



- optical 3D profiler
- measuring principle
- scanning device
- measuring volume
- high speed camera
- point evaluation
- SDK
- evaluation algorithms
- optional profile averaging
- scanning increments
- stative
- system software
- evaluation software
- simplified automation
- optional software modules

specification

- optical 3d profiler with manually exchangeable objective and xyz portal
- coherence scanning (white-light) interferometer
- mechanical precision drive
- 100 x 100 x 50 mm³ (xyz)
- 1920 x 1200 pixel / 169 fps and acceleration up to 3.2 kfps with decimation
- massive parallel in real time on the GPGPUs
(general purpose graphic processing unit / programmable high performance graphic boards)
- software libraries in C++ and C# with sample application and source code
- control of all sensor functions
- VSI (vertical scanning interferometry)
- EPSI (extended phase shift interferometry)
- automated averaging over up to 40 single scans for noise reduction
- variable optimization between speed and resolution

optional system components

- manual and motorized positioning axis, granite portals and tip tilt compensations
- smartVIS3D – user interface for measurements
- MountainsMap® - stitching, visualization and evaluation of 3D point clouds
- IO module for the start of predefined measuring and evaluation processes
- smartSTITCH – with heigh and angle compensation / optimized stitching of nano structures
- smartLAYER – evaluation of coating thickness



increment*	67 nm	200 nm
scanning speed full resolution	11.4 $\mu\text{m/s}$	37.2 $\mu\text{m/s}$
repeatability RMS**	0.05 nm	0.1 nm
topography reproducibility***	0.5 nm	1 nm
1- σ repeatability 245 nm step height	1 nm	3 nm
1- σ repeatability 20 μm step height	20 nm	60 nm
1- σ repeatability 100 μm step height	30 nm	100 nm

* configuration > 1.5 μm possible (increased noise)

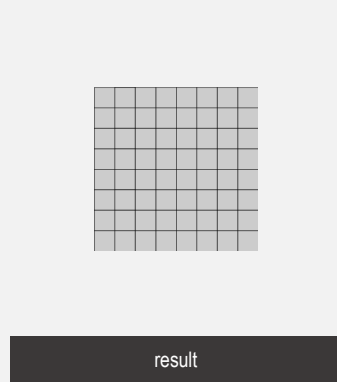
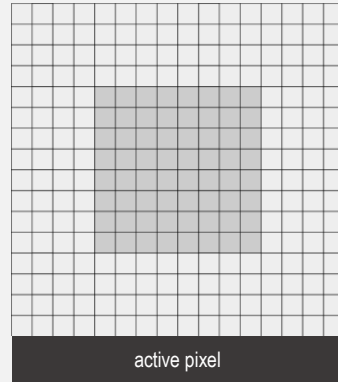
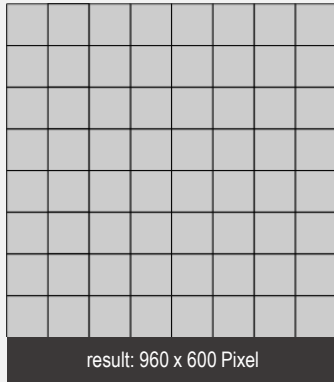
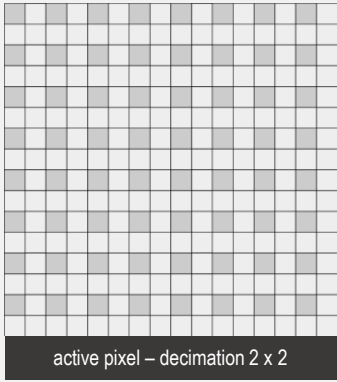
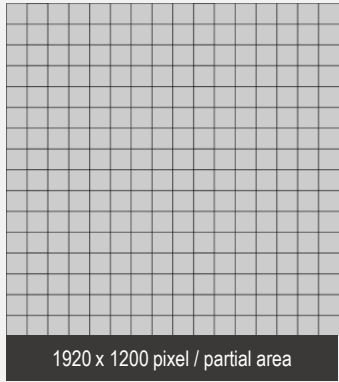
** 1- σ repeatability S_q / EPSI, single scan, without profile averaging, laboratory conditions, 1 million points after 3x3 denoising filter

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

	objective						
available objectives	2.5x	5x	10x	20x	50x	100x	115x **
aperture	0.075	0.13	0.3	0.4	0.55	0.7	0.8
working distance	10.3	9.3	7.4	4.7	3.4	2	0.7
measuring area / mm^2	7.3 x 4.6	3.7 x 2.3	1.8 x 1.2	0.91 x 0.58	0.37 x 0.23	0.18 x 0.12	0.16 x 0.1
sampling interval / μm	3.8	1.9	0.96	0.48	0.19	0.1	0.08
optical resolution / Rayleigh criterion	4.23	2.44	1.06	0.79	0.58	0.45	0.4
optical resolution / Sparrow criterion	3.26	1.9	0.81	0.61	0.44	0.35	0.31



smartWLI acceleration through decimation and AOI



step height*	scanning speed** - $\mu\text{m/s}$			
	70 nm	200 nm	600 nm	1000 nm
1920 x 1200 / full resolution	11	34	102	170
960 x 600 / decimation	36	108	324	540
1200 x 900 / AOI	24	72	216	360
800 x 600 / AOI	48	144	432	720
640 x 480 / AOI	69	206	618	-
400 x 300 / AOI	123	368	-	-
240 x 180 / AOI	168	504	-	-
1920 x 36 / AOI	219	658	-	-

