twip
OPTICAL SOLUTIONS

OPTICAL 3D MEASUREMENT SYSTEMS

THE DEMAND FOR OPTICAL SURFACE METROLOGY IS GROWING IN ALL INDUSTRIES.

COMPANY DATA

Company foundation September 2013

Production / Distribution
3D measuring device CONSIGNO

Development of 2D/3D optical inspection systems

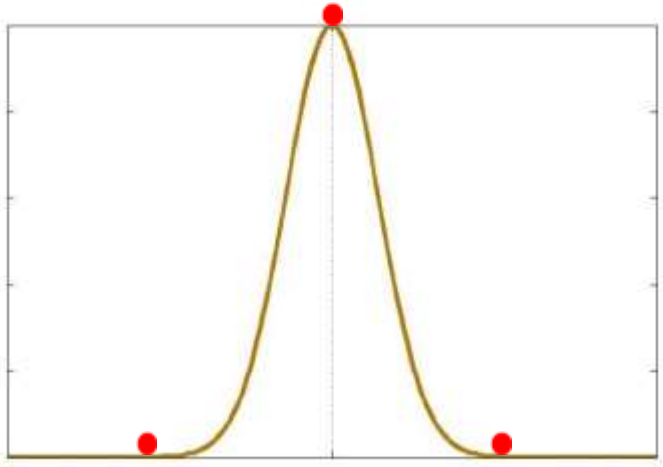
From 2020 Strategic cooperation with E. ZOLLER GmbH & Co. KG

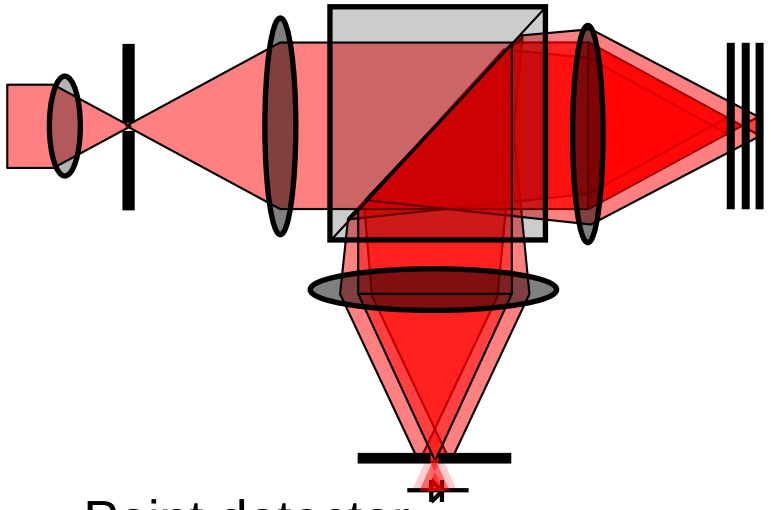
- Optical 3D measuring device
  for microscopic analyses
- Smallest + lightest measuring device in its class
- Robust + reliable measuring methods
- Automation of metrology in production

- Sensor head for integration into customer solutions
- Development of customized solutions
- Integration in multi-sensor measuring systems

CONFOCAL MICROSCOPY

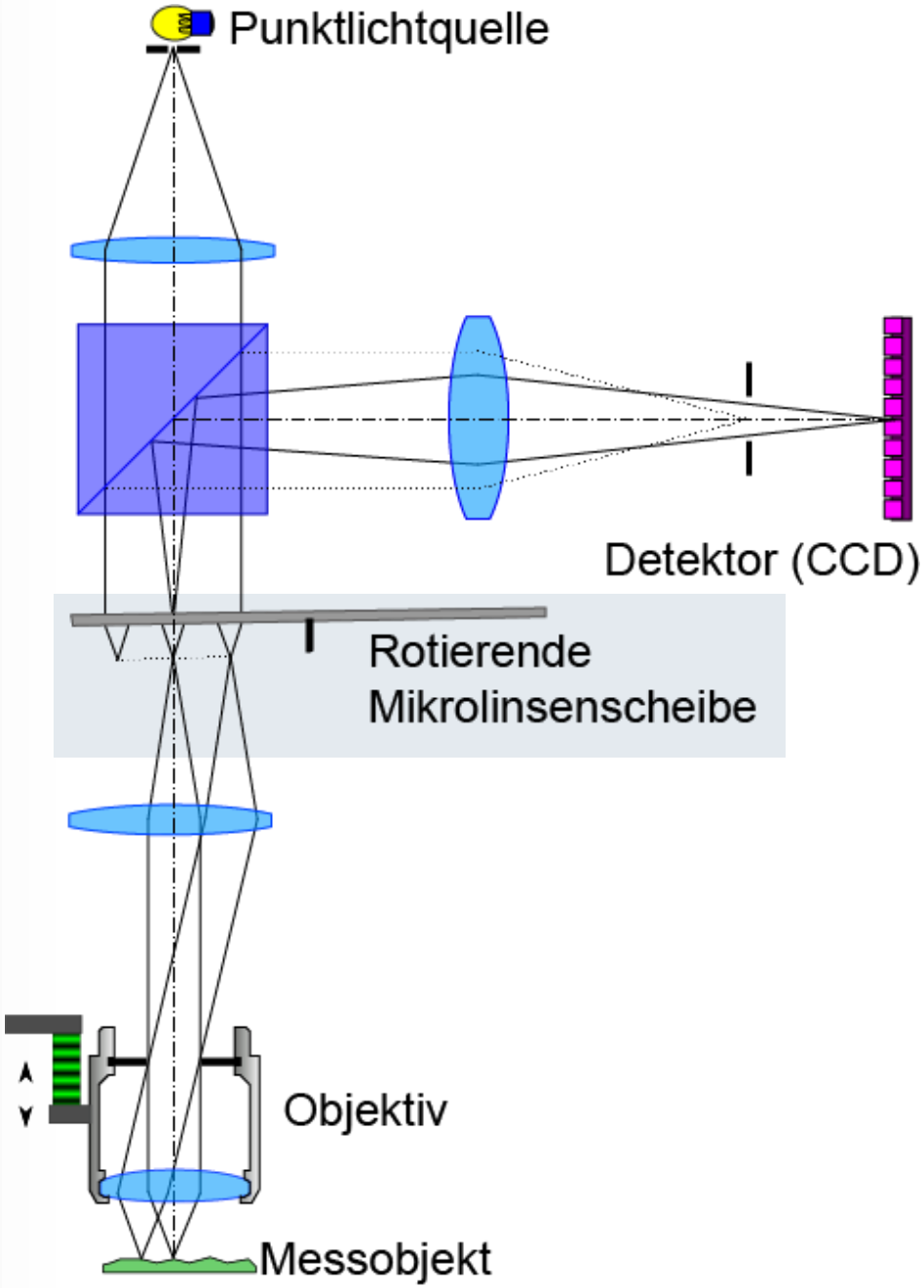
- Point light source is focused on the object
- Point detector/pinhole filter the light from blurred images
- Object height is coded in intensity variation

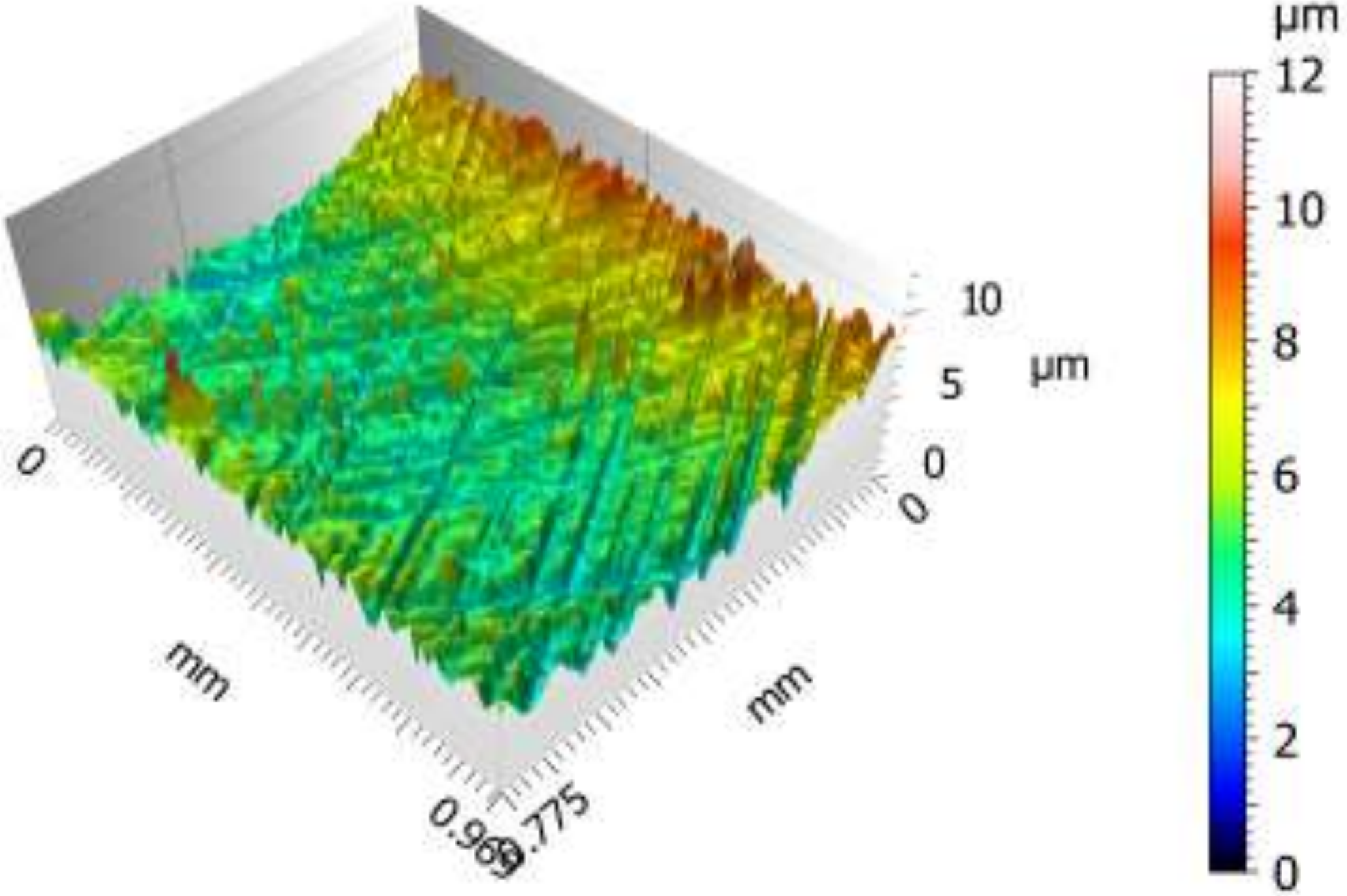




STRUCTURE OF THE MEASURING SYSTEM

- Confocal measuring principle
- Microlens array generates point light sources
- High light efficiency




