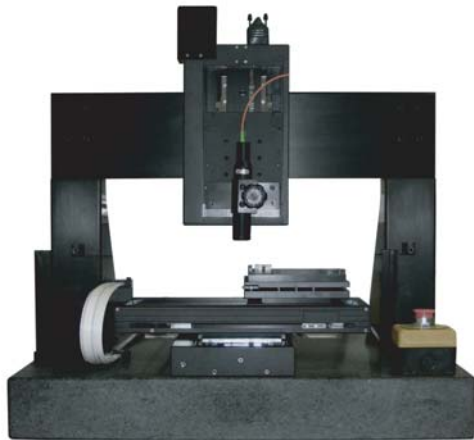
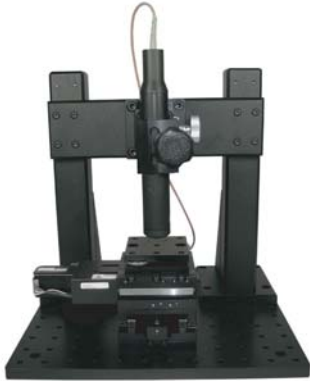


PROFILOMETERS

* INTRO:

The 3D Non-Contact Optical Profilometers are designed with leading edge white light axial chromatism Optical Pens to obtain nanometer resolution for surface inspection, hi-speed 3D metrology and more precise thickness mapping on a wider range of geometries and materials than any other Profilometer. With the use of a large range of Optical Pens the Profilometers are able to obtain superior results on an endless range of applications. All Profilometers use the same Software and Nanovea *PRVision* is available on most Optical Profilometers for automated image pattern recognition. The Optical Profilometer speeds range from 20mm/s to 1m/s for laboratory or research to the needs of Hi-speed inspection environments. Profilometers can be built with custom size, speeds and scanning capabilities and may also be designed for Class 1 Clean Room compliance.



> PROFILOMETERS

PS50 Optical Profiler | Limited Budget

Using the same technology and software as the ST400, along with 50mm X-Y stages, the high-performance PS50 is the ideal choice to replace stylus and laser profilometers. The PS50 has a small footprint (30cm x 25cm) and the option of running on a laptop, which makes for an easy installation where space is critical. Ideal option for budget limitations and small research facilities.

ST400 Optical Profiler | Nanovea Standard

150mm X-Y stages and a large coarse height adjustment to easily accommodate larger sample sizes. The ST400 also has an optional offset camera, with either manual or motorized zooms, to easily identify small features prior to measuring them. The Custom ST400, a more open configuration, allows for the addition of larger X-Y stages to measure even larger areas, a 360° rotational stage for measuring spherical or cylindrical parts and many other custom configurations. Works well for larger samples and larger scan areas. Available with various automation options. Ideal option for diverse and expanding measurement needs.

CR750 Optical Profiler | Class 1 Clean Room Compatible

The CR750 was built and approved for Class 1 Clean room use. Prior to the CR750, advanced 3D Non-Contact profiling technology was rarely available for class 1 compliance. The system was also designed with a high degree of flatness and accuracy by using precision machining and high quality components. The CR750 has an X-Y stage measurement area of 15cm x 20cm and is built on a granite base to enhance stage flatness. Ideal option for strict environments in need of compatible measurement solutions.



HS1000 Optical Profiler | Hi-Speed Automated Inspection

Hi-speed inspection 50 times faster than most inspection systems in its class. Inspection speeds can reach up to 1m/s and data acquisition up to 31KHz providing crucial inspection for more time constraint production and quality control environments. The HS1000 is made mostly of granite to provide superior stability and comes with an optional enclosure workstation to create a fully contained stand-alone instrument. The HS1000 can also be equipped with an 180point line sensor to make inspection up to 180 times faster, which gives 1m/s stage speed and an acquisition rate up to 324,000. Ideal option for hi-speed automation and quality control environments. An optimized version of the HS1000 Profilometer for Photovoltaic inspection is available. The HS100/PV is capable of acquiring up to 31,000 points per second and scan areas up to 1m x 1m. Applications can range from wafer roughness, flatness, trace height to glass roughness and flatness. The HS1000/PV will be available stand alone or inline for integration into panel or wafer production lines for quality control inspection.

* Customized Optical Profiler

Optical Profilers can be built with custom size, speeds and scanning capabilities. Contact Nanovea to learn more about our unique options.

