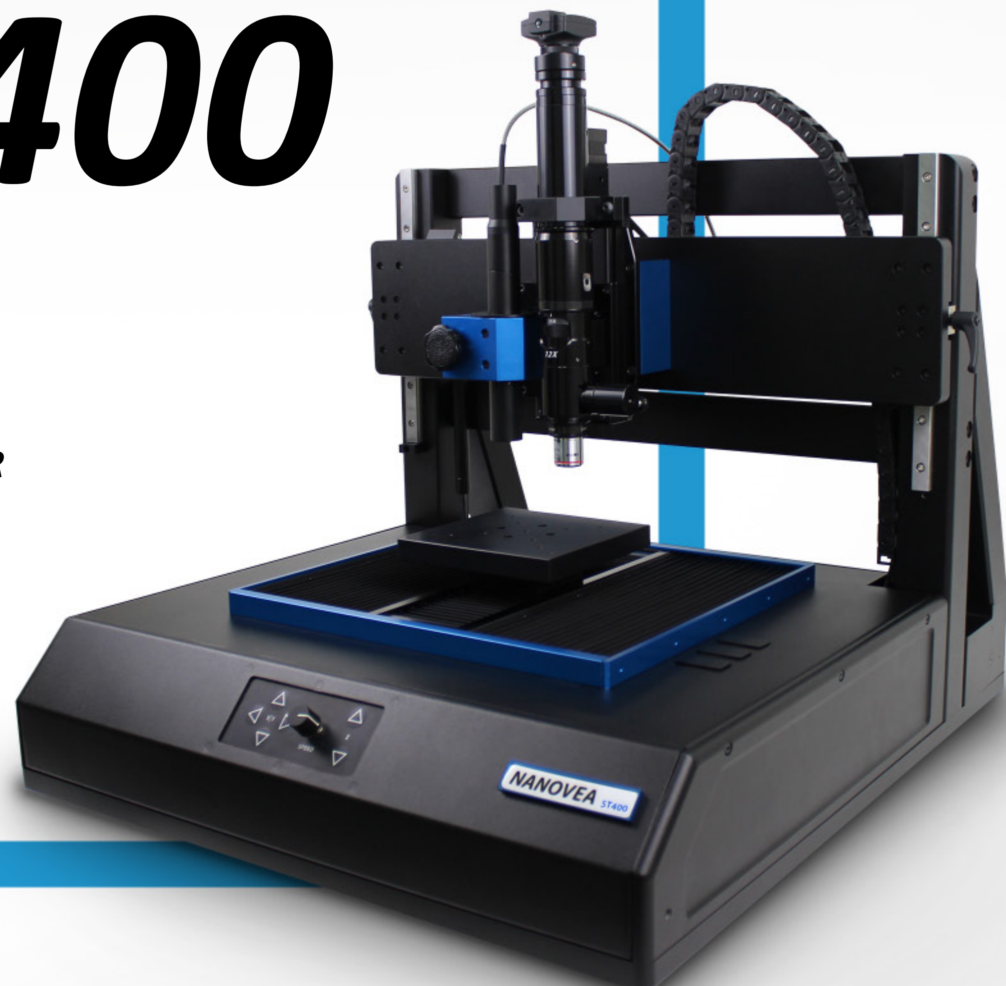
NANOVEA
ST400

STANDARD
OPTICAL PROFILER

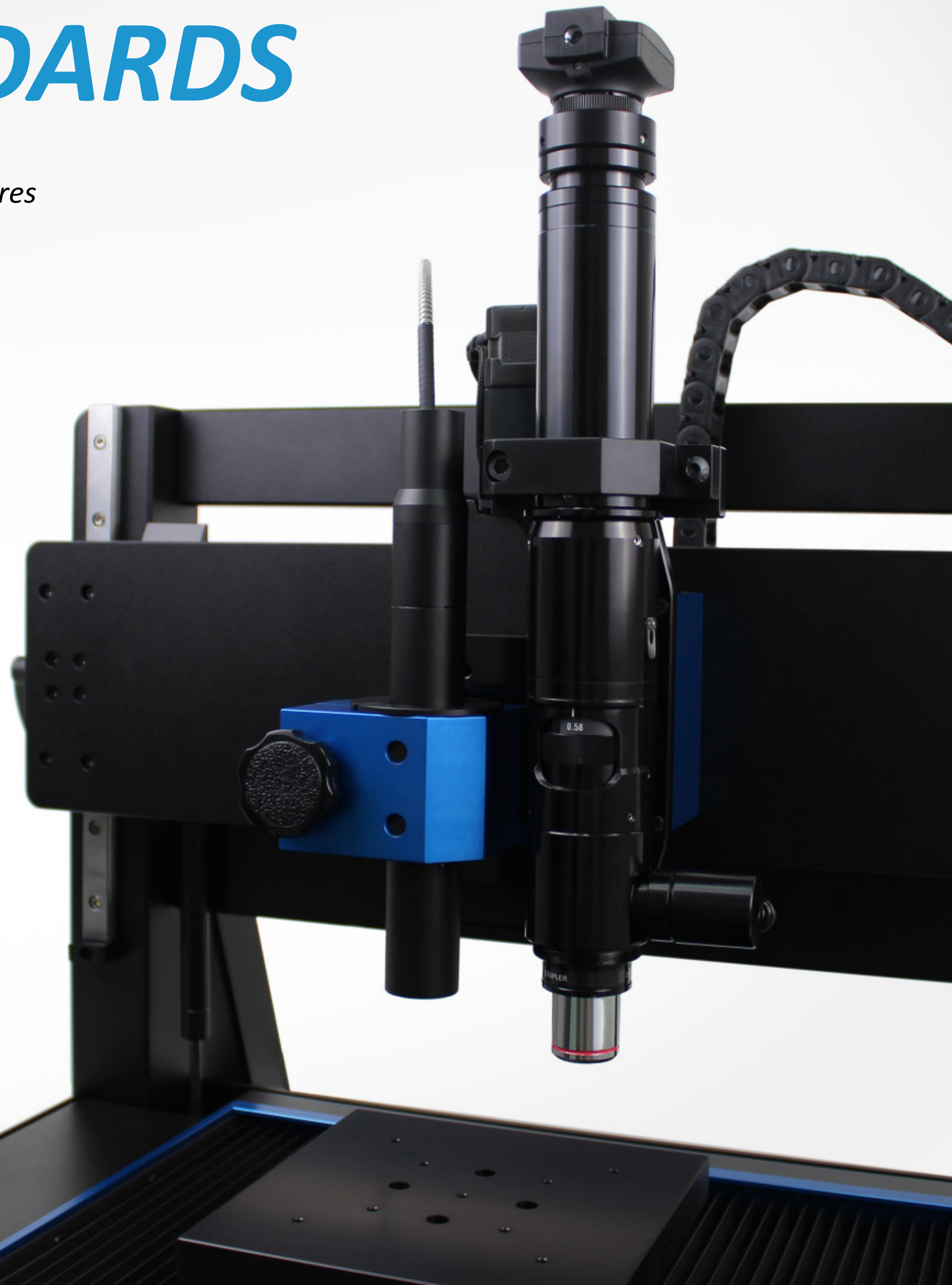


microworld®

NANOVEA.COM

SETTING STANDARDS

Designed with Chromatic Light technology, which measures physical wavelength, ST400 Profiler provides the highest accuracy on any roughness, any form, any material. Transparent or opaque.