µm
12
10
8
6
4
2
0
10
5
0
µm
0
mm
0.969
0.775
mm

Specifications measuring device

Camera
Resolution: 1280 x 1024 Pixel
Binarization: 10 bit
Speed: 60 frames / second

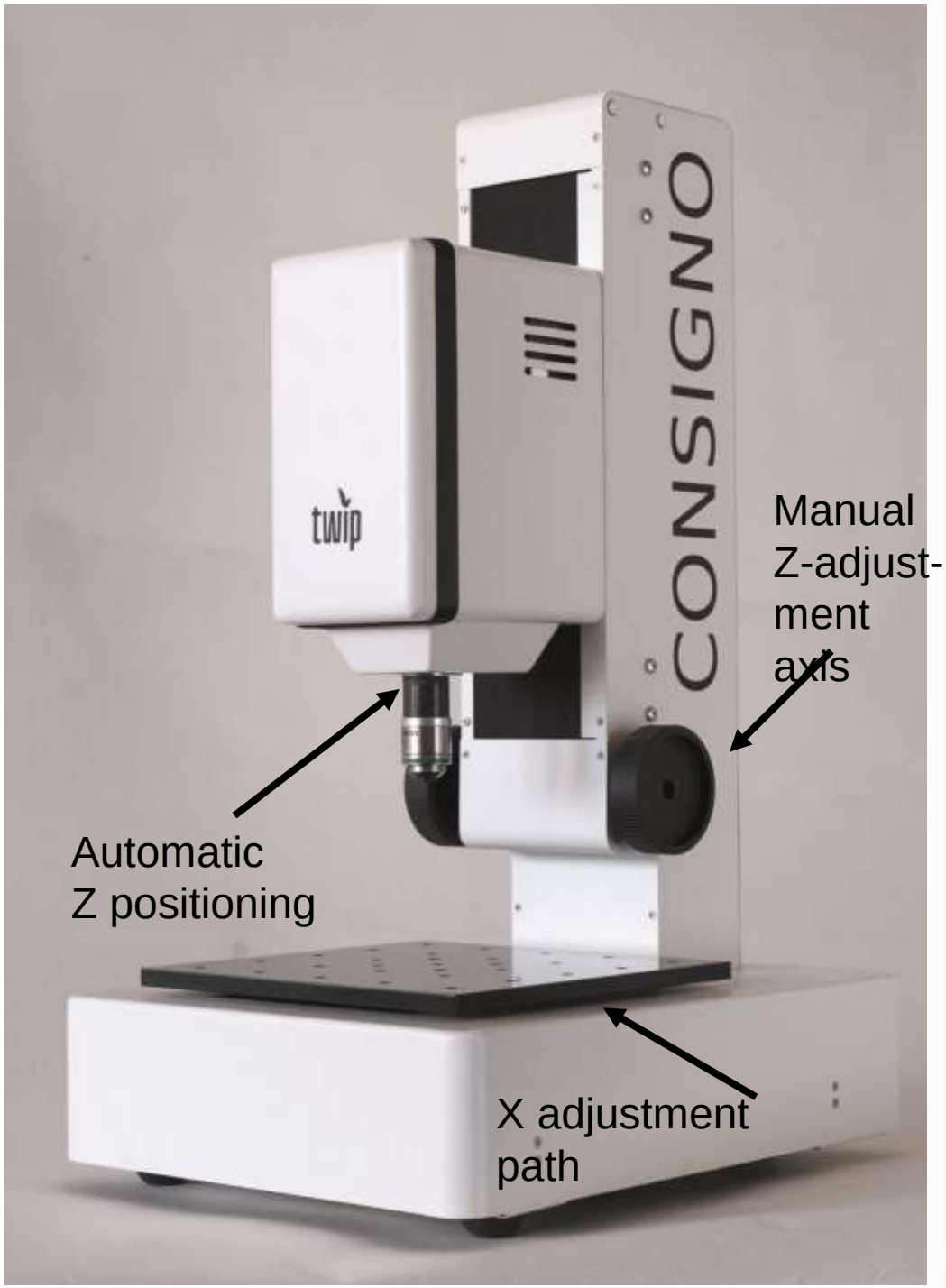
Light source
Blue laser diode: 450 nm (high light intensity)

Z positioning
with more than 20mm scan path
- Ultrasonic drive
- Stepper motor drive

X, Y positioning
X linear axis 25 / 100mm
optional: cross table 75 x 75 mm

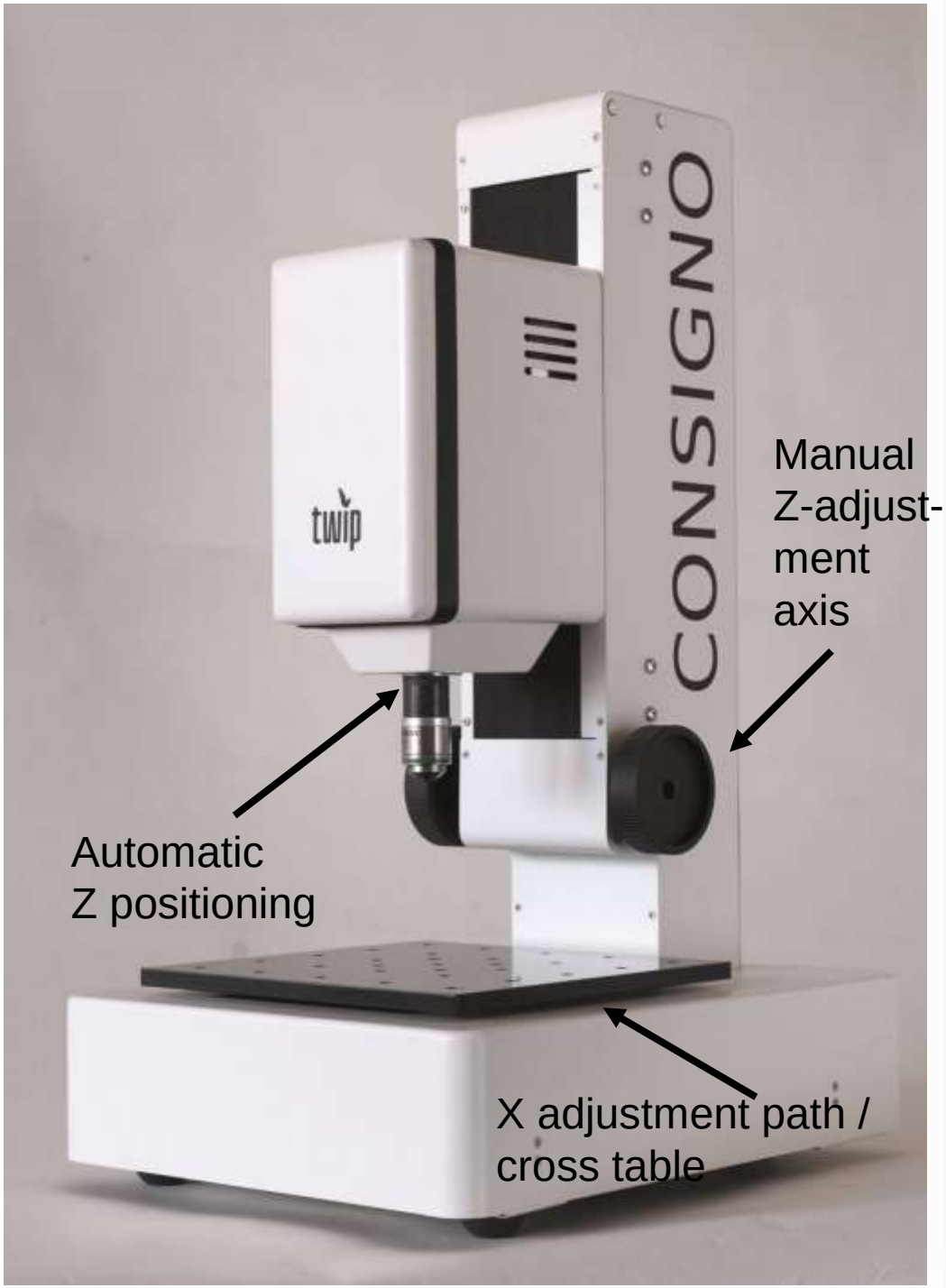
Interchangeable lenses
2.5 - 100x nominal magnification