HARDWARE SPECIFICATIONS

	ST400	PS50	CR750	HS1000
X-Y Axis Travel	150 mm	50 mm	150 x 200 mm	400 x 600 mm
Z Axis	60 mm	30 mm	50mm	50mm
X-Y Axis Resolution	0.1 µm	0.1 µm	0.1um	0.005um
Maximum X-Y speed	20 mm/s	10 mm/s	20m/s	1m/s
Rotational Stage	Optional	n/a	n/a	n/a

*For More Information See Additional Brochures:
Optics, Software and Applications*

PROFILOMETER OPTICS

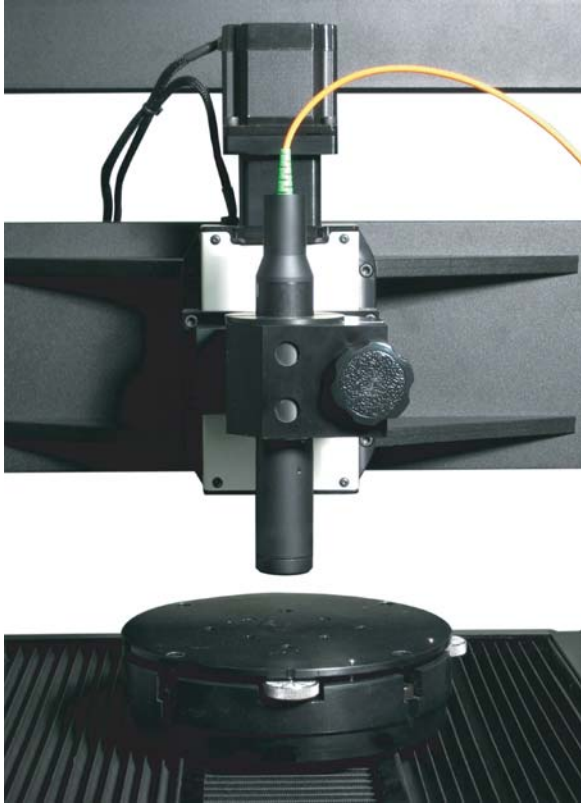
* INTRO:

Optical Pens & Line Sensor

Nanovea Optical Pen and Line Sensor use a ray of white light that passes through a lens containing a high-degree of chromatic aberration, creating a wavelength coded vertical measurement range. The image results from a specific, focused wavelength which is reflected back from the surface being measured. If the surface is composed of transparent or semi-transparent layers, the technique will be able to simultaneously measure two surfaces, as well as the thickness of the layer. Unlike the Optical Pen, the Line Sensor acquires a linear array of 180 points simultaneously at up to 324KHz.

> Benefits:

- Zero influence from sample reflectivity variations
- No sample preparation
- Ability to measure high surface angles
- Large Z measurement range
- Measure all materials: transparent/opaque, specular/diffusive, polished/rough
- Excellent vertical and spatial resolution



OPTICAL PENS

MEASUREMENT RANGE	WORKING DISTANCE (MM)	VERTICAL RESOLUTION (NM)	VERTICAL ACCURACY (NM)	SPOT DIAMETER (μM)	LATERAL RESOLUTION (μM)	MINIMUM TRANSPARENT THICKNESS (μM)
MODULAR OPTICAL PENS						
130μm	3.3	5	20	2	1	7
400μm	11	12	60	2.6	1.3	15
1.2mm	12.7	25	200	4	2	25
3.5mm	16.4	75	400	8	4	60
12mm	29	280	900	16	8	200
27mm	19.6	600	3000	16	8	590
CLASSICAL OPTICAL PENS						
20μm	0.37	2	10	3	1.5	12
300μm	5.68	10	90	7.4	3.7	25
350μm	12.7	10	60	7	3.5	25
6mm	27.3	200	600	12.5	6.25	200
10mm	66.9	300	900	51	25.5	425
24mm	223	1500	3000	45	22.5	1570

LINE SENSOR

MODEL	WAVY	MICROVIEW
Line Length (mm)		
	44.75	1.8mm
Number of Points		
	180	180
Spot Size (μm)		
	50	3.85
Pitch (μm)		
	250	10
Numerical Aperture		
	0.2	0.5
Working Distance (mm)		
	36	10
Z Measurement Range (mm)		
	2	0.5
Resolution (μm)		
	0.5	0.125
Accuracy (μm)		
	2.5	0.5
Field Scanning (mm) (Optional)		
	44.75 x 48.5	1.8 x 1.8

> OPTICS OPTIONS



AFM Module

Nanovea Profilometers can now have the optional advantages of Nanosurf AFM technology. The system provides three-dimensional data at higher lateral and vertical resolution than what Optical Profiler white light technology can provide. AFM measurements are non-destructive and require no sample preparation. The AFM has been designed with ease of use in mind with the easiest probe exchange on the market. The AFM is mounted separately which allows for better stability and a more user-friendly setup avoiding cable tangling that is an issue on microscope mounted AFM's.