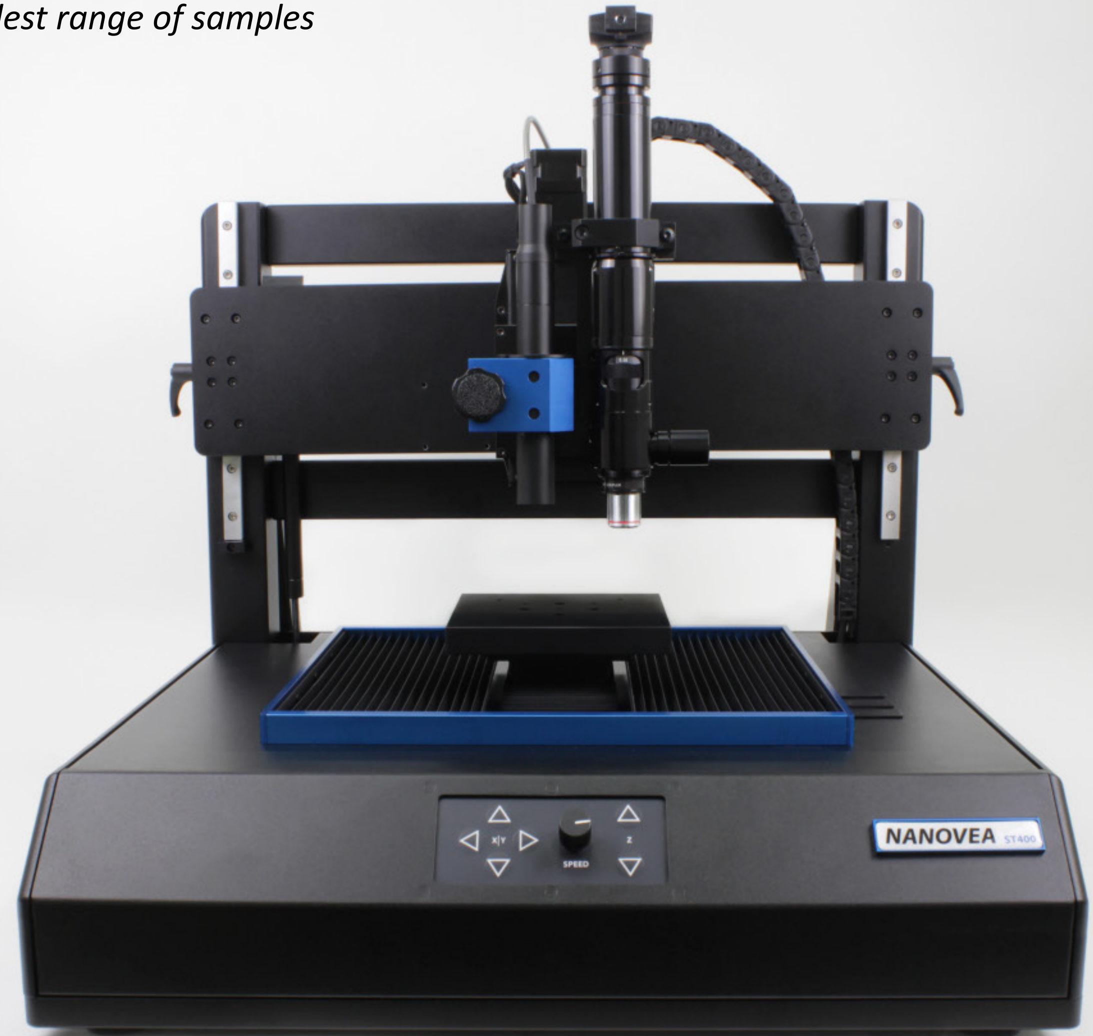
HIGHLY CUSTOMIZABLE
WIDE RANGE OF ADD-ONS

ROTATIONAL OPTIONS
STAGE OR CYLINDER

ULTRA FAST MEASUREMENTS
w/ HIGH SPEED LINE SENSOR

up to 200 mm
HEIGHT SAMPLE CLEARANCE

With larger X-Y stages, 360° rotational stages & many other custom configurations available, ST400 is ideal for the widest range of samples with varied geometries.