Control
PC or laptop with USB3 incl. itom measuring software,
Optional connection to external
(Matlab®, MountainsMaps®)



ROUGHNESS-MEASURING CONSIGNO SR

- Special configuration
- Customized software for easy operation
- Roughness measurement (profile + area based)
- X-adjustment travel 25 mm
- Lens 20x



UNIVERSAL LABORATORY MEASURING

CONSIGNO SL / UL

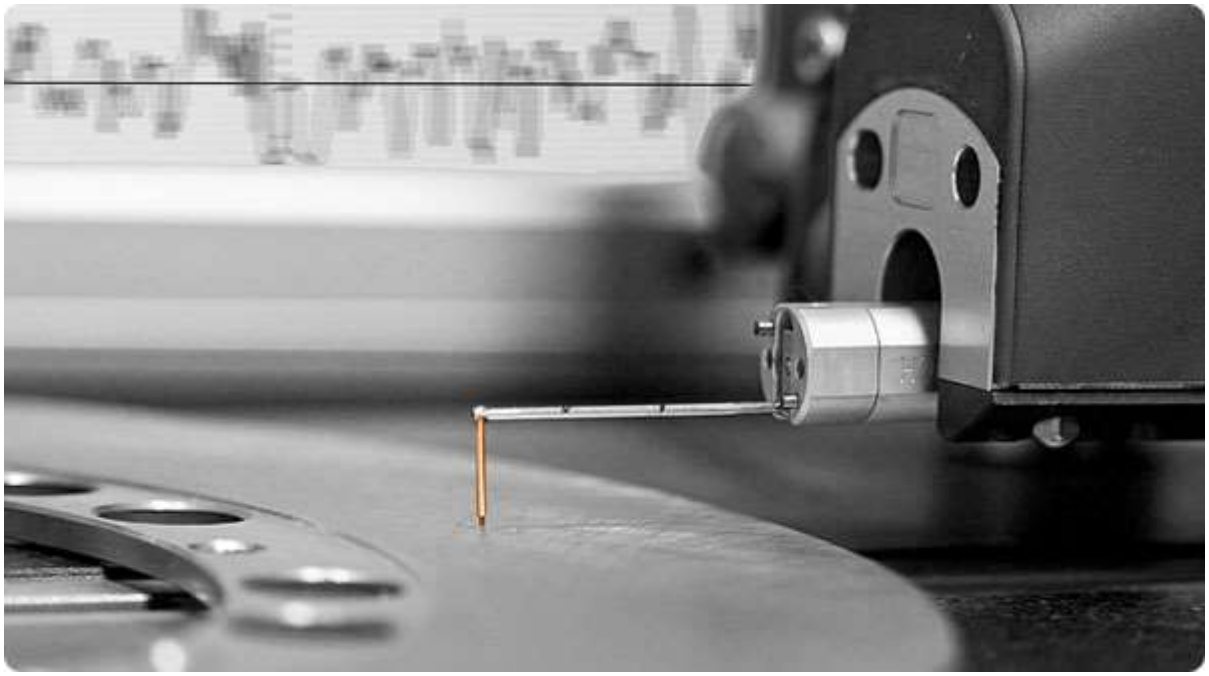
- Universal evaluation software for comprehensive topographic surface analysis and evaluation
- Lenses to suit your needs
- Cross table / automatic X adjustment travel

APPLICATION AREAS

- Automotive industry
- Aviation Industry
- Mechanical Engineering
- Microsystems Technology
- Optics
- Medical Technology
- Semiconductor electronics
- Precision Engineering
- Plastic injection molding
- 3D printing
- Surface qualification