- Scan area up to 110 μ m
- Z range up to 22 μ m
- XY resolution down to 0.15nm
- Z resolution down to 0.027nm



Video Zoom Imaging

The Video Zoom camera features user ability to select an area to be measured through live camera view. The camera is offset to the Optical Pen with a calibrated distance through the Nanovea 3D software. The camera has manual or motorized zoom capabilities with a diagonal field of view ranging from 11.42mm to 1.77mm. When added to a profiler, a video option will be available in the software that allows the user to draw a box around a feature to be measured, take a picture of the surface and stitch multiple images together to create a large picture of the surface. (*PRVision*) pattern recognition software can be included when camera option is added.

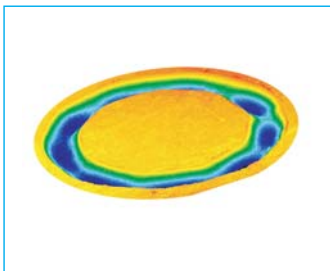
- Magnification = 0.7x – 4.5x
- Diagonal Field of View = 11.42 – 1.77 (mm)
- N.A. = 0.050 – 0.140
- Depth of Field = 0.23 – 0.03 (mm)
- Working Distance = 36mm



Microscope Imaging

With similar functions to the Video Zoom Camera, the Microscope Turret allows for an offset video option. The Microscope Turret can be equipped with up to 5 microscope objectives ranging from 5x to 100x, and provides an overall optical magnification of up to 1000x. The Microscope Turret can be used when a high level of detail is needed to resolve small features on any surface.

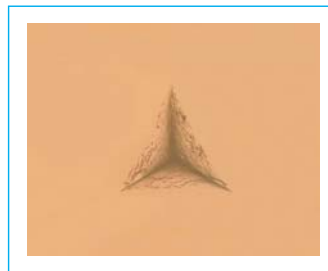
- Available Objectives = 5x, 10x, 20x, 50x.
- Optical Magnifications = 50x – 500x



3D Optical Profiler
(Wear Track)



AFM Module
(Nano Scratch)



Video Zoom Camera
(Nanoindentation)



Video Microscope
(Micro Scratch)

PROFILOMETERS SOFTWARE

SOFTWARE

Nanovea 3D Software

The Nanovea 3D software is the acquisition software that is used with all Nanovea Profilometers. The software permits the user to define the size of the area, or line, to be measured, as well as the lateral resolution of the measurement. The software also allows three different views of the measurement in real-time: cross-sectional, top-down and 3-dimensional views. To make it easier to find and measure small surfaces, a re-centering function allows the user to point-and-click on the scanned image in order to re-center the next scan to that specific point; or by use of a point-and-click feature from an optional offset video camera.

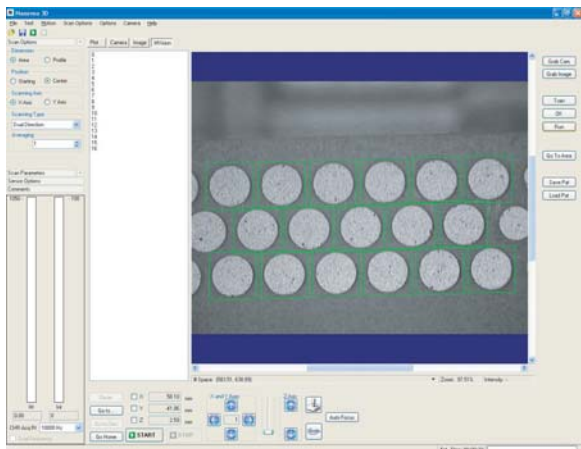
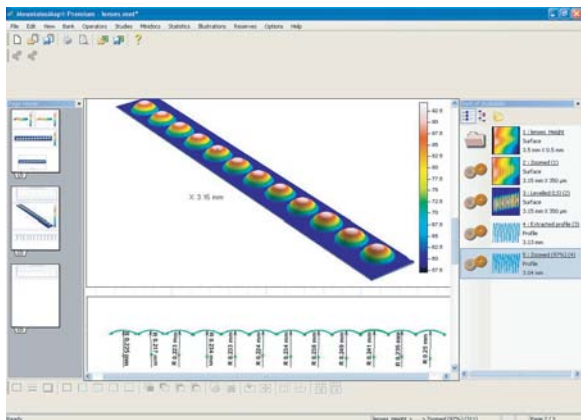
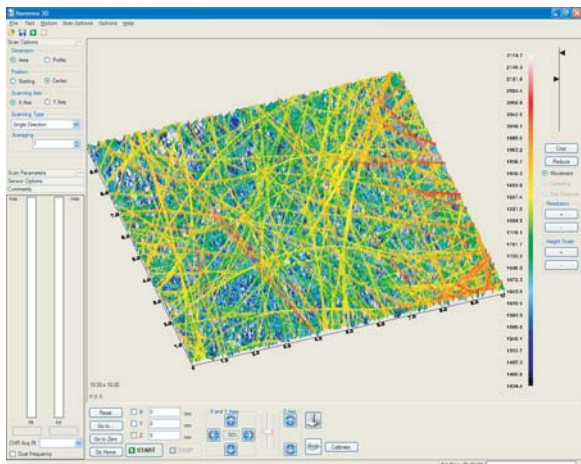
Mountains 3D Analysis Software

