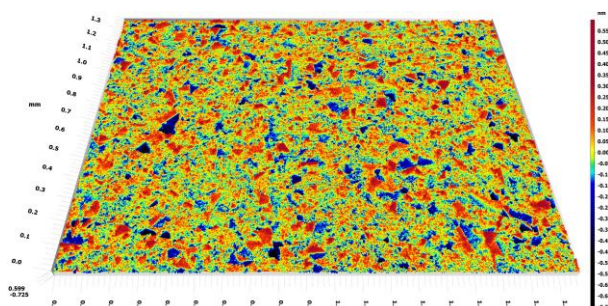
- wafer roughness
- control of optical surfaces
- measurement of super polished surfaces



laser structured surface



plane glass



super polished crystal mirror



general specification

sensor	measurement technique weight height x width x depth	white-light interferometry ca. 2.1 kg ca. 270 x 127 x 66 mm ³
camera	resolution interface speed full resolution	1280 x 1024 10 GigE 935 fps
scanning device	type scan range linearity	piezo positioning system 400 µm < 0.06%
control unit	PC	Core I9, 64 GB RAM, Windows 10, 1 TB SSD, GPGPU
	hardware components	piezo – controller light – controller controller for motorized stages (optional) 100 - 240 VAC, 50/60 Hz
	housing weight height x width x depth	19“ industrial rack ca. 26 kg ca. 300 x 520 x 400 mm ³
software	surface scanning data evaluation 3d calculation height digitalization image aquisition data quality	smartVIS3D MountainsMap® real time on the GPGPU (general purpose graphic processing unit) dynamical, down too 0.01 µm infinite focus image without interference fringes accordance to an ideal interference signal for each measuring point
environment conditions	operation temperature relative humidity	10 - 35 °C up to 80%; non-condensing

performance and objective specification

speed / full camera resolution	16 $\mu\text{m/s}$	65 $\mu\text{m/s}$	195 $\mu\text{m/s}$
repeatability RMS	0.004 nm	0.005	0.008
topography reproducibility	0.05 nm	0.1 nm	0.2 nm
1- σ repeatability 245 nm step	0.2 nm	0.2 nm	0.2 nm
1- σ repeatability 20 μm step	10 nm	3 nm	2 nm
1- σ repeatability 100 μm step	20 nm	10 nm	5 nm

	2.5x	5x	10x	20x	50x	100x	115x*
working distance / mm	10.3	9.3	7.4	4.7	3.4	2	0.7
aperture	0.075	0.13	0.3	0.4	0.55	0.7	0.8
measuring field / mm ²	6.7 x 5.4	3.4 x 2.7	1.6 x 1.4	0.83 x 0.68	0.34 x 0.27	0.16 x 0.14	0.15 x 0.12
spatial sampling / μm	5.2	2.6	1.3	0.65	0.26	0.13	0.11

*repeatability RMS, 10x objective, EPSI, single scan, without profile averaging, lab conditions, 1 Million measuring points after 3x3 denoising filter

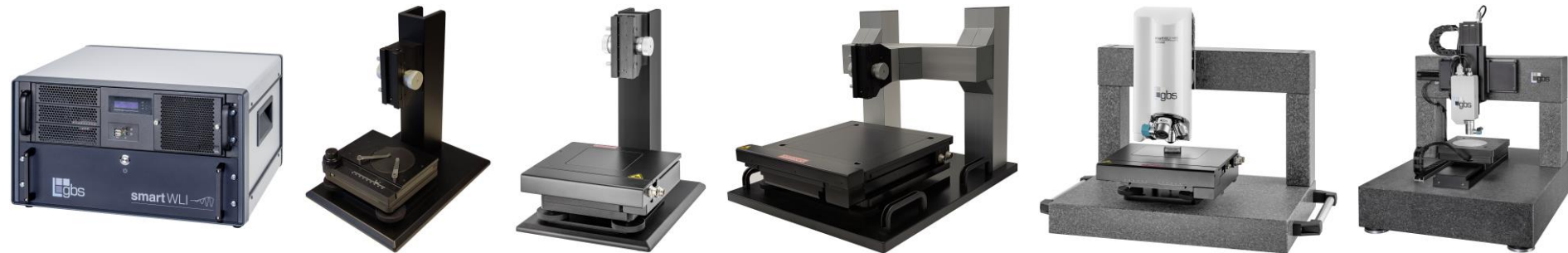
** $\text{Sq}/\sqrt{2}$ – profile difference of 2 scans, EPSI, single scan, without profile averaging, laboratory conditions, 1 million points after 3x3 denoising filter