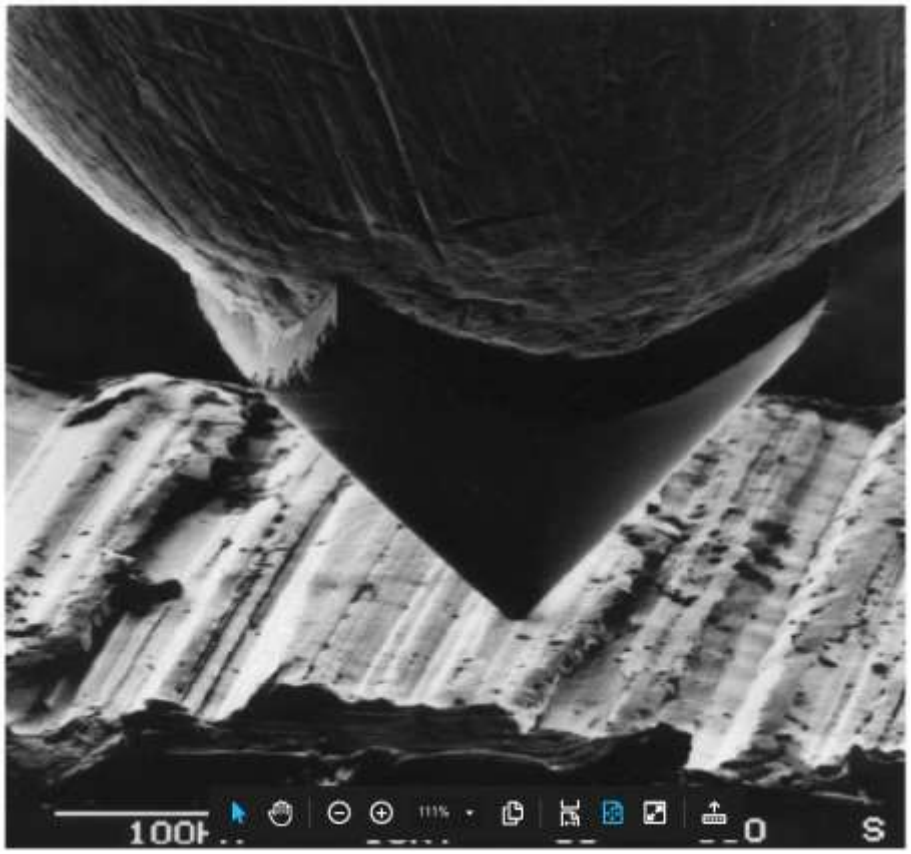
APPLICATION: ROUGHNESS MEASUREMENT

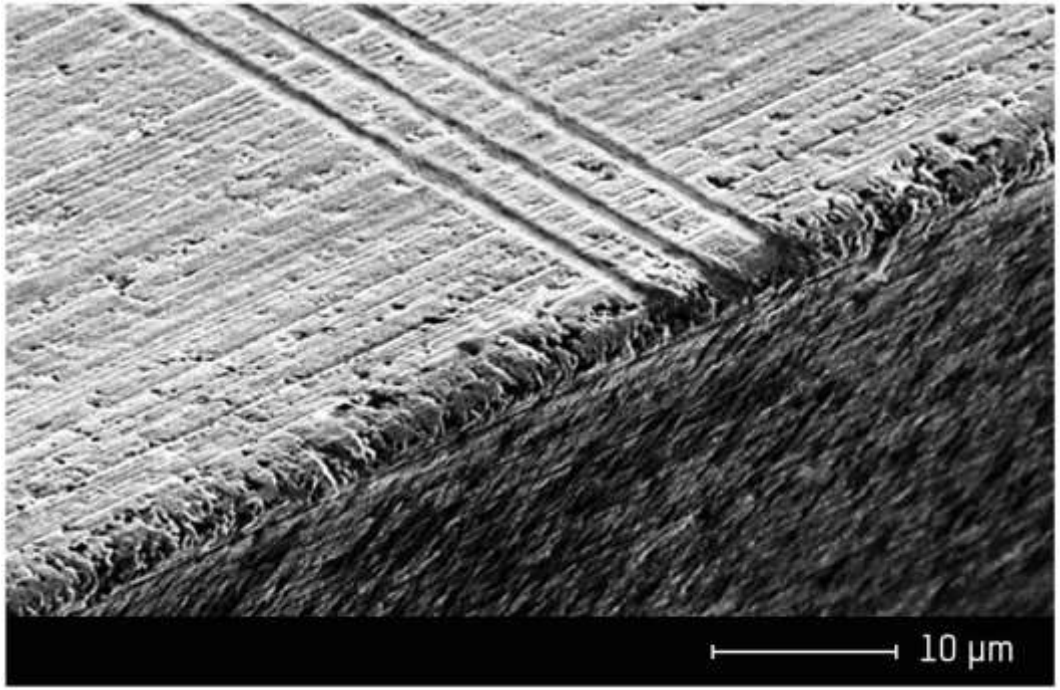
ROUGHNESS MEASUREMENT CLASSIC



ROUGHNESS MEASUREMENT CLASSIC

ASSOCIATED DANGERS - ESPECIALLY WITH SENSITIVE SURFACES

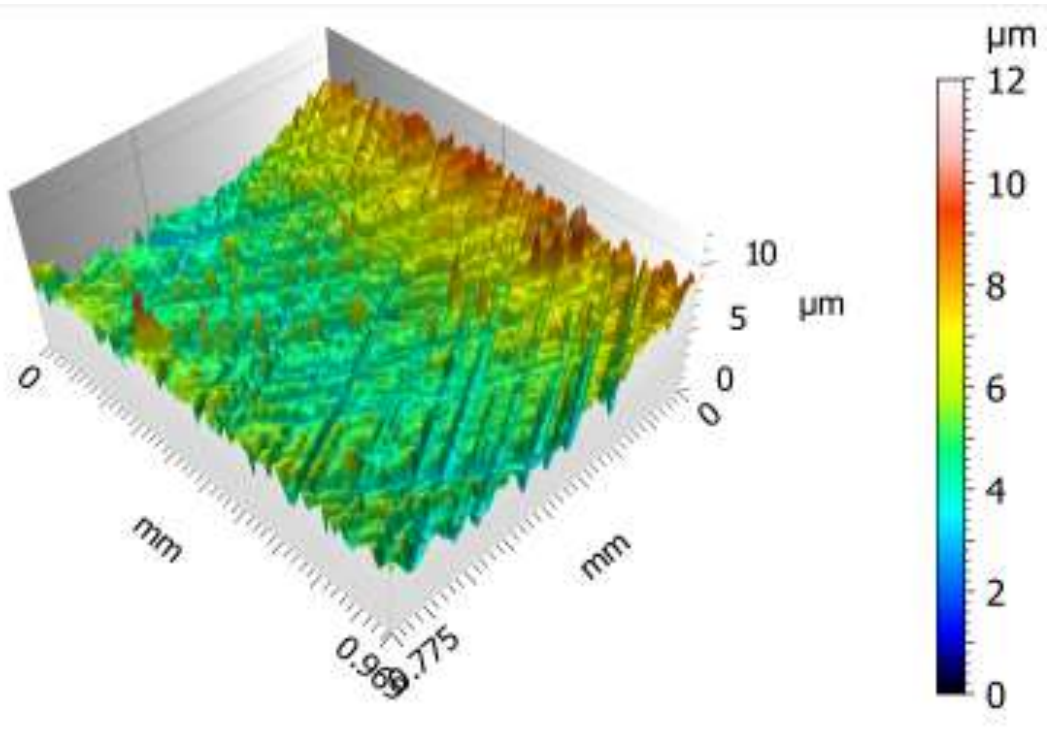




Source PTB

ROUGHNESS MEASUREMENT

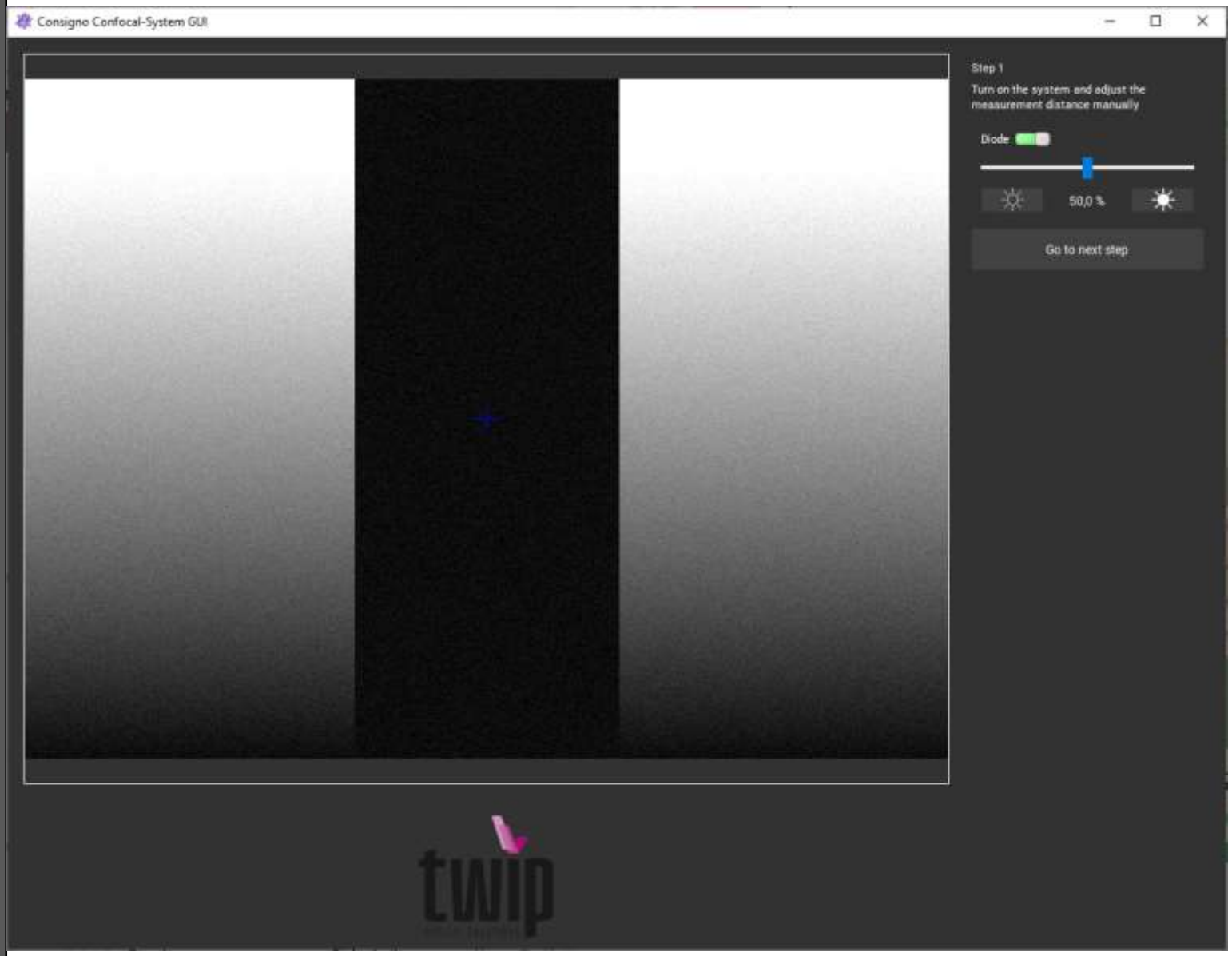
- Acquisition of two-dimensional roughness parameters
- Evaluation of linear roughness parameters possible
- Evaluation according to DIN/ISO standards



