NANOVEA

OPTICAL PROFILERS

The New Standard of Profilometry

NANOVEA.COM

NANOVEA®

A Better Measure.

Offering more than 25 Years of Material Science Experience

RESEARCH AND CONSULTATION

Extensive range of research content such as brochures, application notes, publications, and videos.

EXPERT ASSISTANCE

Dedicated Profilometry experts happy to guide you through any question or project request.

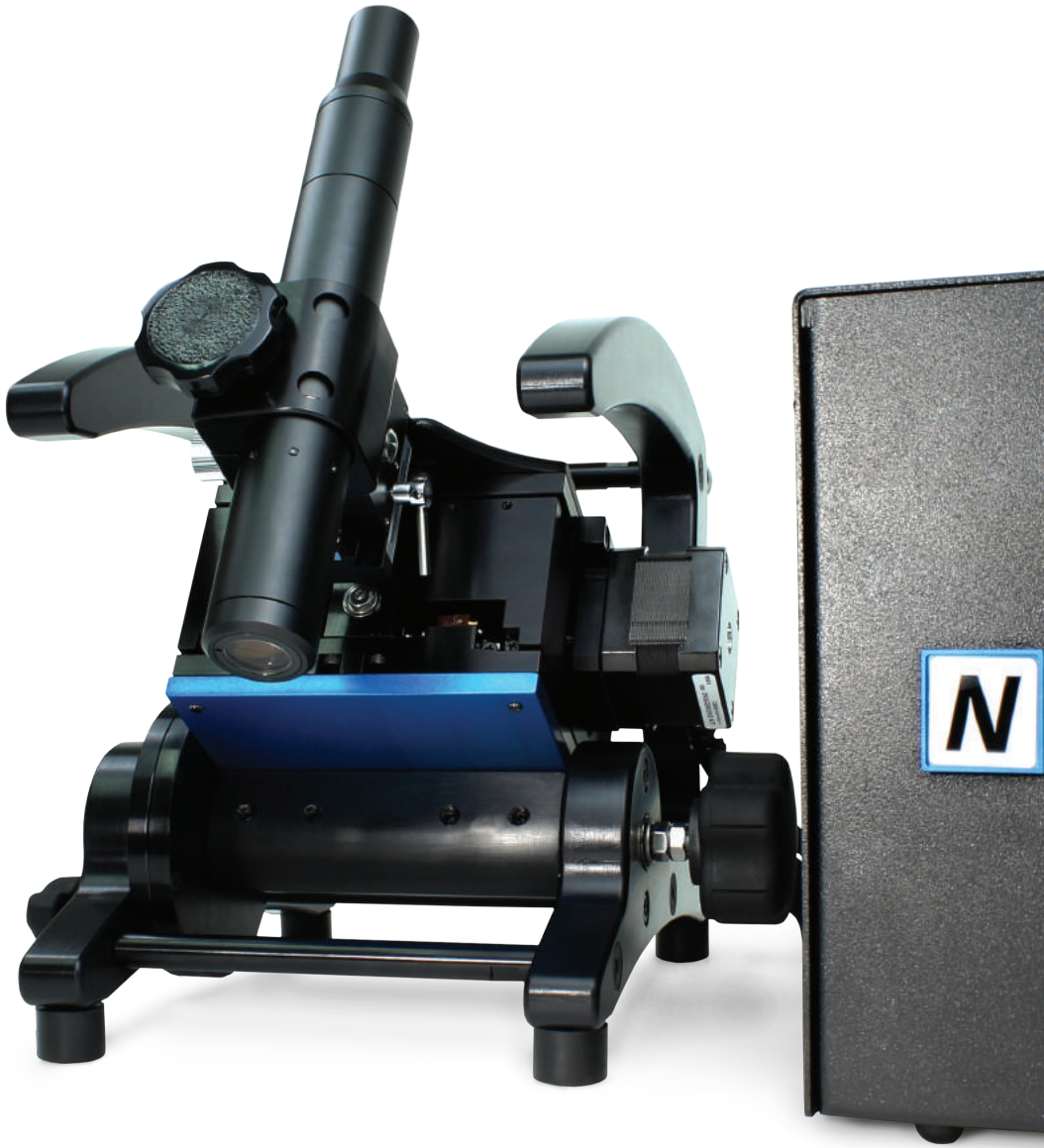
CUTTING EDGE INNOVATION

At Nanovea we are always developing cutting edge technologies and standards. We innovate our instruments so that you can innovate your own products.

PRE AND POST INSTALLATION SUPPORT

Full walk-through and guide to make sure the instrument is installed perfectly. Dedicated support team to help you after your instrument has been installed.

INSTRUMENTS



ST400 OPTICAL PROFILER

- 200 x 150mm XY stages
- Video imaging integration
- Ideal for wide range of samples with varied geometries
- Chromatic confocal sensors w/ speed up to 200 times faster
- Rotational stage parallel or perpendicular to the testing plate
- Height sample clearance up to 200mm

3D CHROMATIC SENSORS

Standard Sensor

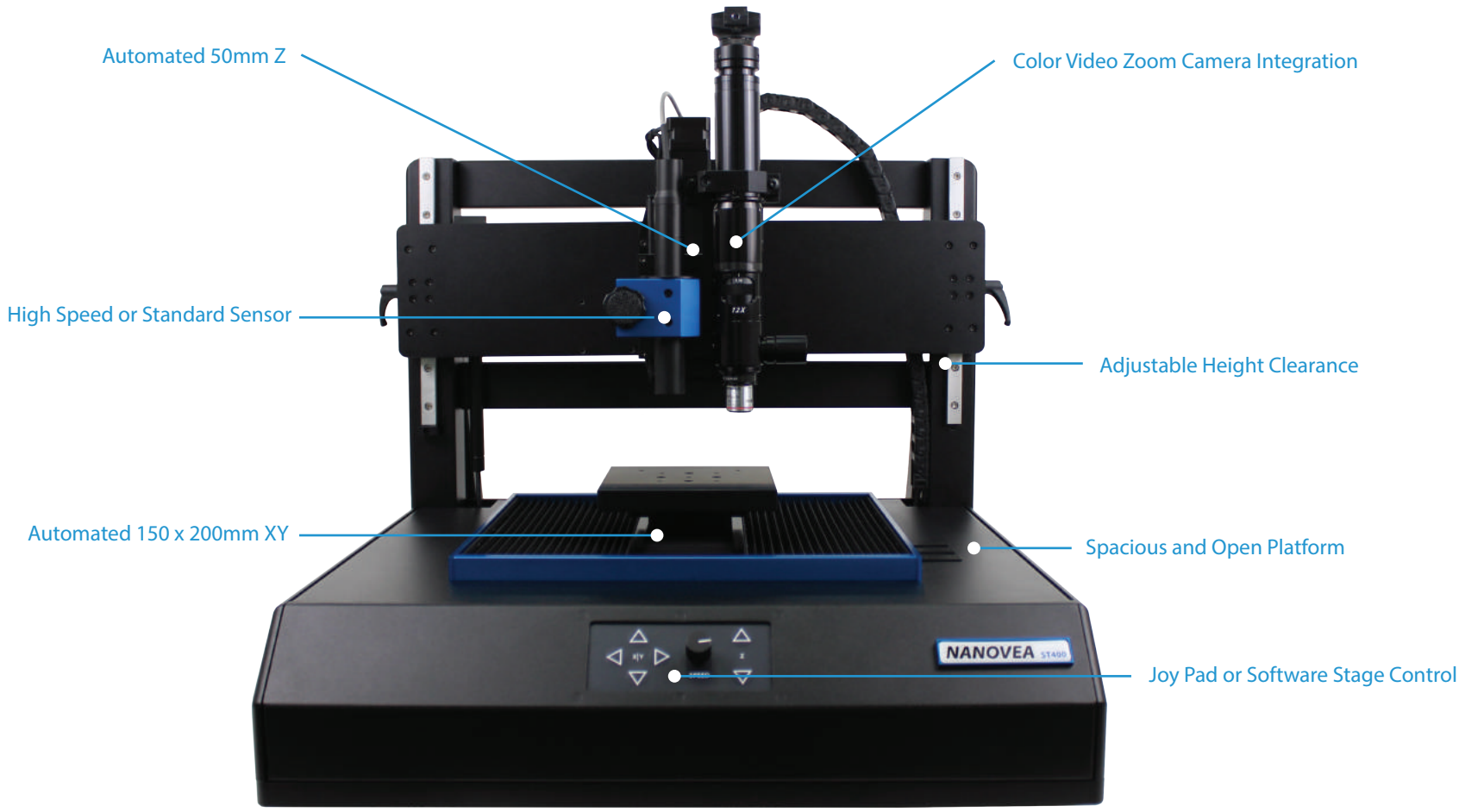
High Speed Sensor

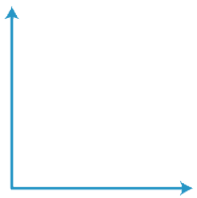
VIDEO OPTIONS

Atomic Force Microscope

Zoom Microscope

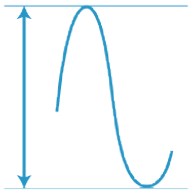
THE STANDARD FOR PROFILOMETRY





X - Y SCAN AREA

200 x 150mm Motorized



HEIGHT RANGE

2.5nm to 25mm

DESKTOP DIMENSIONS

62 x 62 x 82cm

SCAN SPEED

40mm/s

ST500 LARGE AREA OPTICAL PROFILER

- High speed large area measurement w/ high speed sensor
- 400 mm XY axis travel with a maximum speed up to 200 mm/s
- Video zoom camera to provide automated functions
- Measurements with a user friendly desktop platform