***Olympus 100x objective –calculated magnification in relation to the 100x Nikon objective



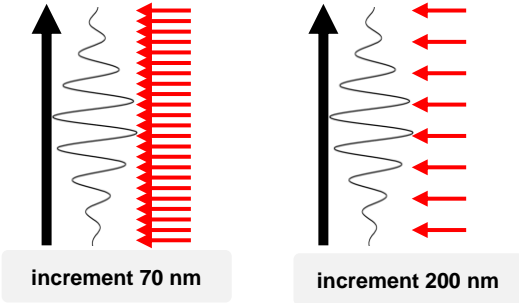
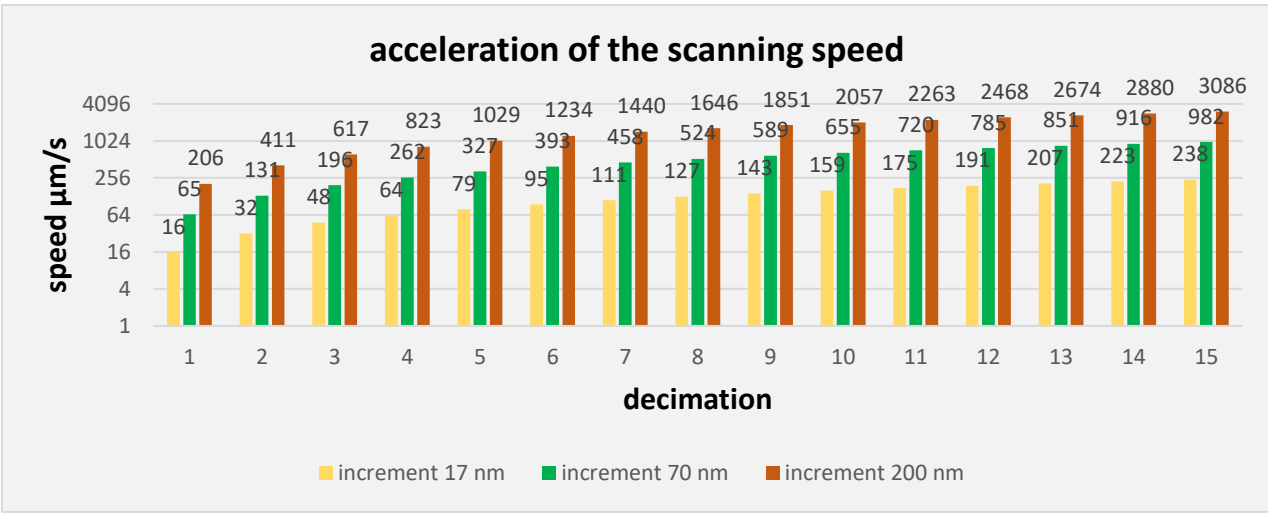
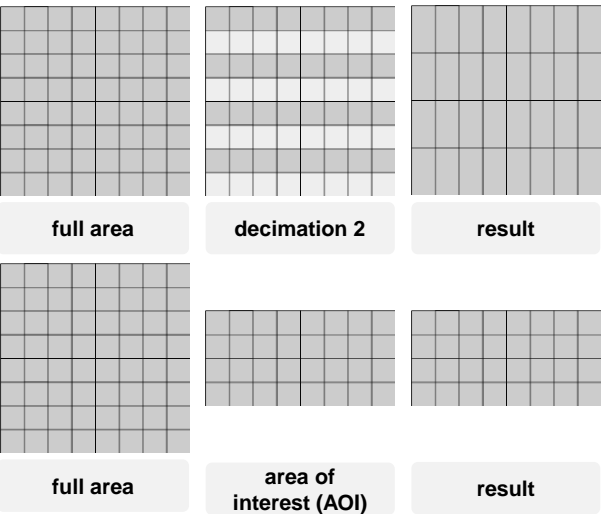
XY(Z) stages and possible system configuration

positioning area	movement	load capacity	resolution	orthogonality	encoder
73 x 55 mm ²	manual	1 kg	-	-	-
100 x 100 mm ²	motorized	2 kg	0.01 μm	<10arcsec	optional
200 x 200 mm ²	motorized	3 kg	0.01 μm	<10arcsec	optional
300 x 300 mm ²	motorized	5 kg	0.01 μm	<5arcsec	optional