ROUGHNESS MEASUREMENT

Step 1

1. adjust brightness and place measuring head correctly



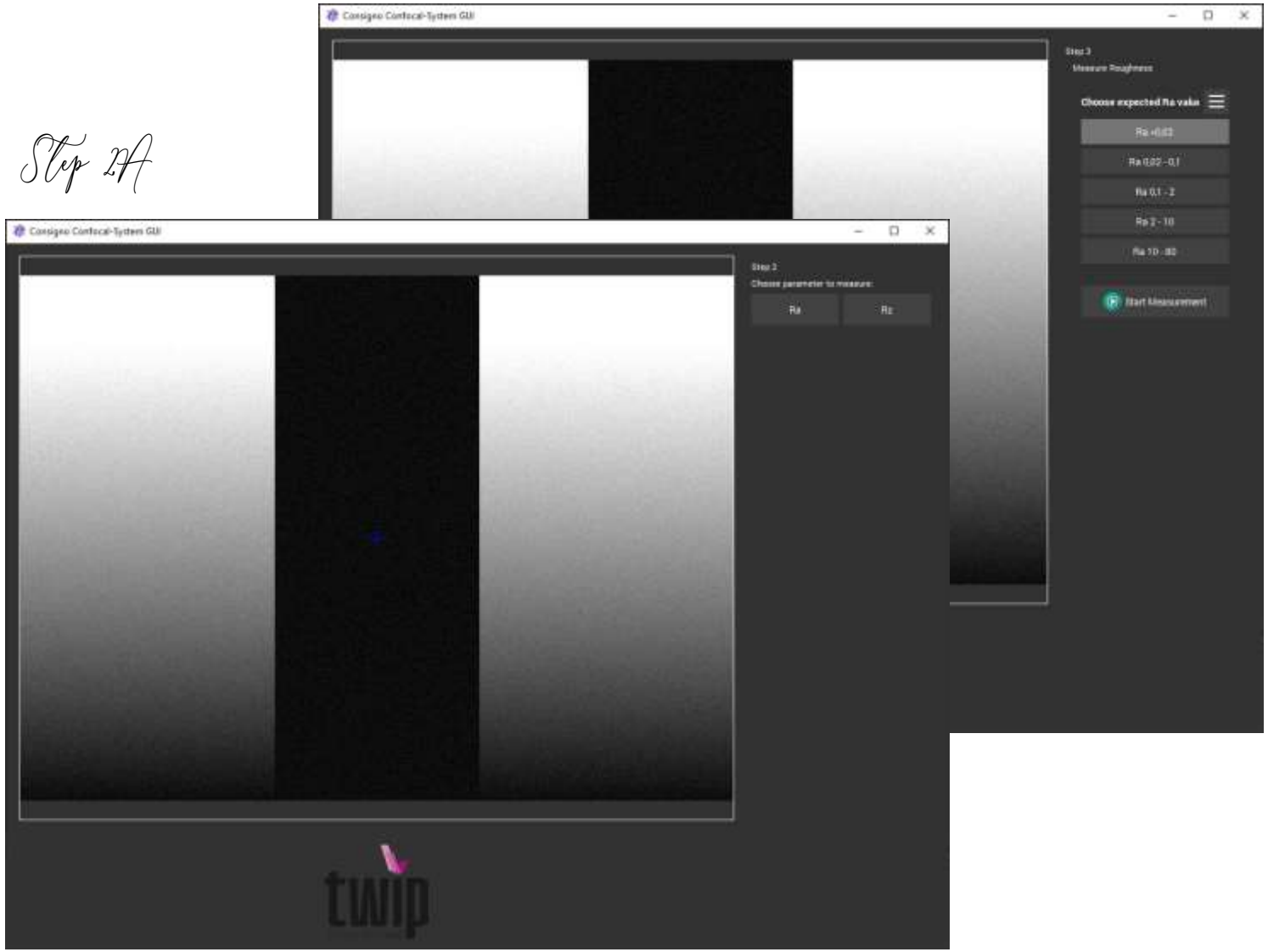
ROUGHNESS MEASUREMENT

Step 2

2. selection of the specified roughness parameters

Step 2A

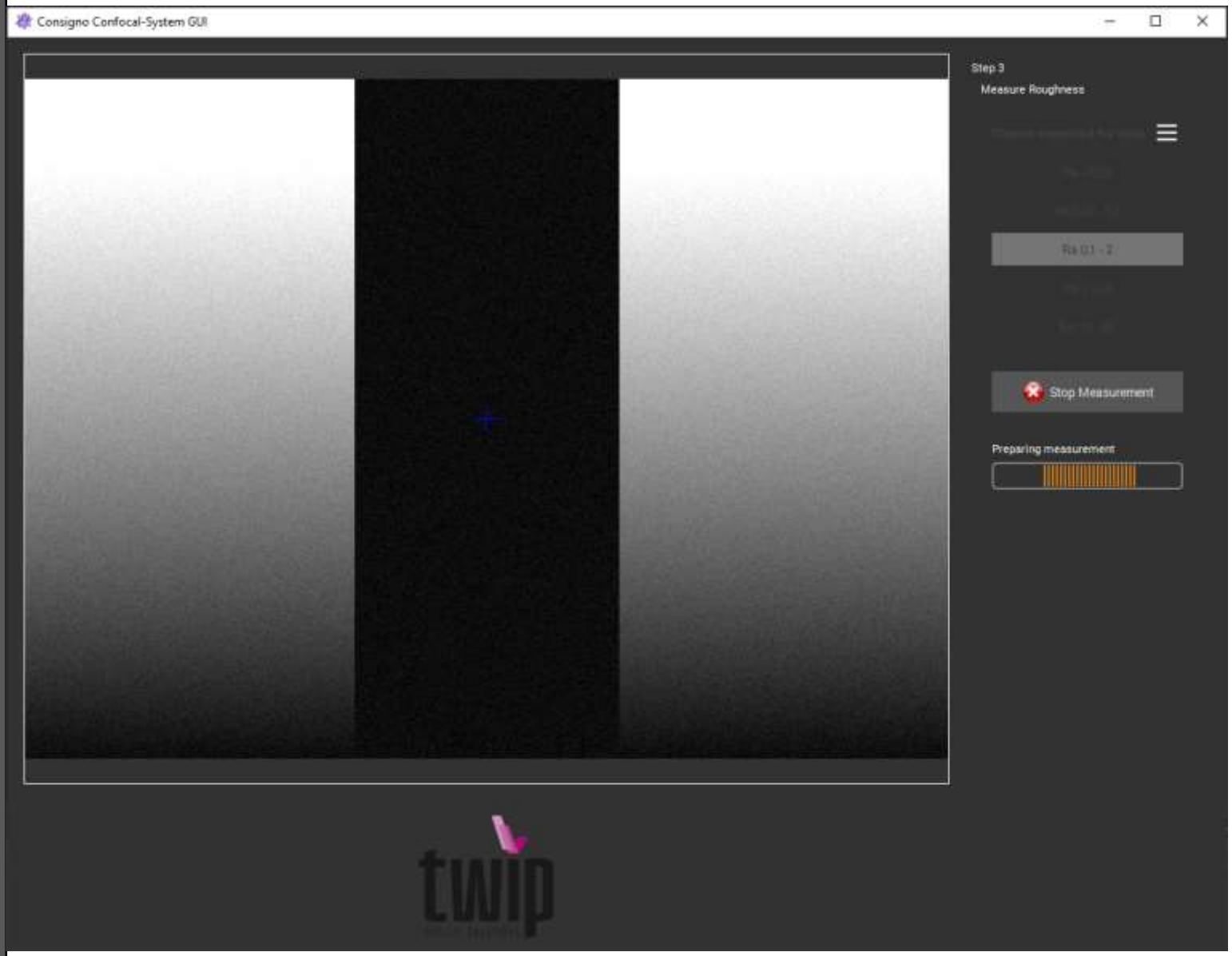
Step 2B



ROUGHNESS MEASUREMENT

Step 3

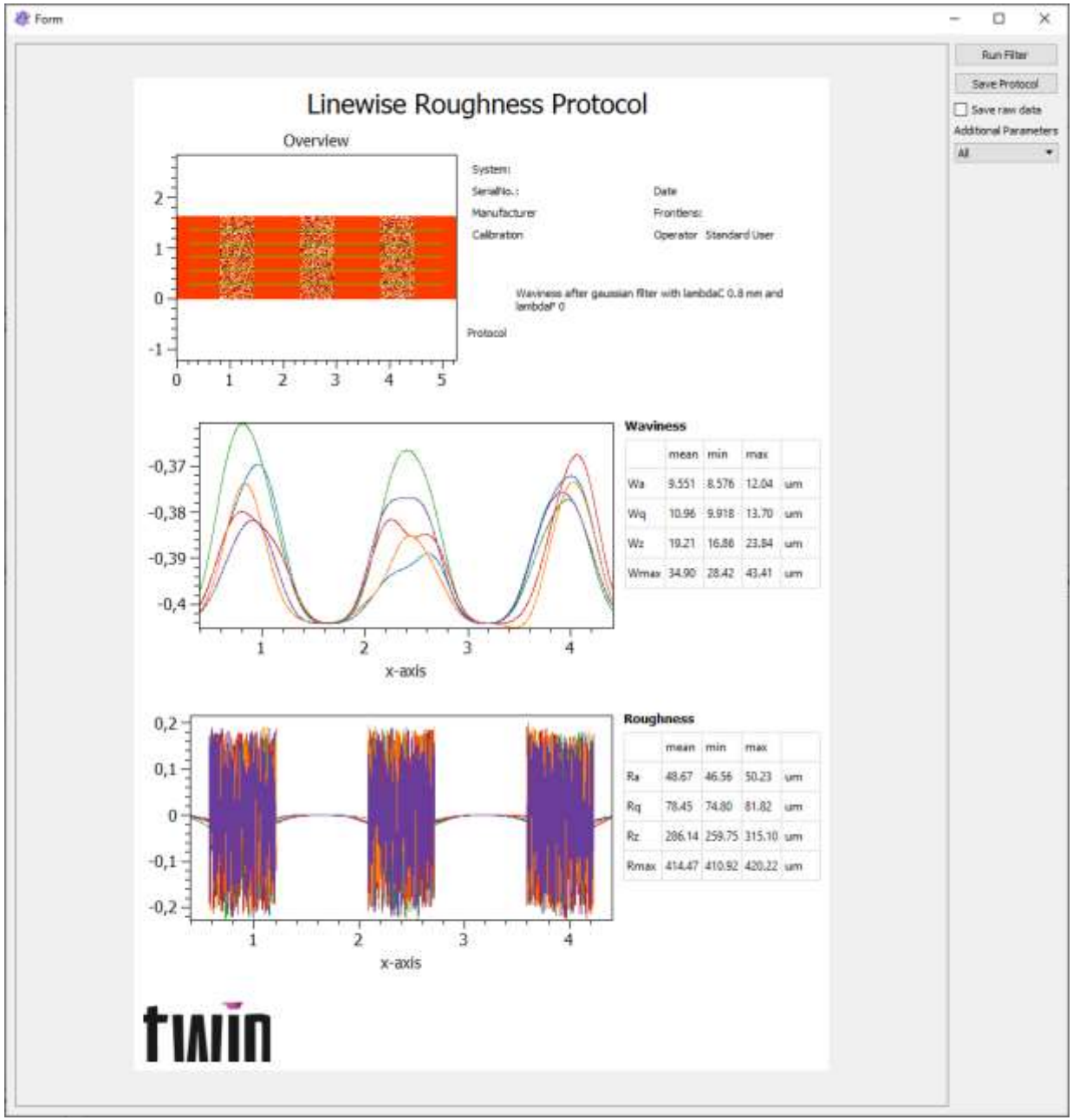
3. perform measurement



ROUGHNESS MEASUREMENT

Step 4

4. result evaluation



ROUGHNESS MEASUREMENT

Step 5

Profile Roughness: Select Measurable Parameters in accordance with ISO 4287 and ISO 13565

- Ra: arithmetic mean deviation of the assessed profile
- Rq: root mean square deviation of the assessed profile
- Rt: total height of the roughness profile
- Rmax: maximum height of the roughness profile within an individual measured distance
- Rz: mean height of the roughness profile
- Rp: maximum profile peak height
- Rv: maximum profile valley depth
- Rk: core roughness depth
- Rpk: reduced peak height
- Rvk: reduced valley depth
- Mr1: material ratio delimiting the core area (Abbot curve)
- Mr2: material ratio delimiting the core area (Abbott curve)
- Rsm: mean spacing of profile elements
- RPc: Peak count number