3D CHROMATIC SENSORS

Standard Sensor

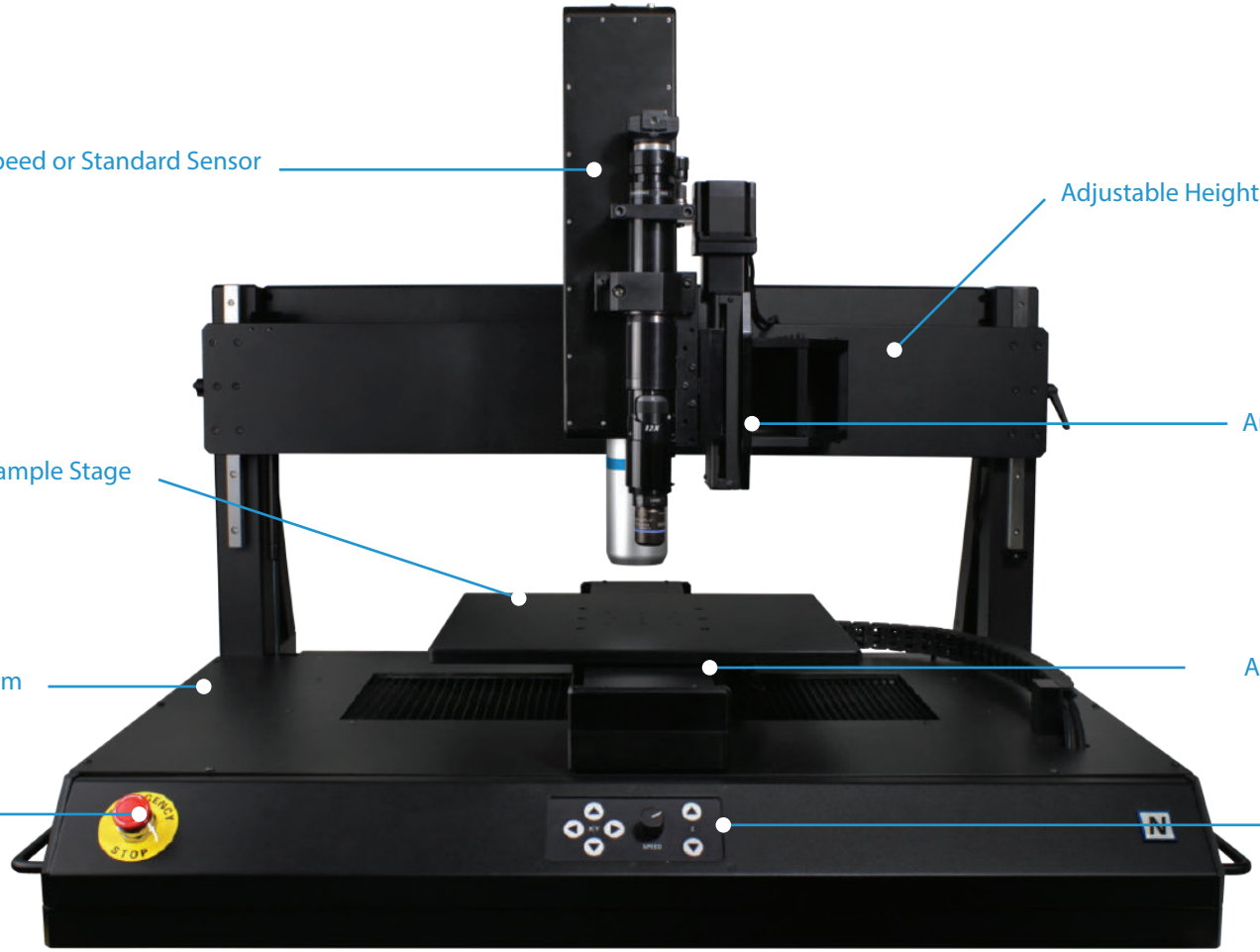
High Speed Sensor

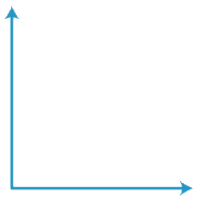
VIDEO OPTIONS

Atomic Force Microscope

Zoom Microscope

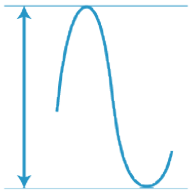
HIGH SPEED AND LARGE AREA MEASUREMENT





X - Y SCAN AREA

400 x 400mm Motorized



HEIGHT RANGE

2.5nm to 25mm

DESKTOP DIMENSIONS

97 x 72 x 92cm

SCAN SPEED

200mm/s

JR25 PORTABLE OPTICAL PROFILER

- First truly portable non contact profilometer
- Weight less than 5.5 kg
- Lab quality results on the go
- Measurement capabilities up to 25mm x 25mm
- Able to measure samples at difficult angles
- Possible integration into automated robot arms and other equipment

3D CHROMATIC SENSORS

Standard Sensor

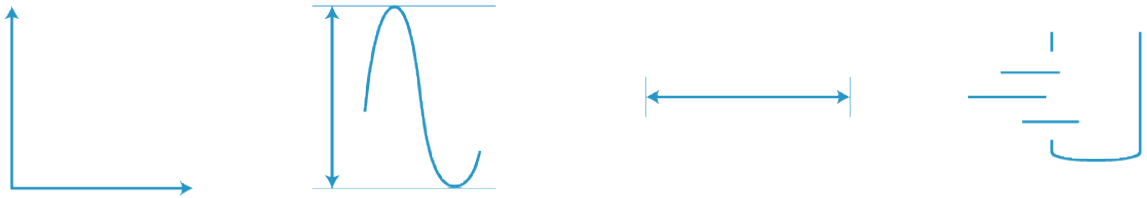
High Speed Sensor

VIDEO OPTIONS

Atomic Force Microscope

Zoom Microscope

LABORATORY QUALITY RESULTS IN ANY LOCATION



X - Y SCAN AREA
25 x 25mm Motorized

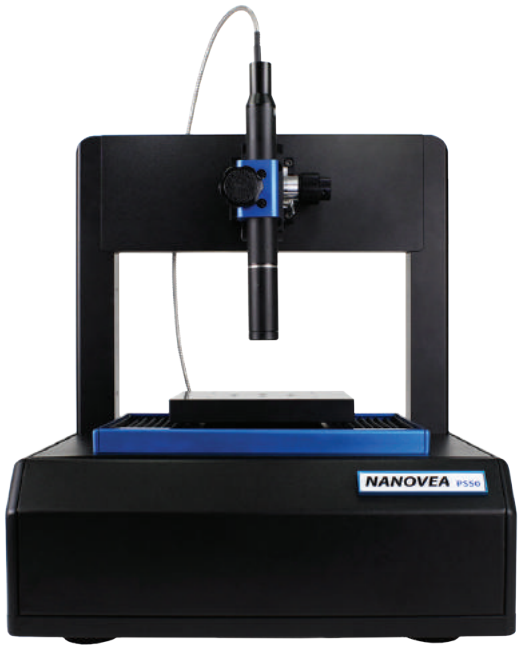
HEIGHT RANGE
2.5nm to 25mm

DESKTOP DIMENSIONS
20 x 30 x 17cm

SCAN SPEED
20mm/s

PS50 COMPACT OPTICAL PROFILER

- Most advanced compact profilometer
- Small and simple footprint
- Measurement capabilities up to 50mm x 50mm
- All testing capabilities in compact version