X-Y
STAGE TRAVEL
200 x 150 mm

Z
AXIS
50 mm Motorized

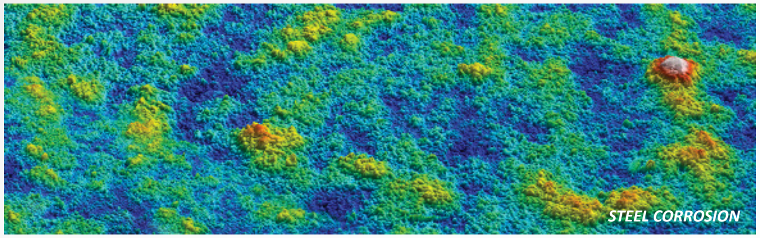
X-Y
MAX SPEED
40 mm/s

THE POWER OF
CHROMATIC LIGHT

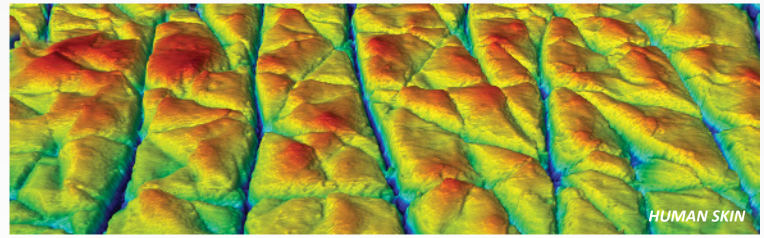
***NANOVEA**’s Non-Contact Optical Profilers are the ideal upgrade from traditional contact stylus and laser profilometers.*

2D & 3D NON-CONTACT

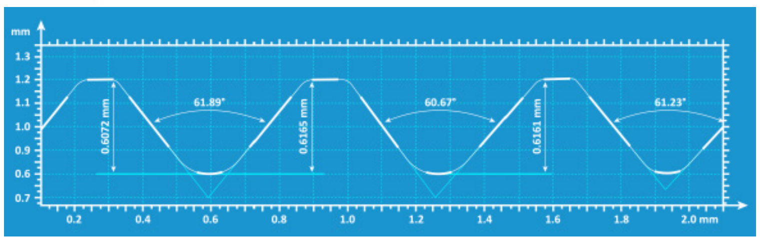
SURFACE MEASUREMENTS



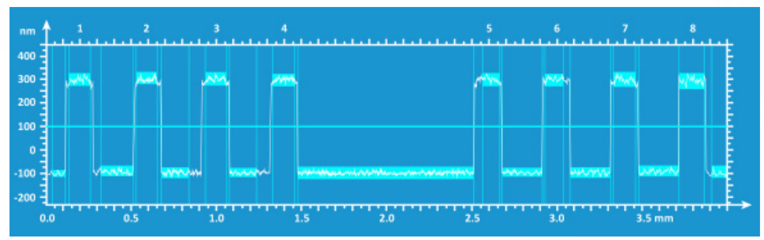
ROUGHNESS & FINISH



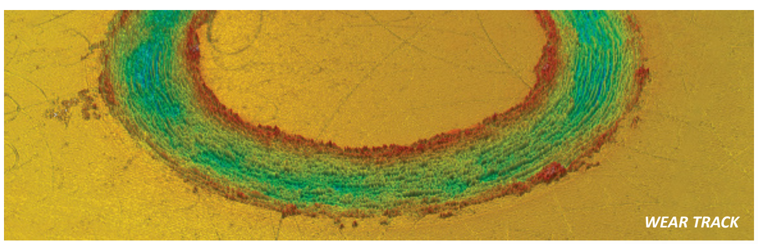
TEXTURE



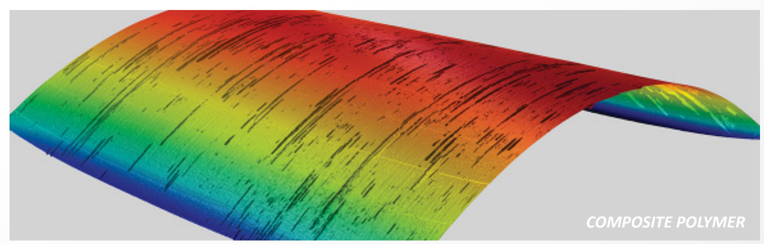
GEOMETRY & SHAPE



STEP HEIGHT & THICKNESS



VOLUME & AREA

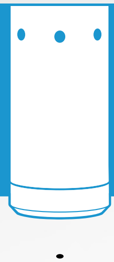


FLATNESS & WARPAGE

STANDARDS ISO 4287 / ISO 13565 / ISO 12085 / ISO 12780 / ISO 12181 / ISO 25178 & other ISO & ASME standards