*selection of possible step heights

**higher scanning speed causes higher noise levels



smart WLI sensor dimensions and connections

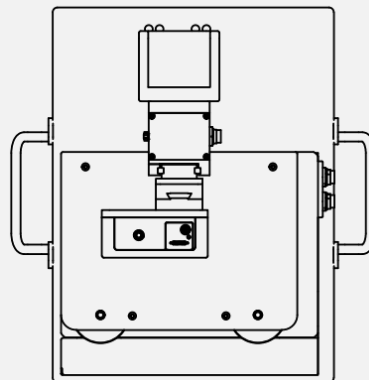
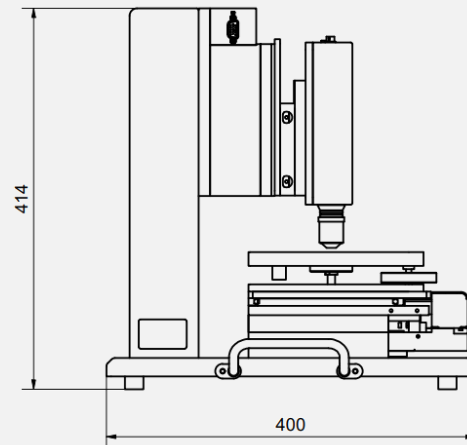
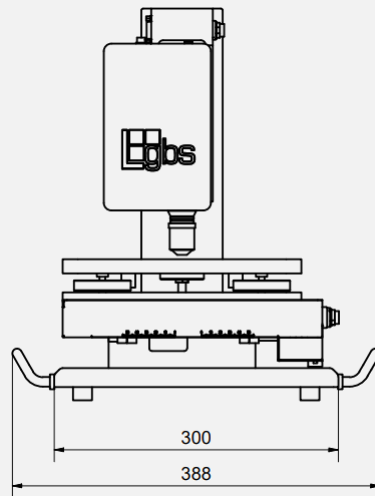
system dimensions

height	414 mm
width	400 mm
depth	388 mm
weight*	18 kg

connectivity - cables

cable length	3 m (optional up to 10 m)
camera	USB 3.0
3 axis controller	special connectors 2 m
power supply	HR-10A-7P-6S
trigger	HR25-7TP-8S
power consumption	3 – 7 W
LED	up to 4 W
spectrum	green / $\lambda \approx 520 \text{ nm}$

* without objective and cables





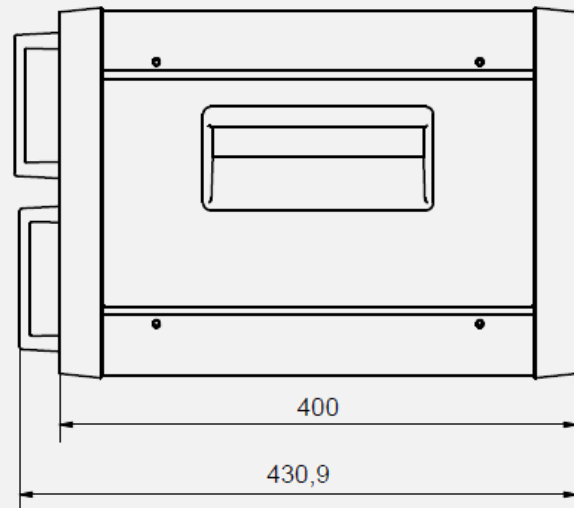
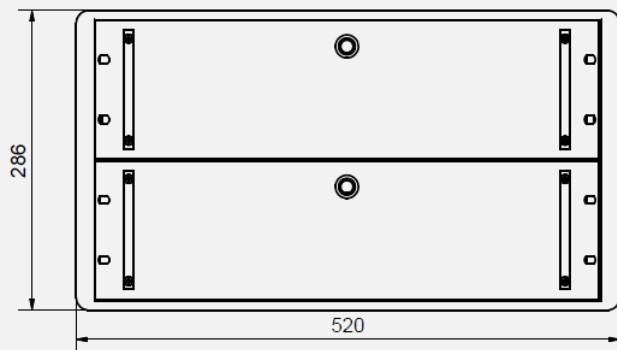
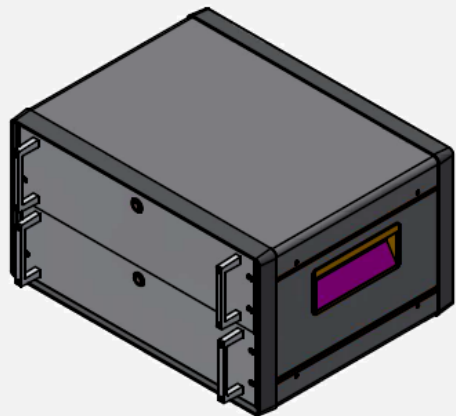
controller

key features

housing	industrial 19" rack / 6 height units	
power supply	100 – 240 V AC / 50-60 Hz	
LED	LED controller	
stages	integrated controller for motorized xyz stages	
	standard PC	optional high performance PC
operating system	Windows 10/11	Windows 10/11
CPU	Core I5	Core I9
RAM	16 GB	64 GB
SSD	1 TB	1 TB
	GPGPU	GPGPU
FP 32 (float)	16 TFLOPS	82 TFLOPS
memory	12 GB / GDDR6	24 GB / GDDR6
	optional components	
	27" monitor, keyboard, mouse	
	environmental conditions	
humidity	up to 80% / non-condensing	
operation temperature	10 - 35 °C	

controller dimensions

height	286 mm
width	520 mm
depth	430.9 mm
weight	app. 25 kg



modification date

November 10, 2023

disclaimer

changes are subject to technical progress