3D CHROMATIC SENSORS

Standard Sensor

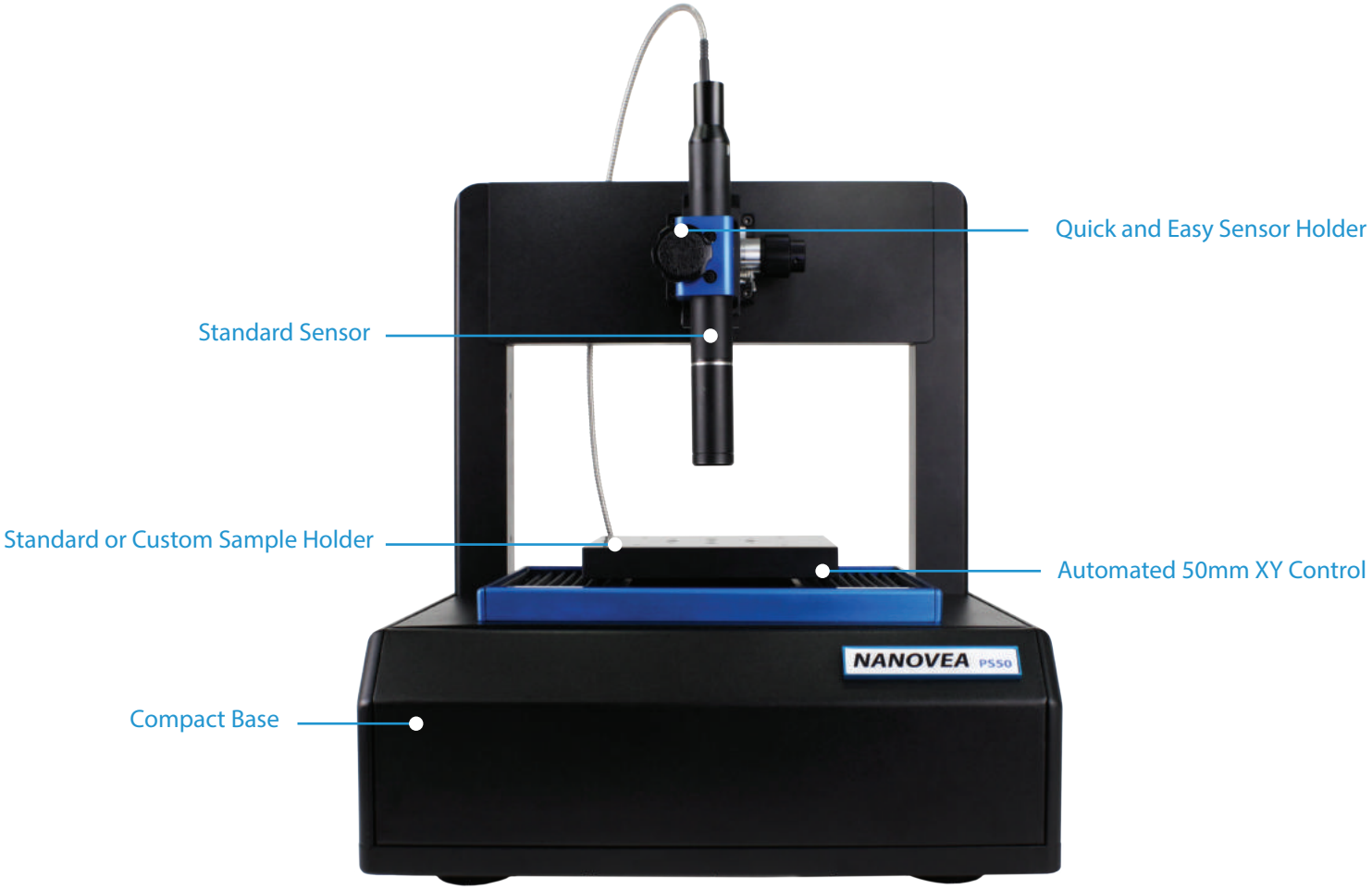
High Speed Sensor

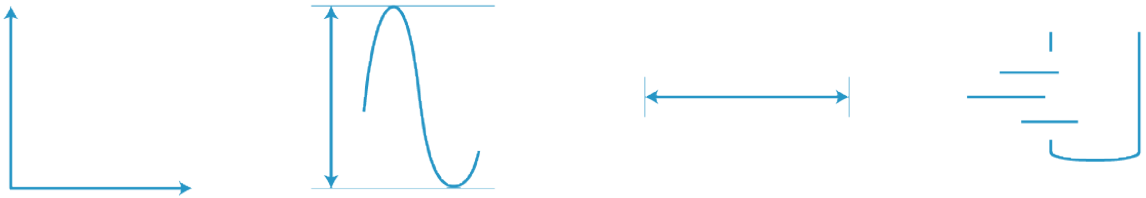
VIDEO OPTIONS

Atomic Force Microscope

Zoom Microscope

MOST ADVANCED COMPACT BENCHTOP





X - Y SCAN AREA
50 x 50mm Motorized

HEIGHT RANGE
2.5nm to 25mm

DESKTOP DIMENSIONS
38 x 33 x 43cm

SCAN SPEED
20mm/s

JR100 PORTABLE & HIGH SPEED OPTICAL PROFILER

- Fast measurement (without stitching) using a 100 mm XY axis travel
- Z stage allows setup of measurements at various starting heights
- A high speed sensor gives ultra fast measurements at 382,000 points per second.
- Powerful for quality control

3D CHROMATIC SENSORS

Standard Sensor

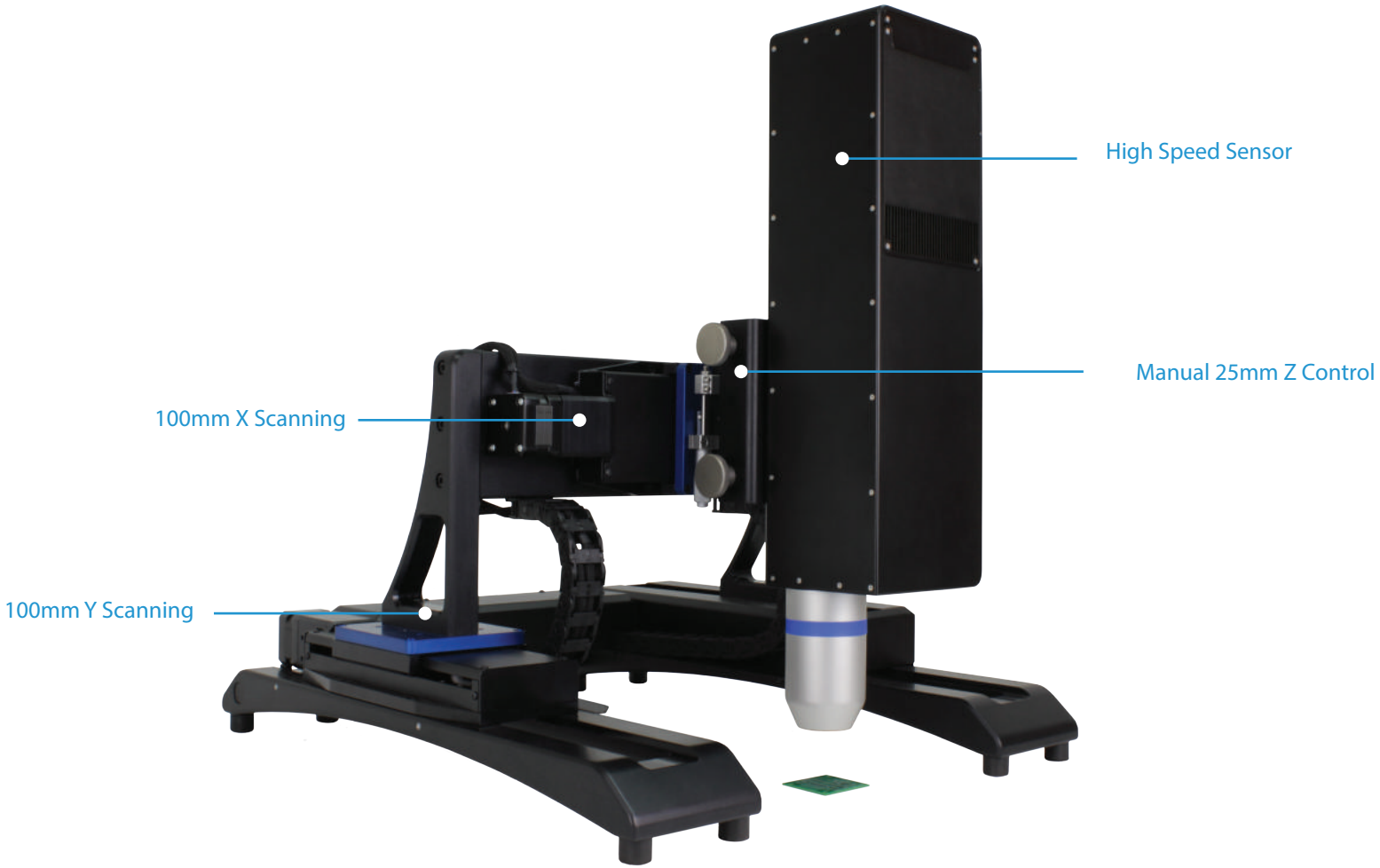
High Speed Sensor

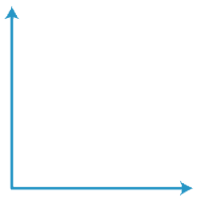
VIDEO OPTIONS

Atomic Force Microscope

Zoom Microscope

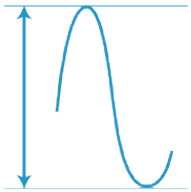
PORTABILITY AND HIGH SPEED





X - Y SCAN AREA

100 x 100mm Motorized



HEIGHT RANGE

2.5nm to 25mm

DESKTOP DIMENSIONS

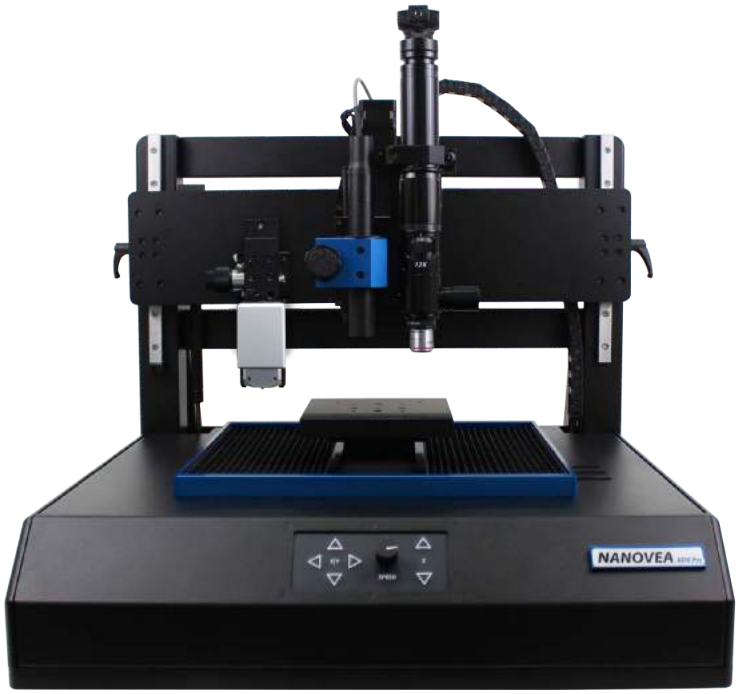
44 x 49 x 32cm

SCAN SPEED

20mm/s

AFMPRO OPTICAL PROFILER

- 150 x 200mm XY stages and an adjustable height clearance of up to 140mm
- High magnification microscopy
- AFM expands the 3D capabilities into the sub nanometer range
- AFM gives the best lateral accuracy compared to optical techniques
- Easy to select zones on the video to be scanned