1 nm MAX VERTICAL RESOLUTION

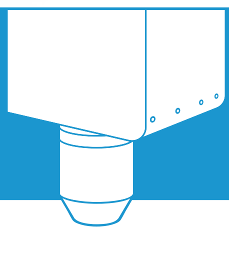
up to 87° MAX SURFACE ANGLE



STANDARD SENSOR

SINGLE POINT

	PS1	PS2	PS3	PS4	PS5	PS6
MAX HEIGHT RANGE	110µm	300µm	1.1mm	3.5mm	10mm	24mm
WORKING DISTANCE	3.35mm	10.8mm	12.0mm	16.2mm	25.9mm	20mm
LATERAL X-Y ACCURACY	0.9µm	1.2µm	2.0µm	3.0µm	7.0µm	8.0µm
HEIGHT REPEATABILITY *	1.2nm	2.2nm	3.4nm	17nm	31nm	41nm



HIGH SPEED SENSOR

192 POINTS

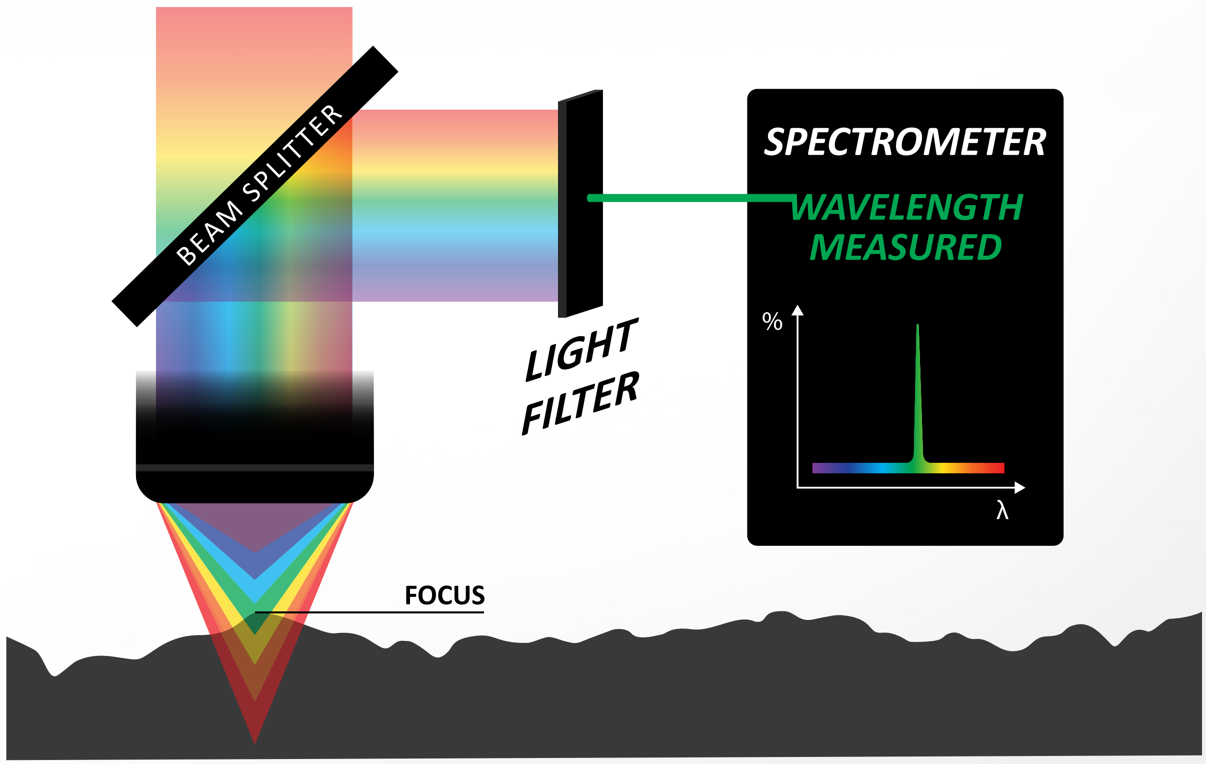
	LS1	LS2	LS3
MAX HEIGHT RANGE	200µm	0.95mm	3.9mm
WORKING DISTANCE	5.3mm	18.5mm	41mm
HEIGHT REPEATABILITY Ra *	14nm	21nm	70nm
LINE WIDTH	0.96mm	1.91mm	4.78mm
PITCH	5µm	10µm	25µm
LATERAL ACCURACY OF EACH POINT	1µm	2µm	5µm
ACQUISITION RATE (points per second)	384KHz	384KHz	384KHz