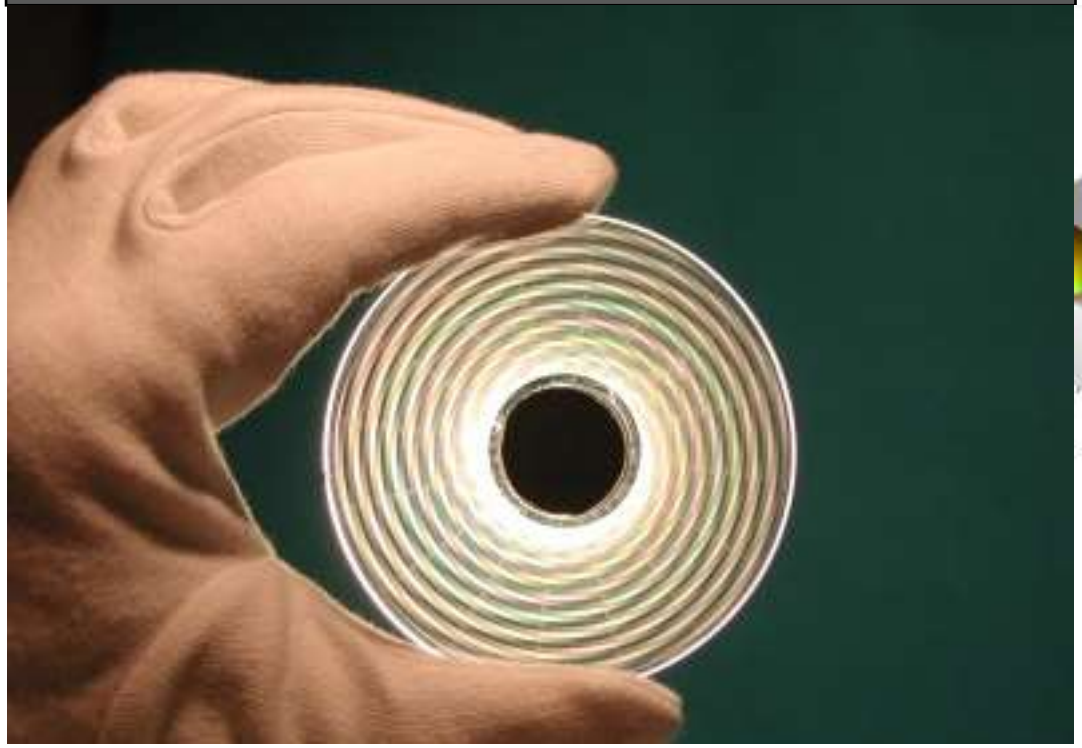
Surface Roughness: Select Measurable Parameters in accordance with ISO 25178-2 and ISO 16610

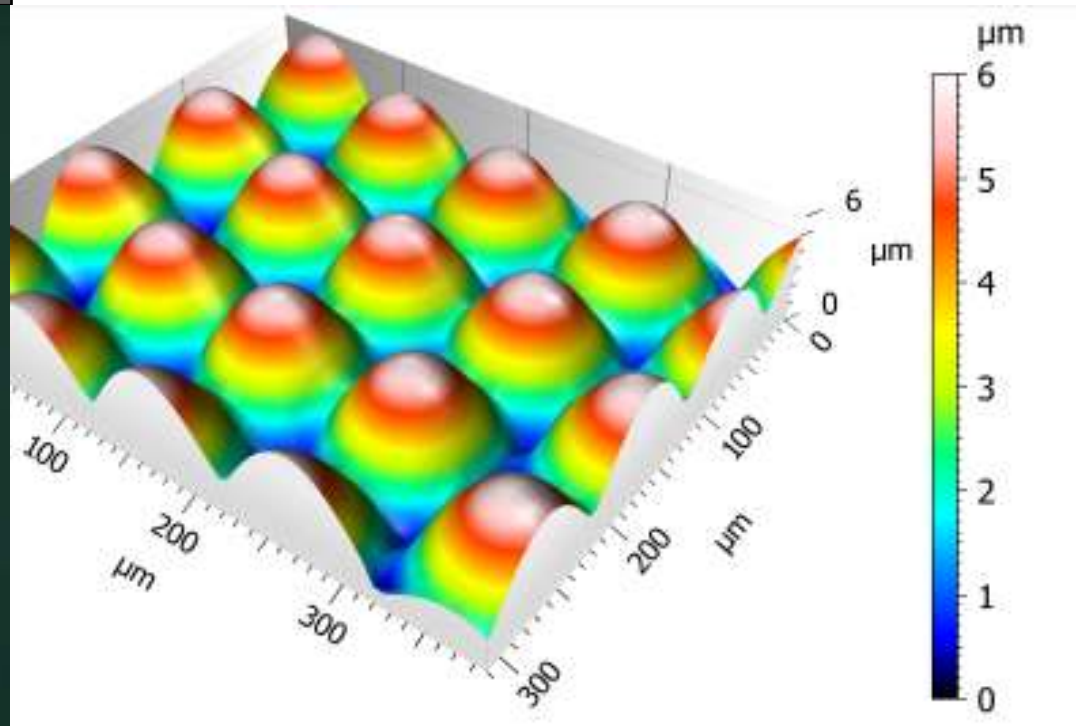
- Sa: mean arithmetic height
- Sq: Root mean square height
- Sp: maximum peak height
- Sv: Maximum valley height
- Sz: maximum height
- S10z: ten-point height of the surface
- Ssk: Skewness
- Sku: Kurtosis
- Sdq: Root mean square gradient
- Sdr: Developed interfacial area ratio
- FLTt: Evenness
- Sk: Level difference on core surface
- Spk: Reduced peak height
- Svk: reduced valley depth
- Smr1: Peak material portion
- Smr2: Valley material portion
- Vmc: Core material volume
- Vmp: Peak material volume
- Vvc: Core void volume
- Vvv: Dale void volume
- Sxp: Peak extreme height
- Str: Texture aspect ratio

APPLICATION:
UNIVERSAL LABORATORY MEASUREMENT TECHNOLOGY

MICROOPTICS MEASUREMENT

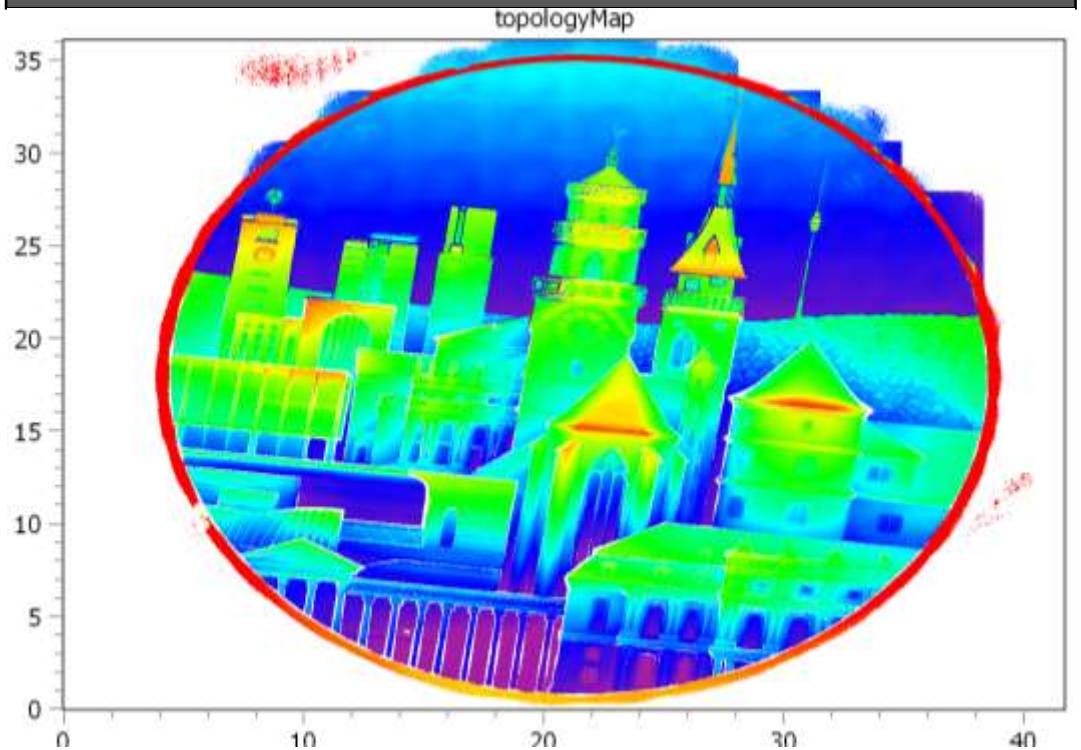
- Non-contact and non-destructive measurement of micro-optics
- Evaluation of geometric parameters