Optional software package available to all Nanovea Profilometers, which provides a complete set of surface analysis tools. Some of these functions include:

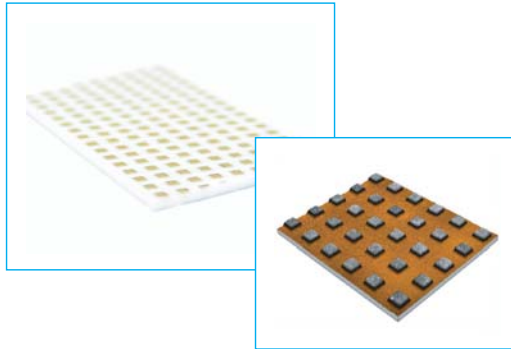
- User-friendly report making and editing
- An extensive list of roughness, flatness, waviness and other surface parameters
- Create 3D images in false color, contour maps and photo simulation
- A variety of filtering, leveling and other surface correction functions
- Ability to create templates to be applied to multiple individual measurements
- Dimensional analysis, surface area, volume, bearing ratio and texture direction
- Grain counting, sorting, and other grain analysis
- Spectral analysis, autocorrelation, and fractal analysis
- Statistical analysis over a population of results
- Ability to export raw data, images, and entire reports
- Create and export your videos of the surface
- 4D analysis to look at surface changes, as a function of time
- Motif analysis
- Additional functions available, please check with us for more details

PRVision Software

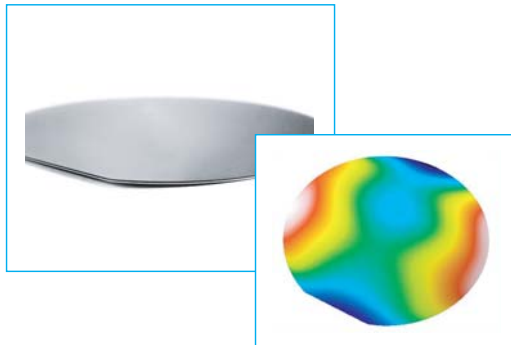
PRVision Software module can be included in Nanovea 3D Software with any Profiler installed with camera. PRVision has the ability to automatically recognize features from a user-trained image file. The surface is scanned while automatically recognizing all features of interest; then either automatically measures every feature found or a select few that are chosen by the user. PRVision can also be used to reference sample orientation during a Macro measurement, which will automatically correct for rotations or displacement created when samples are loaded and unloaded from their holder. This option will significantly reduce setup time when a surface pattern or if several samples are being measured.



Bond Pad Surface



Wafer Surface



Drill Bit Edge



PROFILOMETERS APPLICATIONS

> APPLICATIONS

Solar

- Thin Film
- Glass
- Wafer
- Critical Dimensions

Semiconductor Technology

- Wafer Flatness
- Critical Dimensions
- Wafer Thickness

Pharmacological

- Tablets, Pills
- Implants
- Coating Thickness

General Materials

- Carbon Fiber
- Ceramic

Electronics

- BGA (Ball Grid Array)
- LED Chip
- Printed Component Height
- Bonding Pad
- Connector

Optical Components

- Micro Lens
- Optical Gratings
- Diffractive Lens
- Fresnel Lens

Automotive

- Break Disk
- Tire

Other

- Skin Wrinkles and Acne Scars
- Measurement of Teeth
- Sandpaper
- Woven Fabrics
- Micro Channels
- Paper
- Cutting Tools

+ STANDARDS

Surface Measurement

- ISO 25178
- ISO 12781