3D CHROMATIC SENSORS

Standard Sensor

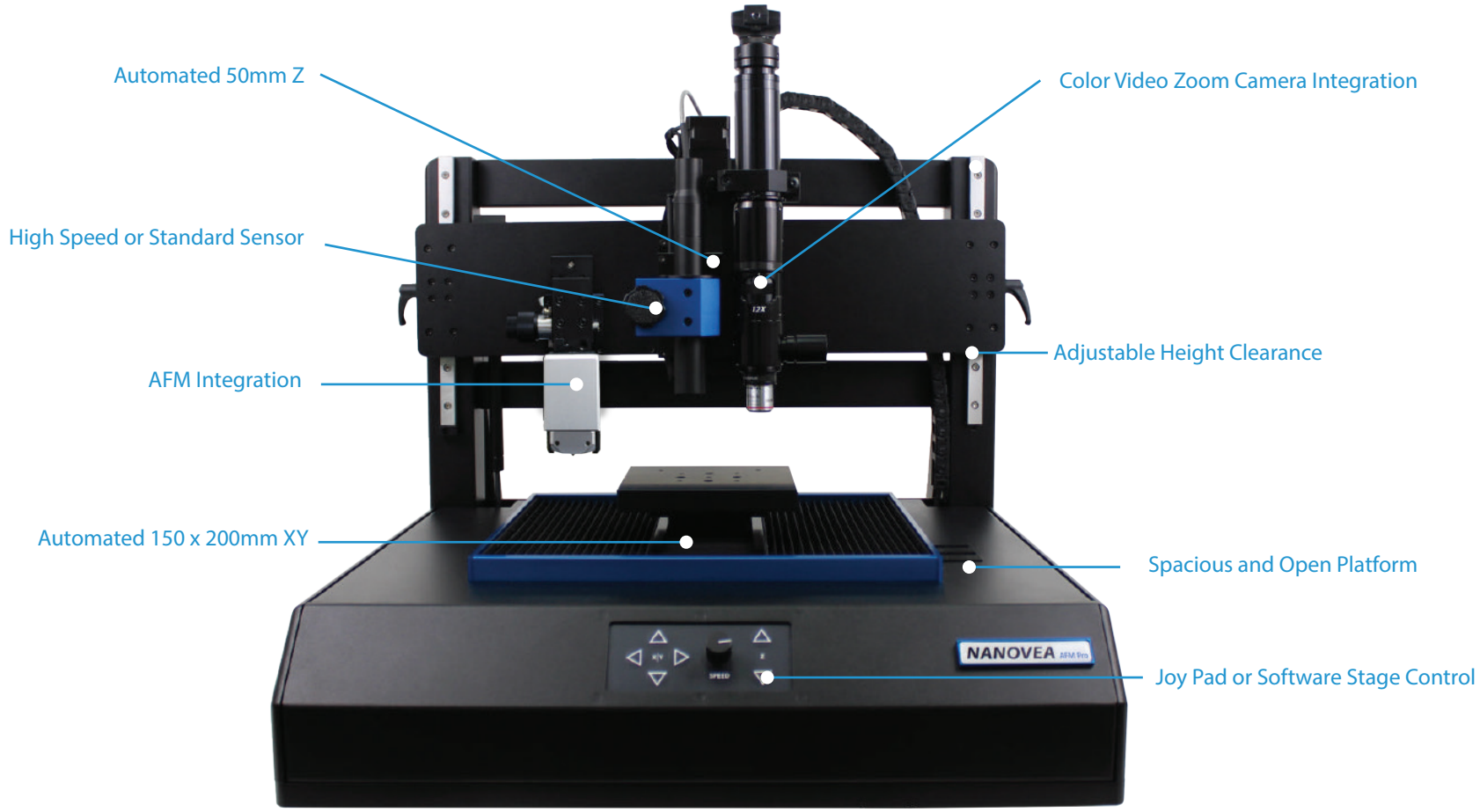
High Speed Sensor

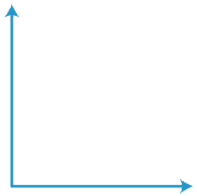
VIDEO OPTIONS

Atomic Force Microscope

Zoom Microscope

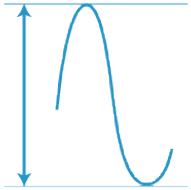
OPTICAL PROFILER WITH AFM MODULE





X - Y SCAN AREA

200 x 150mm Motorized



HEIGHT RANGE

2.5nm to 25mm

DESKTOP DIMENSIONS

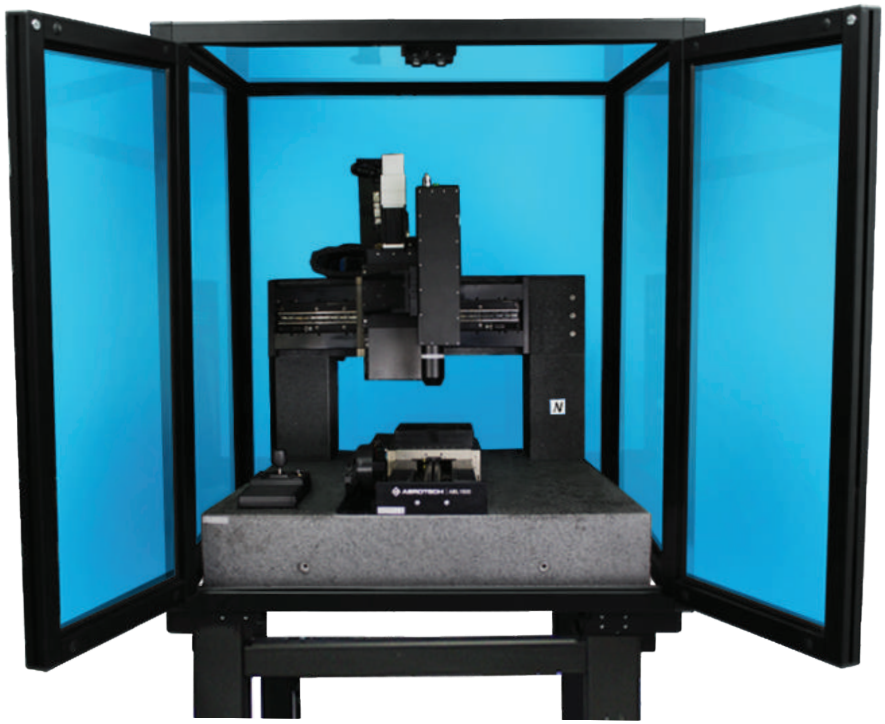
64 x 64 x 82cm

SCAN SPEED

40mm/s

HS2000 BEST STABILITY OPTICAL PROFILER

- **Granite base** provides superior stability
- Automated inspection for quality control
- Workstation included to create fully contained stand alone instrument
- Excellent for roughness measurements, combined with advanced automation features