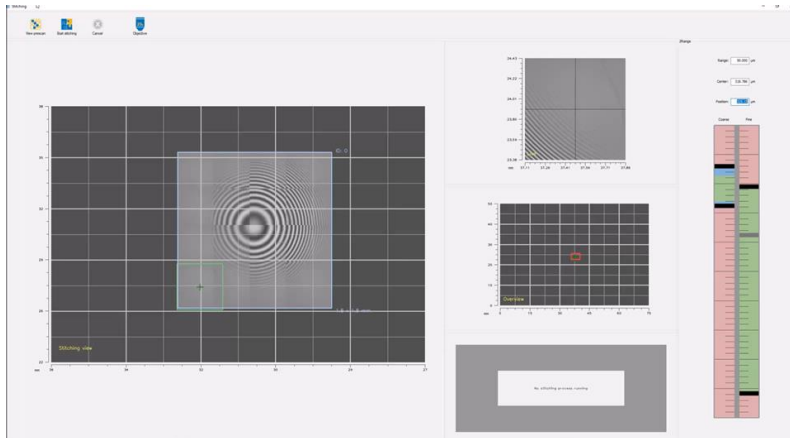
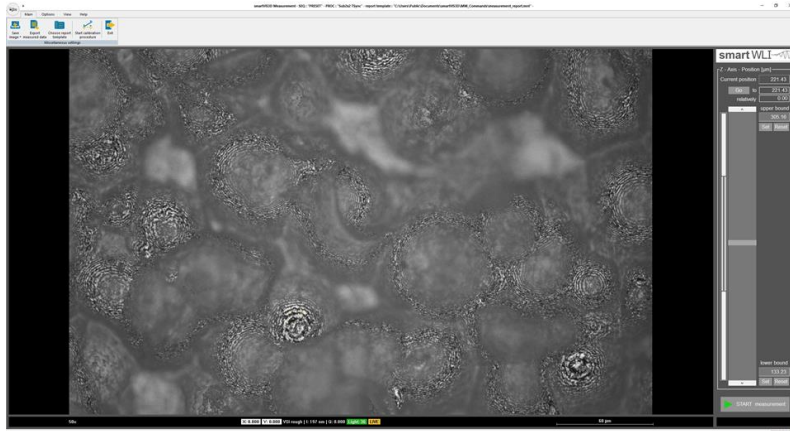
- standard stands with manual height and tilt adjustment and various stage configurations for lab measuring systems
- portal measuring systems with extended height measuring range and motorized tip tilt
- customized configuration of special measuring systems

high speed measurements



- the scanning speed is limited by the 10 GigE camera interface
- the reduction of the image seize by decimation or AOI's increase the scanning speed
- alternatively is it possible to increase the speed with bigger increments and a lower image density in the interference zone
- the accelerated scanning speed minimize the impact of environmental influence factors
- the accelerated scanning speed cause a higher system noise and limit the maximal possible scanning speed based on the requirements of the application





user interface	<ul style="list-style-type: none">• simplified and intuitive handling• configuration of scanning and measuring processes
scanning and measurement process control	<ul style="list-style-type: none">• objective selection• control of scanning range and scanning process parameters• scanning methods:<ul style="list-style-type: none">○ vertical scanning interferometry○ extended phase shift interferometry○ profile averaging○ high density image acquisition• selection of application specific scanning and evaluation macros• optional control of motorized xyz-stages for automated scanning and evaluation of larger objects• acceleration of scanning processes:<ul style="list-style-type: none">○ sub-sampling○ decimation○ AOIs (reduced area of interest)○ flexible increments for z-scanning○ fast prescan for object and range detection• image correction and contrast enhancement
calibration	<ul style="list-style-type: none">• lateral objective calibration• flatness calibration



schemes and options for integration

smartVIS3D

MountainsMap

USB - IO Channels – triggering of measurements from the production line, return of pass/fail classifications with optional storage of results via Ethernet

SDK

control program

integration of the sensor into a customer-specific control program on the sensor's PC and control of handling systems or manufacturing processes via the sensor

SDK

integration of the sensor into a customer-specific control program of the production line and control of the measurements and evaluation processes via the production line (client-server architecture)

production line

control program