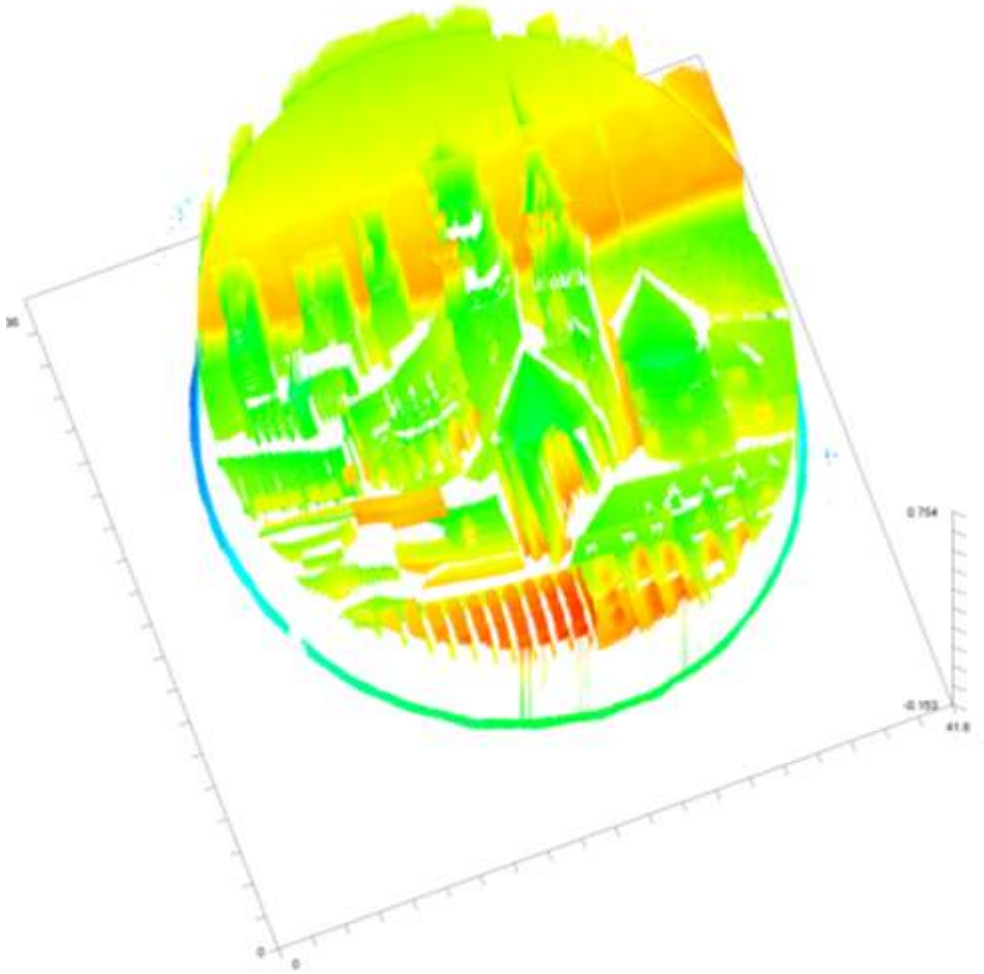




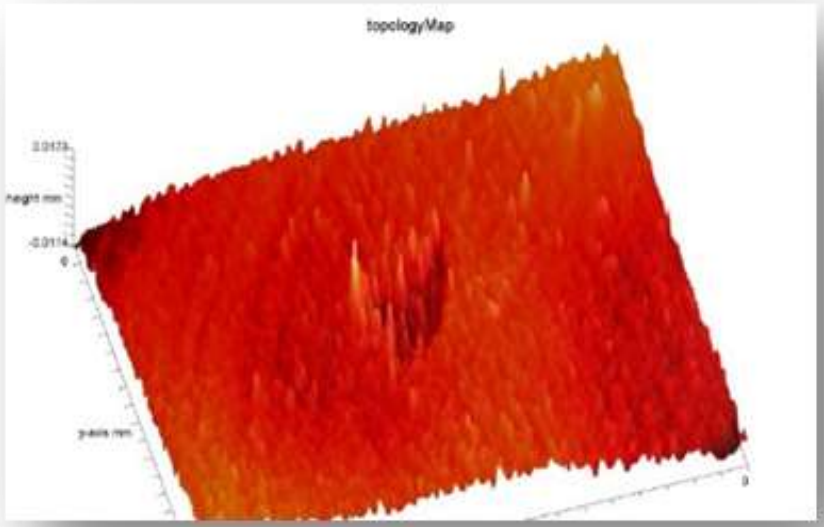
3D ACQUISITION LASER STRUCTURING

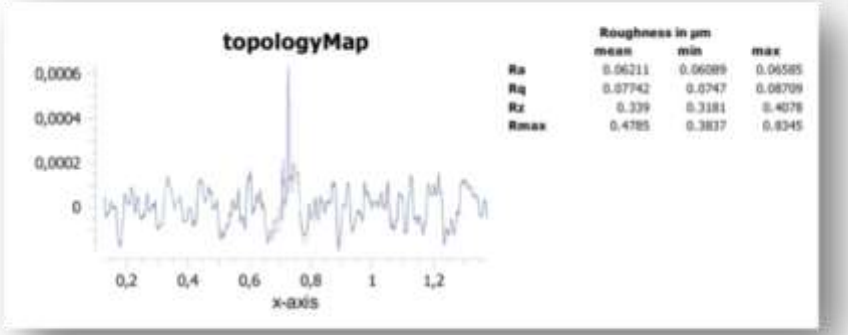
- 3D data recording
- Capture of large areas via stitching

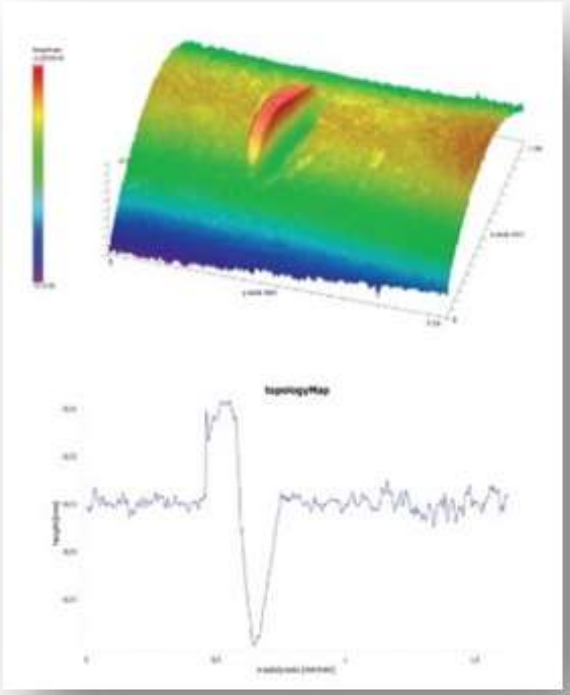




3D CAPTURE SURFACES – STRUCTURING



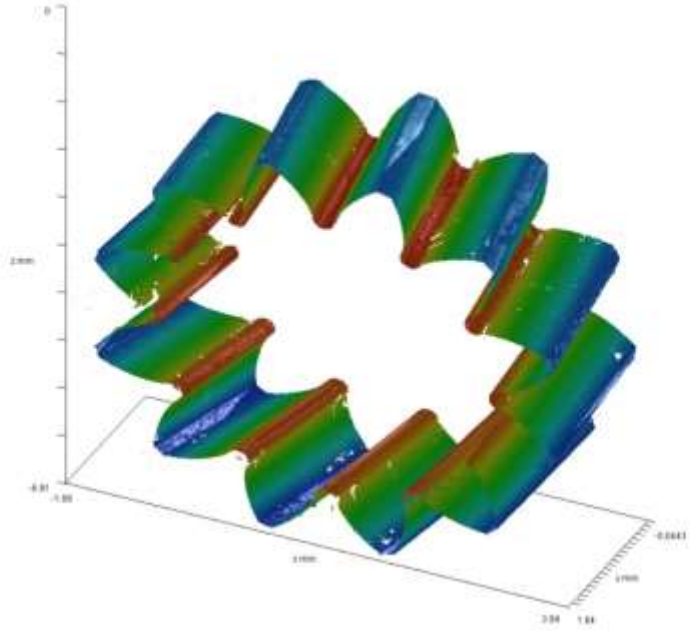




Microscopic defects can be precisely and reliably evaluated. Examples of this include the maximum depth of a notch, the volume of damage