* Fixed point measurement on glass. Ra average height variation for 1,200 points (100 sampling).

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.

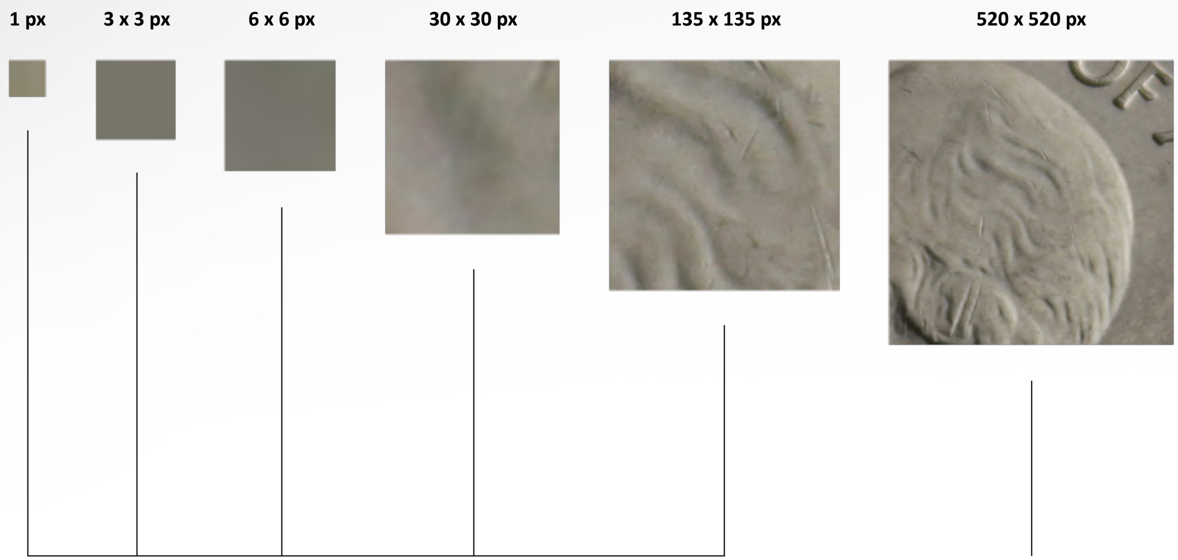


NO COMPLEX ALGORITHMS

NO DATA STITCHING WITHIN X-Y STAGE TRAVEL

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

LASER SCANNING CONFOCAL MICROSCOPE	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 <u>are</u> 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