3D CHROMATIC SENSORS

Standard Sensor

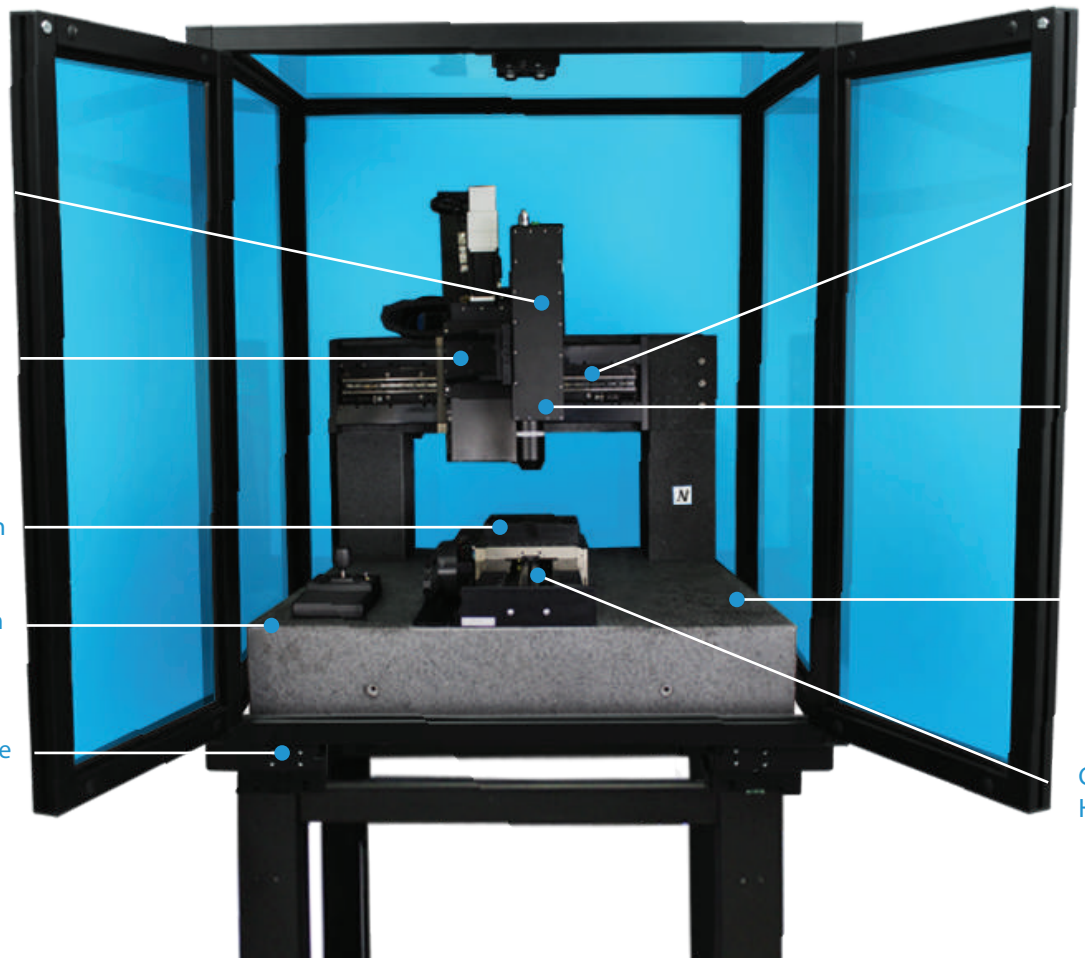
High Speed Sensor

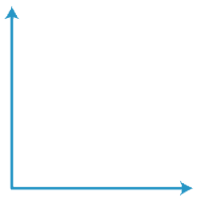
VIDEO OPTIONS

Atomic Force Microscope

Zoom Microscope

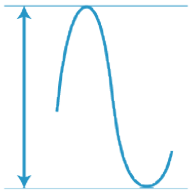
HIGH SPEED AND PRECISION FLATNESS TOOL





X - Y SCAN AREA

400 x 500mm Motorized



HEIGHT RANGE

2.5nm to 25mm

DESKTOP DIMENSIONS

101 x 106 x 195cm

SCAN SPEED

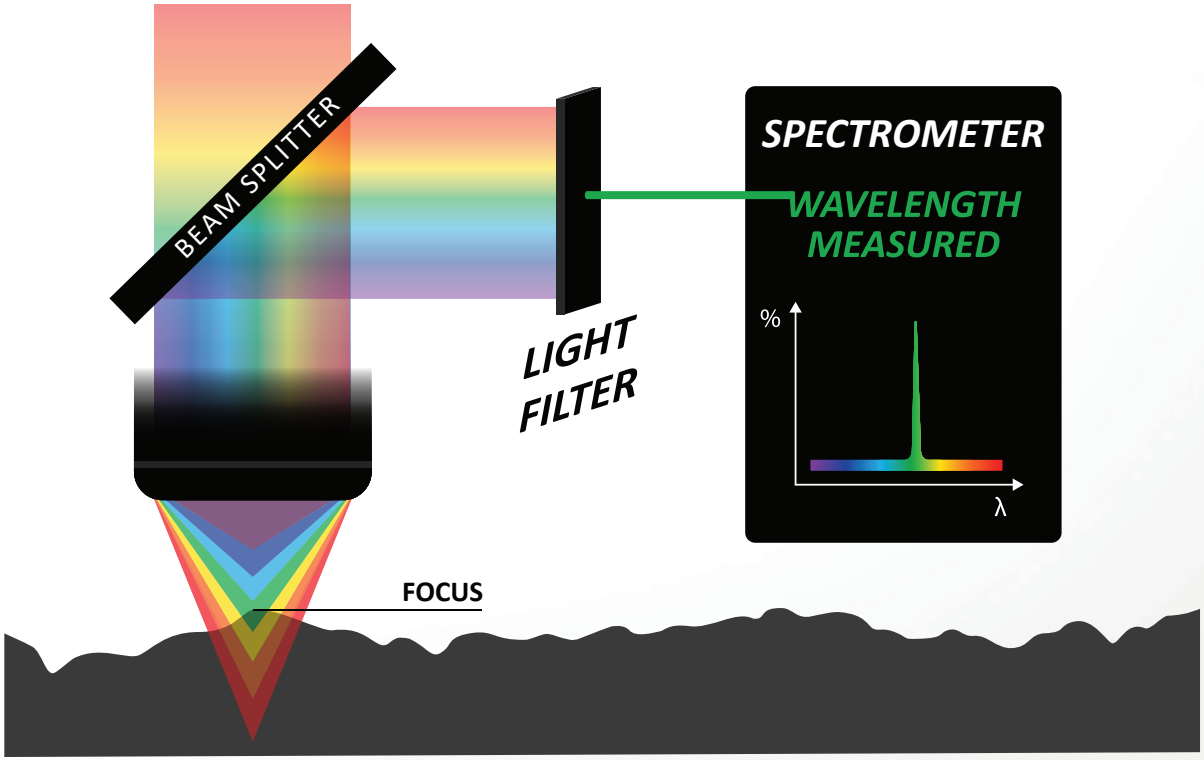
500mm/s

TECHNIQUE

HOW IT WORKS

Chromatic Light Technology operates via a process that utilizes white light and a series of spherochromatic lenses. The spherochromatic lenses split the white light into individual wavelengths with unique vertical focal points (vertical distance from surface or height).
All wavelengths and their corresponding heights make up the height range measurement scale of a sensor.

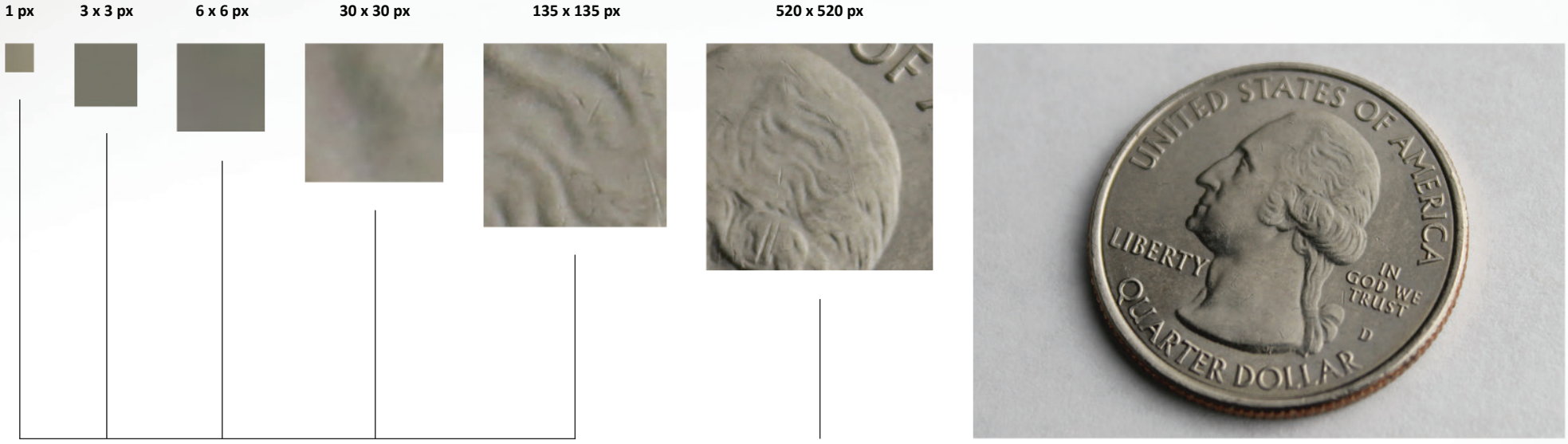
The wavelength with the highest intensity will be detected by the spectrometer which processes the wavelength's associated height. During a full raster scan, this process takes a fraction of a second and produces an accurate height map of the surface of interest.



NO COMPLEX ALGORITHMS • NO LEVELING REQUIRED • NO X-Y DATA STITCHING

THE PROBLEM WITH OTHER TECHNIQUES

LATERAL RESOLUTION vs LATERAL ACCURACY



NOT ENOUGH DATA TO CALCULATE FOCUS
NO PRACTICAL USE

PIXEL SIZE RESOLUTION: 2nm

FOCUS CAN BE CALCULATED
THE SMALLEST INCREMENT
FOR ANY PRACTICAL USE

EFFECTIVE ACCURACY: 1040 nm

THEM

Camera Pixel Size or ***Display Resolution*** is often defined as **lateral resolution** to impress clients. Instruments that use camera pixel-based technology require complex algorithms to determine the focal point of the instrument which is problematic for complex surfaces.

US

Chromatic Light provides **lateral accuracy** which is determined by physics and is directly related to the spot size of the chromatic light source of the optical sensor.