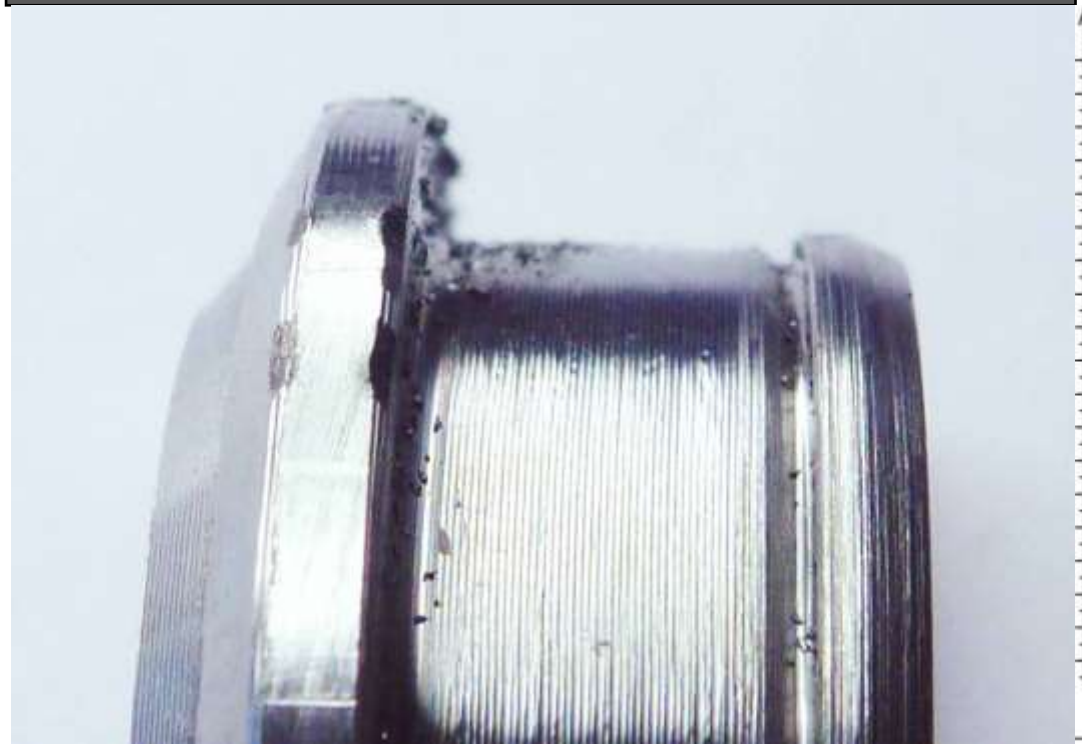
GEAR – MEASSUREMENT

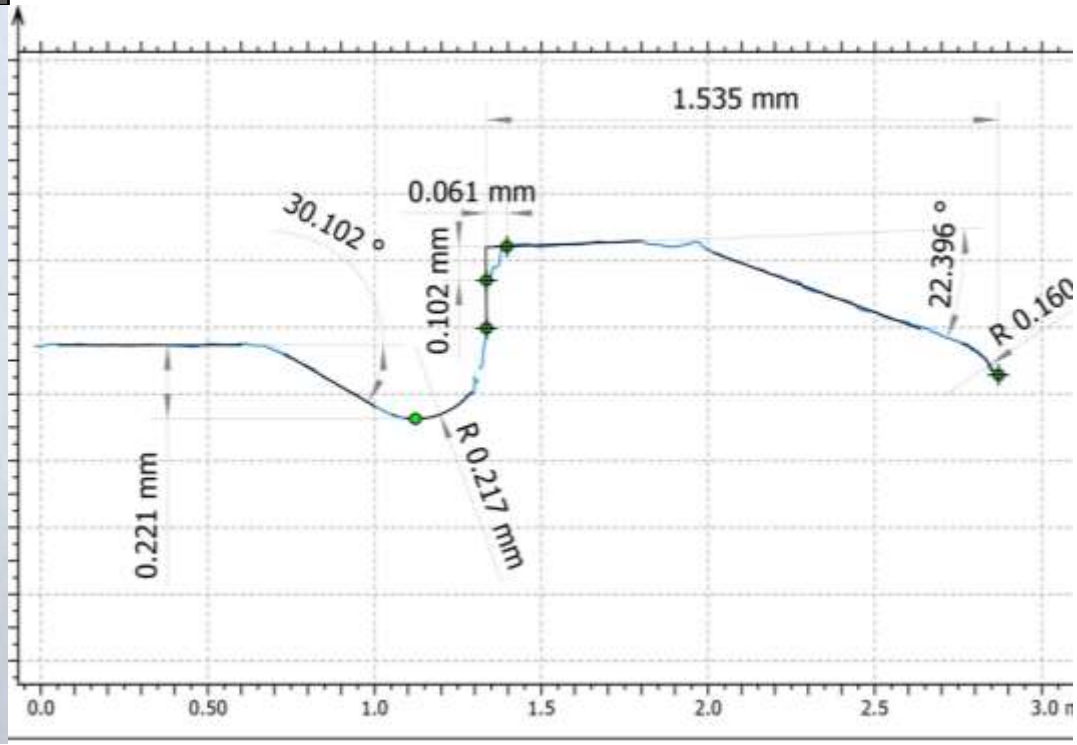
- Gear measurement
- Capture of the entire geometry with the help of rotational stitching



CONTOUR-MEASUREMENT

- Non-destructive measurement of the contour
- Fast and reliable measurement
- Evaluation of geometric and roughness parameters

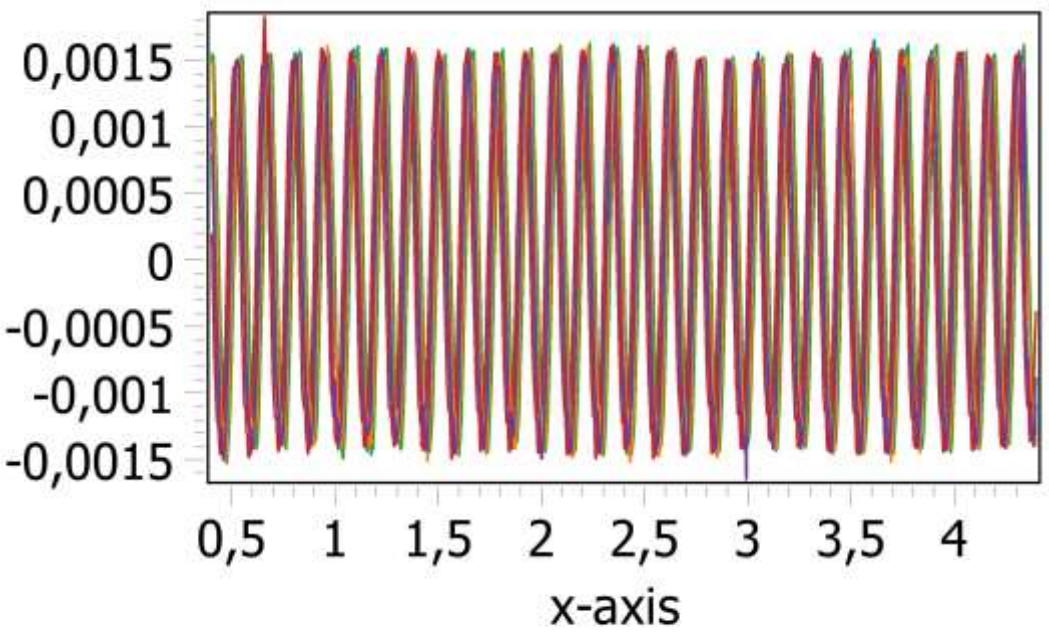




VERIFICATION METRICS

VERIFICATION MEASUREMENT

- Verification to Hall Normal KNT4040/03
- Sinusoidal roughness profile
- DAkkS calibrated roughness values
- Comparison with measured roughness values

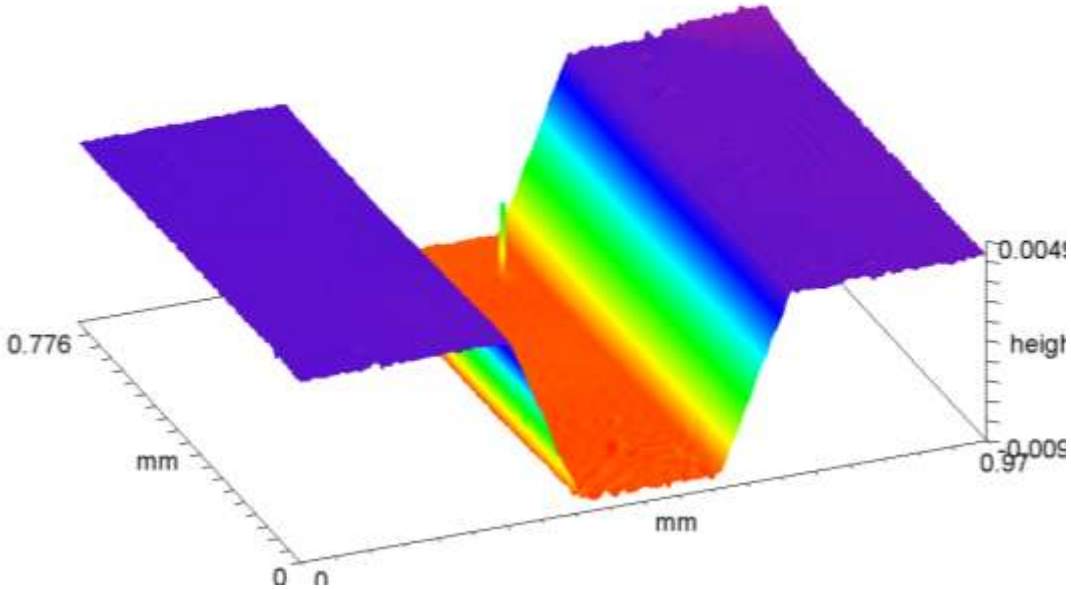


Ra value	Min	Mean	Max
Shall	0.905 µm	0.953 µm	1.001 µm
Is	0.918 µm	0.926 µm	0.930 µm

Rz value	Min	Mean	Max
Shall	2.85 µm	3.00 µm	3.15 µm
Is	3.065 µm	3.089 µm	3.177 µm

VERIFICATION MEASUREMENT

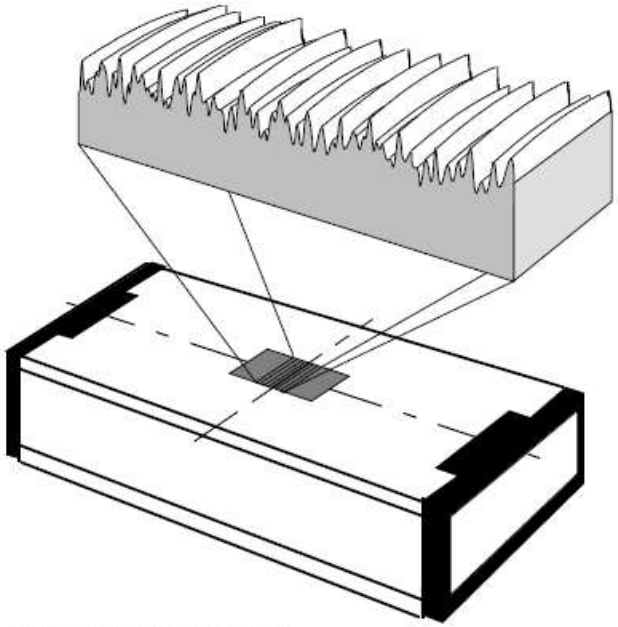
- Verification to Hall Normal 4040/03
- DAkkS calibrated stage
- Comparison with measured roughness values



Step height	Measured value
Calibrated value	12.02 µm
Measured value	12.033 µm

VERIFICATION MEASUREMENT

- Verification to Hall Standard 4070/03 A2
- Superfine Raunormal
- No calibration, only nominal value is known
- Comparison with measured roughness values



(Profil überhöht dargestellt)

Ra value	Min	Mean	Max
Shall		60 nm	
Is	55.01 nm	59.61 nm	66.36 nm

Rz value	Min	Mean	Max
Shall		350 nm	
Is	330.5 nm	348.6 nm	376.4 nm

VERIFICATION DEPTH-SETTING-NORMAL

- Verification at hall depth setting standard
- No calibration, only nominal value is known
- Comparison with measured step heights

Groove	1	2	3
Shall	0.24 µm	0.75 µm	2.4 µm
Is	0.246 µm	0.742 µm	2.407 µm

Groove	4	5	6
Shall	7.5 µm	24 µm	75 µm
Is	7.533 µm	24.002 µm	75.041 µm