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

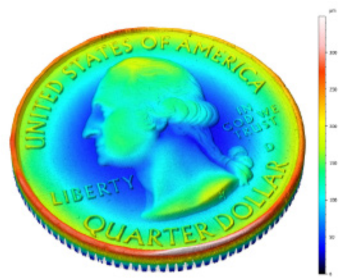
950 µm range
≈ 0.6 µm

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

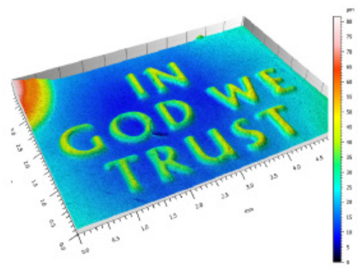


NO STITCHING
Consistent accuracy across any measurement size

1 SCAN

TEST TIME

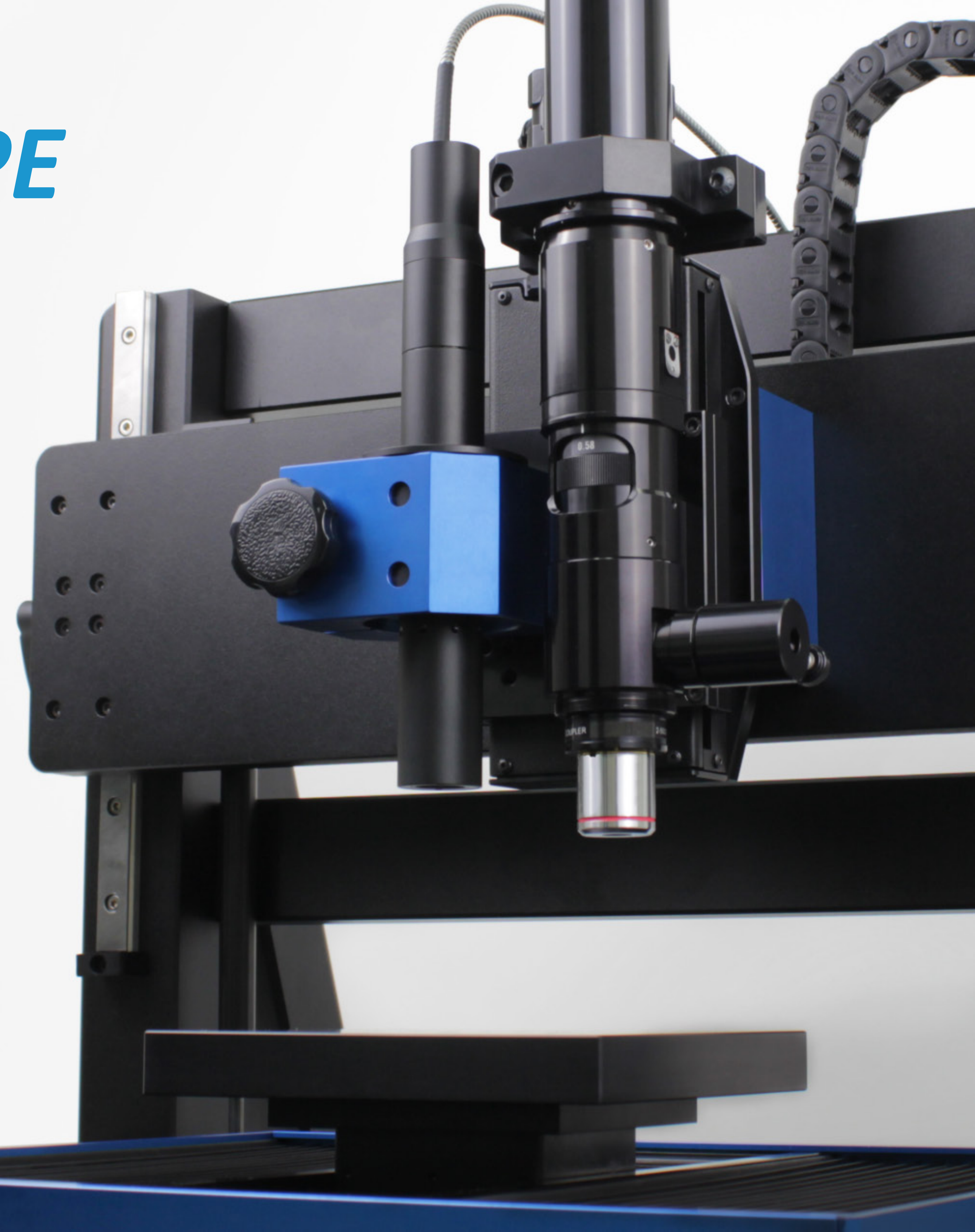
6 sec per scan
+ 4 sec displacement & stitching
= 10 sec/scan x 6188 scans
= 61860 seconds (≈ 17 hours)



Scan time (25 x 25 mm)
= 29.6 seconds

2090x FASTER

MICROSCOPE VIDEO IMAGING



- ***up to 100x***
  objective magnification
- ***1200 x 1600***
  color video camera
- ***ACCURACY OF <0.2 µm***
  to/from indenter position
- ***LARGE AREA STITCHING***
  capability