LASER SCANNING CONFOCAL MICROSCOPE

VS

CHROMATIC LIGHT OPTICAL SENSOR

HEALTH HAZARD
Exposure to laser light reflectivity

SAFE WHITE LIGHT
No need for protective wear

INCONSISTENT LASER LIGHT WAVELENGTH
Inconsistencies in wavelength during scanning affect accuracy of results

UNIFORM & BROAD WHITE LIGHT SPECTRUM
Changes in wavelength are the data being collected

DECEPTIVE 'DISPLAY RESOLUTION'
Lateral & height accuracy are fixed by the objective lens making 'Display Resolution' insignificant

INDEPENDENT LATERAL & HEIGHT ACCURACY
Lateral & height accuracy can be mixed and matched to meet a broad range of scanning requirements

COMPLEX ALGORITHMS
Alpha blending algorithms stitch collected data layer by layer, grounding accuracy on complex calculations

NO ALGORITHMS
Physical wavelength reflected from the surface is measured directly for an accurate representative height map

STITCHING REQUIRED
Objective lenses have limited fixed fields of view
Stitching of larger areas compromises accuracy of the scan

NO STITCHING
Data points are collected continuously providing the same level of accuracy for both small and large areas

50x SLOWER
Data acquisition speed up to 7.9 KHz

50x FASTER
Data acquisition speed up to 384 KHz

LASER MICROSCOPE

OPTICAL SENSOR

LATERAL ACCURACY

For 50x objective (370 x 277 µm)

± 2% of measuring value
± 2% x 370 µm
≈ 15 µm

w/ stitching algorithms >> 15 µm

Step size:
= 5 µm

3x BETTER LATERAL ACCURACY

HEIGHT ACCURACY

≈ 0.2 + L/100 µm
≈ 0.2 + 950/100 µm
≈ 9.7 µm

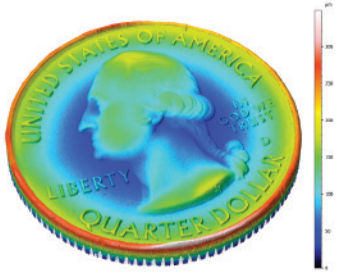
950 µm range
≈ 0.6 µm

16x BETTER HEIGHT ACCURACY

AREA TESTED

STITCHING REQUIRED

scans (25 x 25 mm)
25 000 µm / 370 µm x 25 000 µm / 277 µm
68 x 91
= 6188 scans

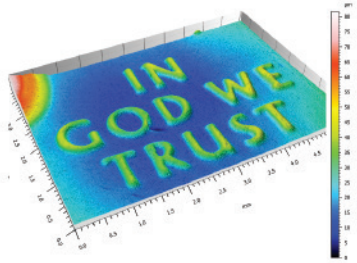


NO STITCHING
Consistent accuracy across any measurement size

1 SCAN

TEST TIME

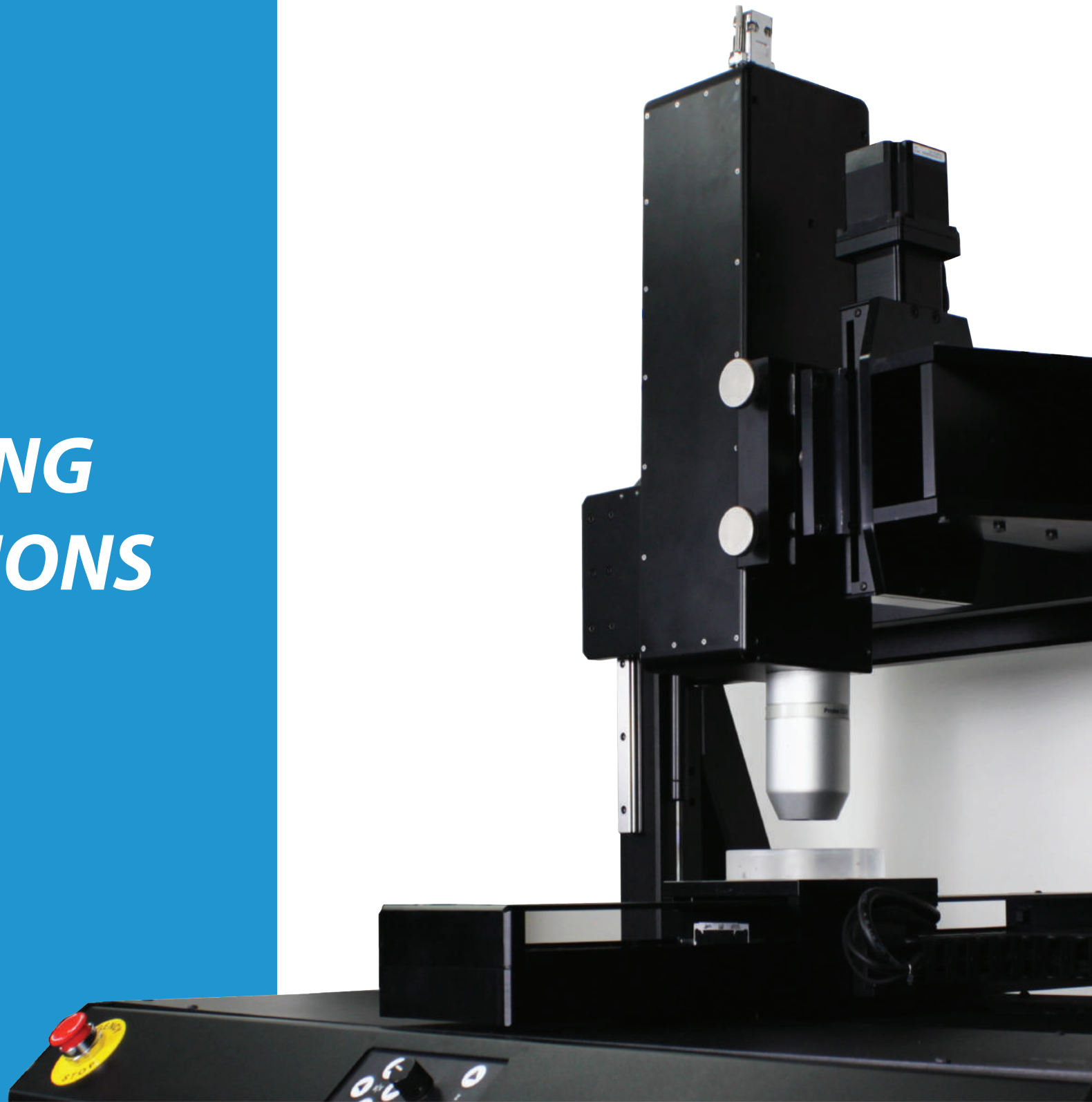
6 sec per scan
+ 4 sec displacement & stitching
= 10 sec/scan x 6188 scans
= 61860 seconds (≈ 17 hours)



Scan time (25 x 25 mm)
= 29.6 seconds

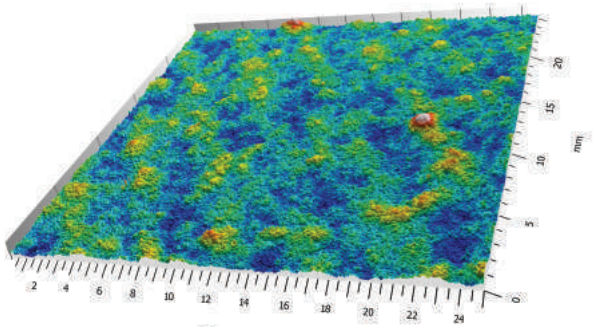
2090x FASTER

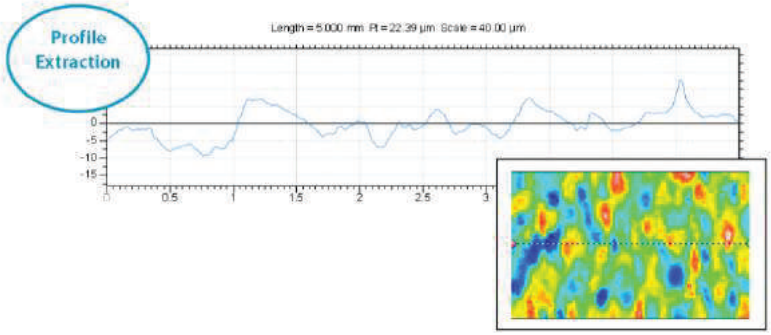
TESTING SOLUTIONS



ROUGHNESS | FINISH

- One second Ra measurement
- Any materials or surface complexity (3D or 2D)
- Automotive roughness finish standards





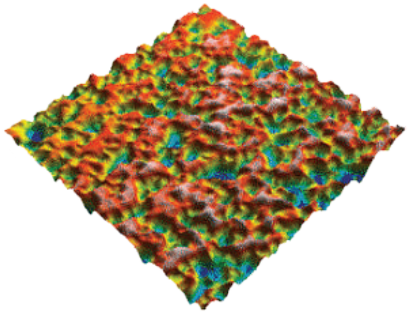
ROUGHNESS | FINISH ANALYSIS

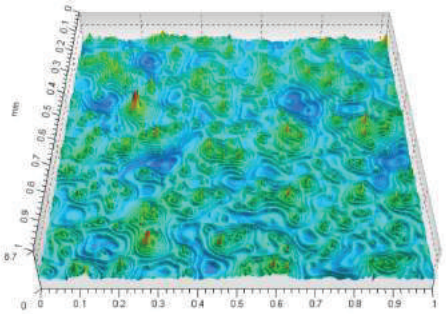
- Ra | Sa profile & surface average roughness
- Rq | Sq profile & surface rms roughness
- Rz | Sz maximum height
- Sp | Sv maximum peak & pit height
- SKu | Ssk kurtosis & skewness of height distribution
- Bearing ratio and index
- Sk kernel roughness depth
- Spk | Svk reduced peak height & valley depth
- Sr1 | Sr2 upper & lower material ratio
- Sci & Svi core & valley fluid retention index