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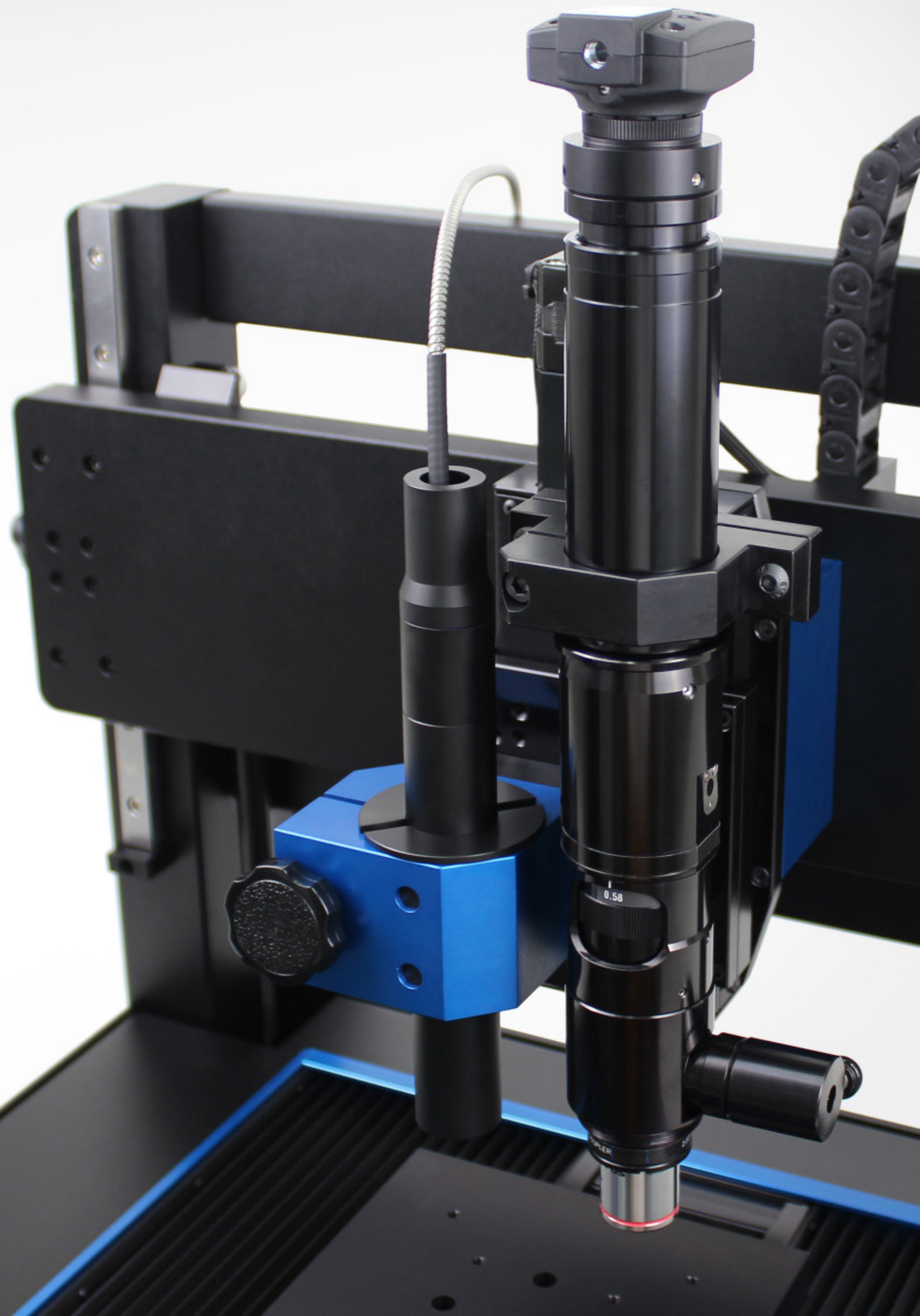
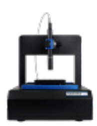


Also available in other configurations

PORTABLE



COMPACT

HIGH SPEED

LARGE AREA

ZERO NOISE