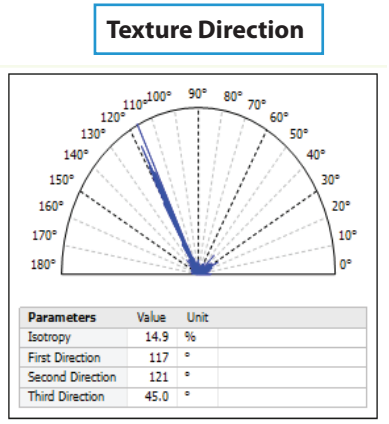
AND MORE

TEXTURE

- Isotropic & anisotropic surfaces
- Hills and valleys analysis







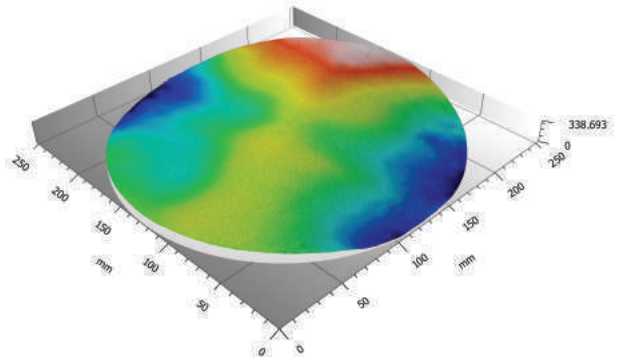
TEXTURE ANALYSIS

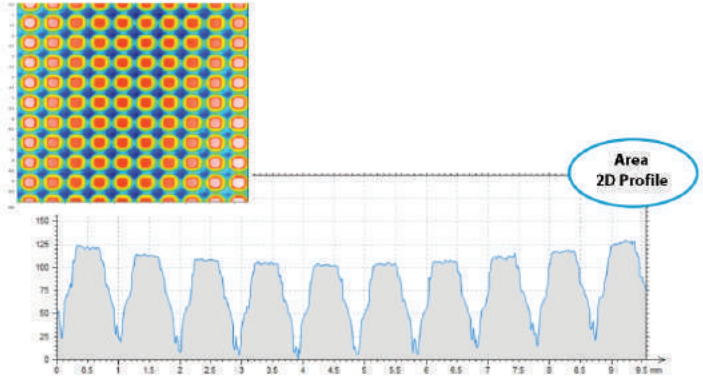
- % of isotropy
- 1st, 2nd and 3 rd direction
- % of periodicity
- Period
- Density of peaks
- Peak curvature (pointed or rounded)
- Average area of valleys & hills
- Average volume of valleys & hills

AND MORE

FLATNESS | WARPAGE

- Flatness <1µm over 500mm with no correction





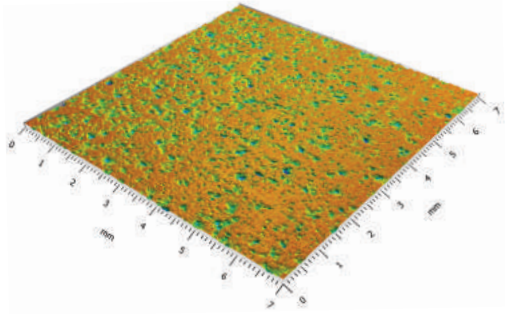
FLATNESS | WARPAGE ANALYSIS

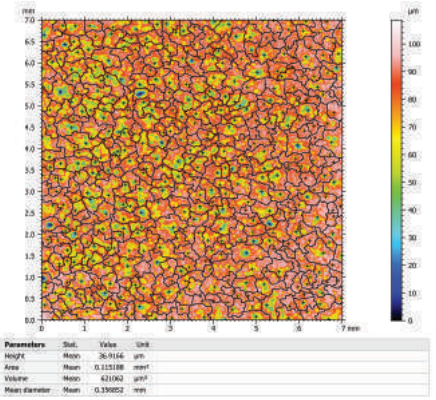
- 3D & 2D surface waviness & flatness
- Best polynomial match
- Material & bearing ratios
- Distance measurement
- FLTt peak to valley flatness deviation of the surface
- FLTp peak to reference flatness deviation
- FLTv reference to valley flatness deviation
- FLTq rms flatness deviation

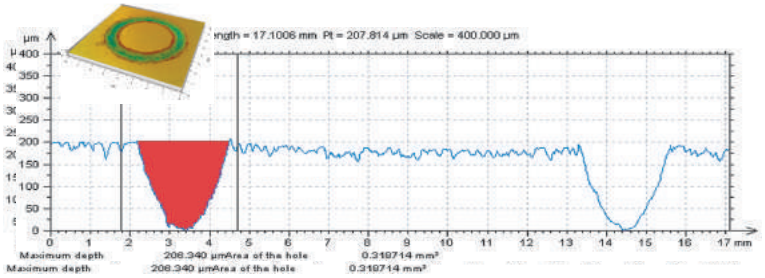
AND MORE

VOLUME | AREA

- Surface subtraction & volume lost
- Corrosion analysis
- Motif and grain analysis







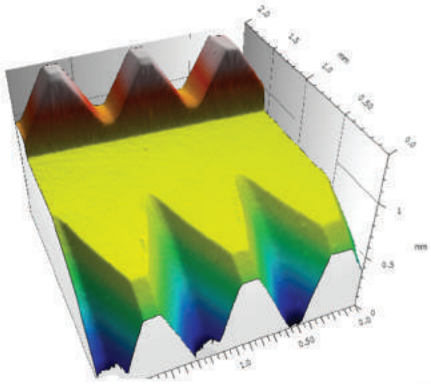
VOLUME | AREA ANALYSIS

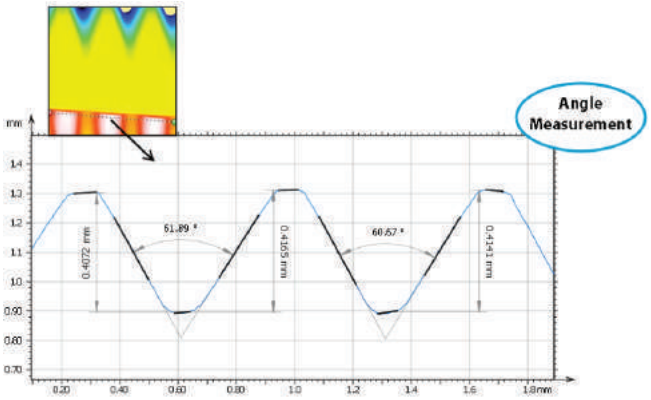
- Volume of void, hills or valleys
- Sdar | Spar developed surface area & projected area
- Volume of void & material from given height
- Map area above or below given heights (%,µm²)
- Mean thickness of void & material from given height
- # of grains & average size
- Area & perimeter of grains
- Height, area, volume of motifs
- Max and min pitch of motifs

AND MORE

GEOMETRY AND SHAPE

- Direct comparison to CAD geometry
- Curvature, radius, angles
- Lateral dimension
- Drill bit studies
- Cutting tools studies





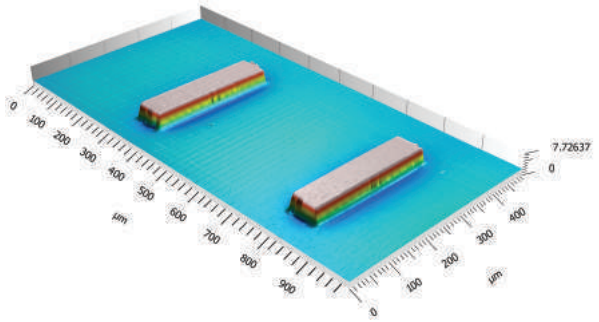
GEOMETRY AND SHAPE ANALYSIS

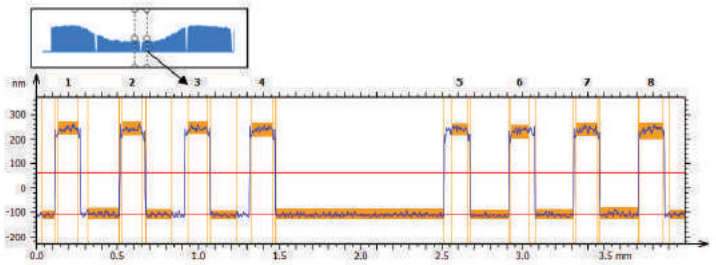
- Radius of curvature
- Relative angle measurement
- Distance measurement
- Mean diameter
- Contour analysis
- Rake and wedge angle of drill bit
- K symmetry of cutting edge
- S alpha and gamma dist apex to end of clearance & rake roundness

AND MORE

STEP HEIGHT | THICKNESS

- Measure through transparent materials
- Transparent film and coating thickness down to 20nm
- Steps from 20nm to 25mm





STEP HEIGHT | THICKNESS ANALYSIS

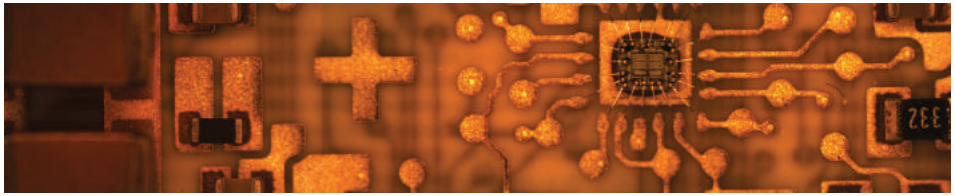
- Point to point
- Point to plane
- Maximum, minimum and mean heights
- 3D or 2D map of thickness
- Thickness distribution curve

AND MORE

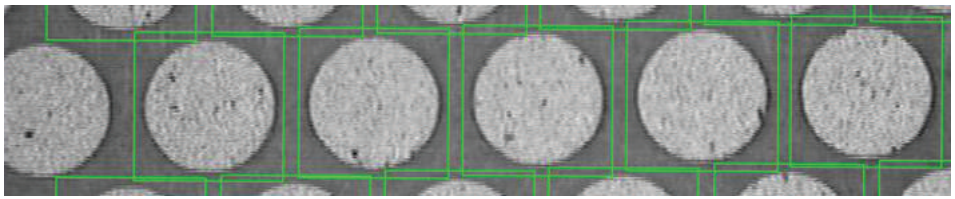
MICROSCOPE VIDEO IMAGING

Available on : **ST400, ST500, AFMPRO, & HS2000**

- Ultra zoom lens with coax lighting & detent
- Large area stitching capability
- Color video camera (1200x1600)
- Maximum magnification of 8000X
- Three positions turret (optional)



Broadview map selection tool



PRVision for machine vision capability

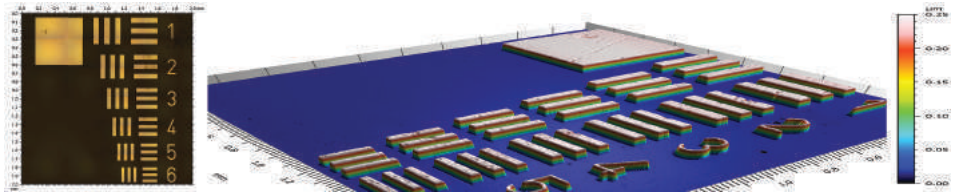
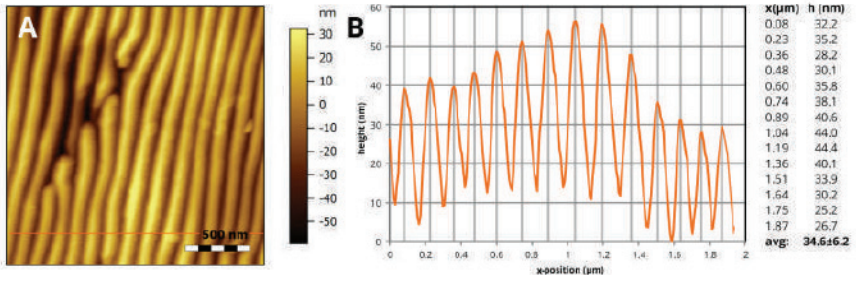


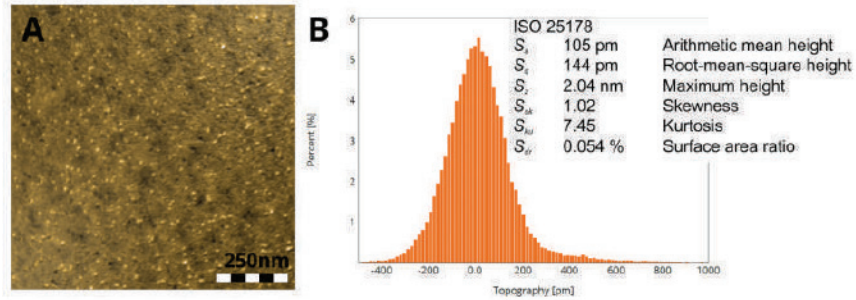
Image area selection measurement and image overlay

ATOMIC FORCE MICROSCOPE

Available on : **AFMPRO**

- Scan of XY 110µm | high resolution XY 25µm
- Lateral resolution 1.7nm
- Static, dynamic and extended modes
- Max Z range 22µm | 5µm
- Integrated video camera
- AFM to/from indenter position or video imaging with accuracy of < 0.2µm





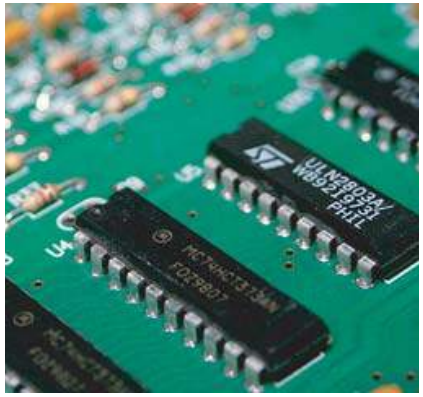
ADVANCED AUTOMATION

- Automatic focus (optical and microscope)
- Automatic analysis template
- Multi sample handling macros
- Easy selection of area under microscope
- Automatic dual frequency for surfaces with varying reflections
- Custom mounting setup of sensors for inline roughness QC
- Pattern recognition, database communications, pass/fail limits

VISIT OUR APPLICATION NOTES LIBRARY

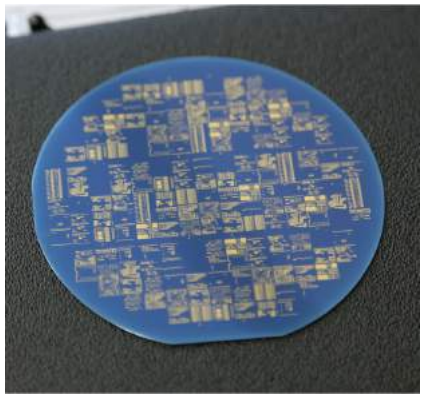
nanovea.com/app-notes

Nanovea Optical Profilers **measure any material with a wider range of measurement** than any other Profilometer.










BASE	Jr25	Jr100	PS50	ST400	ST500	HS2000
Type	Portable	Portable & Fast	Compact	Standard	Large Area	Zero Noise / Flatness
X-Y Stage Travel	25 x 25mm	100 x 100mm	50 x 50mm	200 x 150mm	400 x 400mm	400 x 500mm
Z Axis	30mm Manual	25mm Manual	30mm Manual	50mm Motorized	50mm Motorized	100mm Motorized
Maximum X-Y Speed	20 mm/s	20 mm/s	20mm/s	40mm/s	200mm/s	500mm/s
System Dimensions	20 x 30 x 17cm	44 x 49 x 32cm	38 x 33 x 43cm	62 x 62 x 82cm	97 x 72 x 92cm	101 x 106 x 195cm
Rotational Options	N/A	N/A	N/A	Stage or Cylinder	Stage or Cylinder	Software
Video Microscope	N/A	N/A	N/A	Available	Available	Available
Max Sample Weight	No Limit	No Limit	8Kg	8Kg	4-8Kg	7Kg
High Speed Line Sensor	N/A	Included	N/A	Available	Available	Available
Customizable	50mm Stage Travel	N/A	N/A	4 axis & AFM	4 axis	5 axis

MEASUREMENT TECHNOLOGY

Technique	Non Contact • Chromatic Light
Data Stitching	Not Required within X-Y Stage Travel
Materials Types	ALL - Including Dark, Transparent, & Reflective
Max Surface Angle	Up To 87°

More Information at
nanovea.com/profilometers

STANDARD SENSOR (Singe Point)	PS1	PS2	PS3	PS4	PS5	PS6
Max Height Range	110µm	300µm	1.1mm	3.5mm	10mm	24mm
Working Distance	3.3mm	10.8mm	12.2mm	16.5mm	26.6mm	20mm
Lateral Accuracy (X-Y)	0.8µm	1.7µm	2.6µm	4.6µm	11.0µm	11.0µm
Height Repeatability (Ra) *	1.9nm	5.4nm	15.8nm	31.6nm	117.0 nm	237.2 nm

HIGH SPEED SENSOR (192 Points)	LS1	LS2	LS3
Max Height Range	200µm	0.95mm	3.9mm
Working Distance	5.3mm	18.5mm	41mm
Height Repeatability (Ra) *	14nm	21nm	70nm
Line Width	0.96mm	1.91mm	4.78mm
Pitch	5µm	10µm	25µm
Lateral Accuracy of each point	1µm	2µm	5µm
Acquisiton Rate (points per second)	384KHz	384KHz	384KHz

* Fixed point on glass, average height variation for 1200points (100 sampling)

Specifications are continously improving, please contact ***NANOVEA*** for the latest.

Today's Standard For Tomorrow's Materials.

NANOVEA instruments can be found in renowned education and industrial organizations around the world.

From aerospace applications to medical devices, thousands of clients at the frontiers of the most demanding industries, with no room for error, rely on our instruments' unmatched accuracy and technical superiority.

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