EVIDENT

Infinite Surfaces, Trusted Results

LEXT™ OLS5500

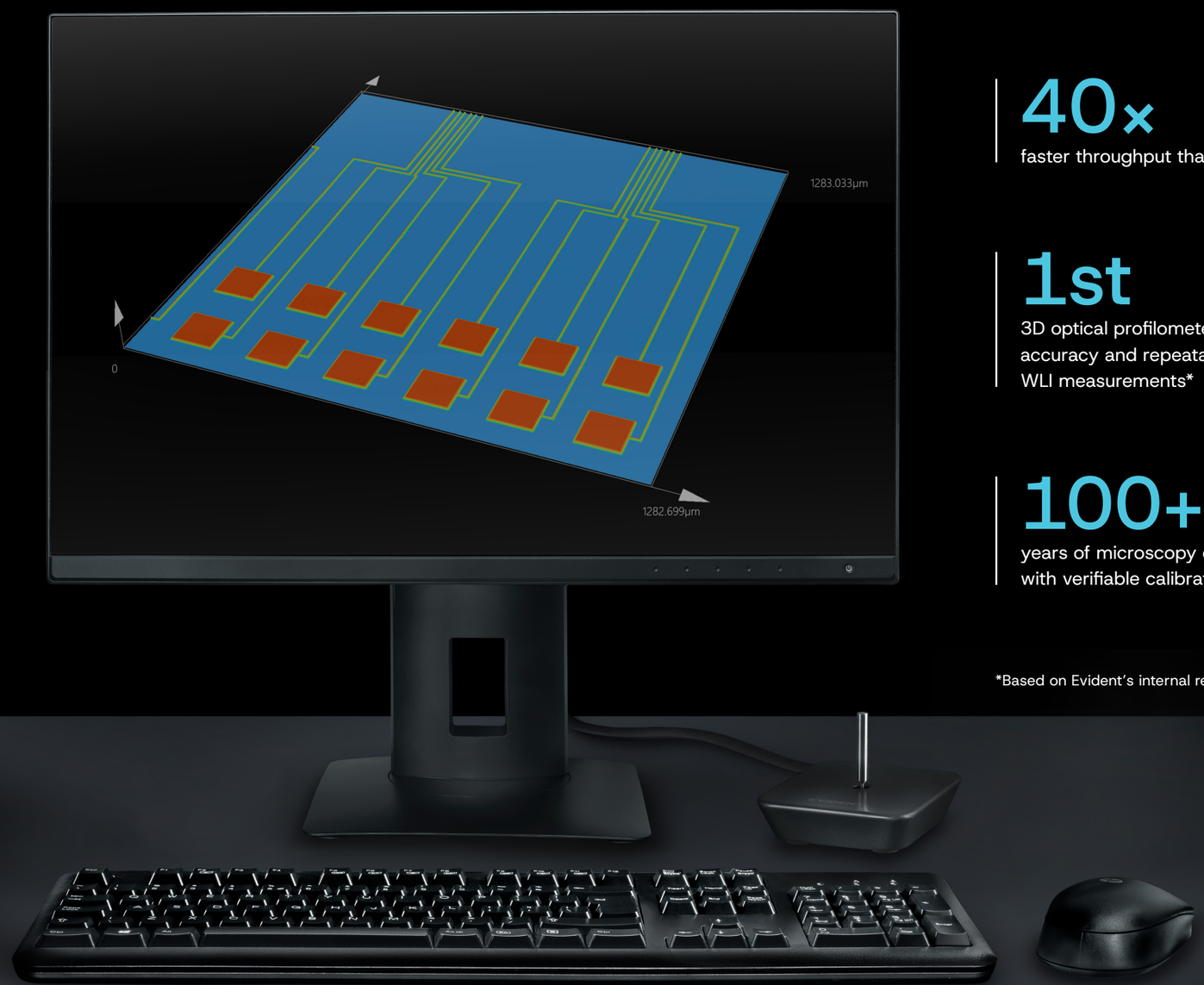
3D Optical Profilometer

Surface Data You Can Trust. Accuracy We Can Prove.

The Evident LEXT™ OLS5500 hybrid 3D optical profilometer unites laser scanning microscopy (LSM), white light interferometry (WLI), and focus variation microscopy (FVM) in one powerful platform.

Designed for R&D, QA, and QC teams, it delivers precise surface detail, traceable accuracy for confident measurements, and an intuitive user experience to streamline workflows.

Trusted data—powered by precision optics, verifiable calibration, and smart automation—helps labs move seamlessly from first discovery to final decision.



3-in-1
exceptional precision imaging—LSM, WLI, and FVM—in one easy-to-use platform

40×
faster throughput than conventional LSM using WLI

1st
3D optical profilometer that ensures guaranteed accuracy and repeatability for both LSM and WLI measurements*

100+
years of microscopy expertise, ensuring accuracy with verifiable calibration and time-stamped records

*Based on Evident's internal research as of October 2025.

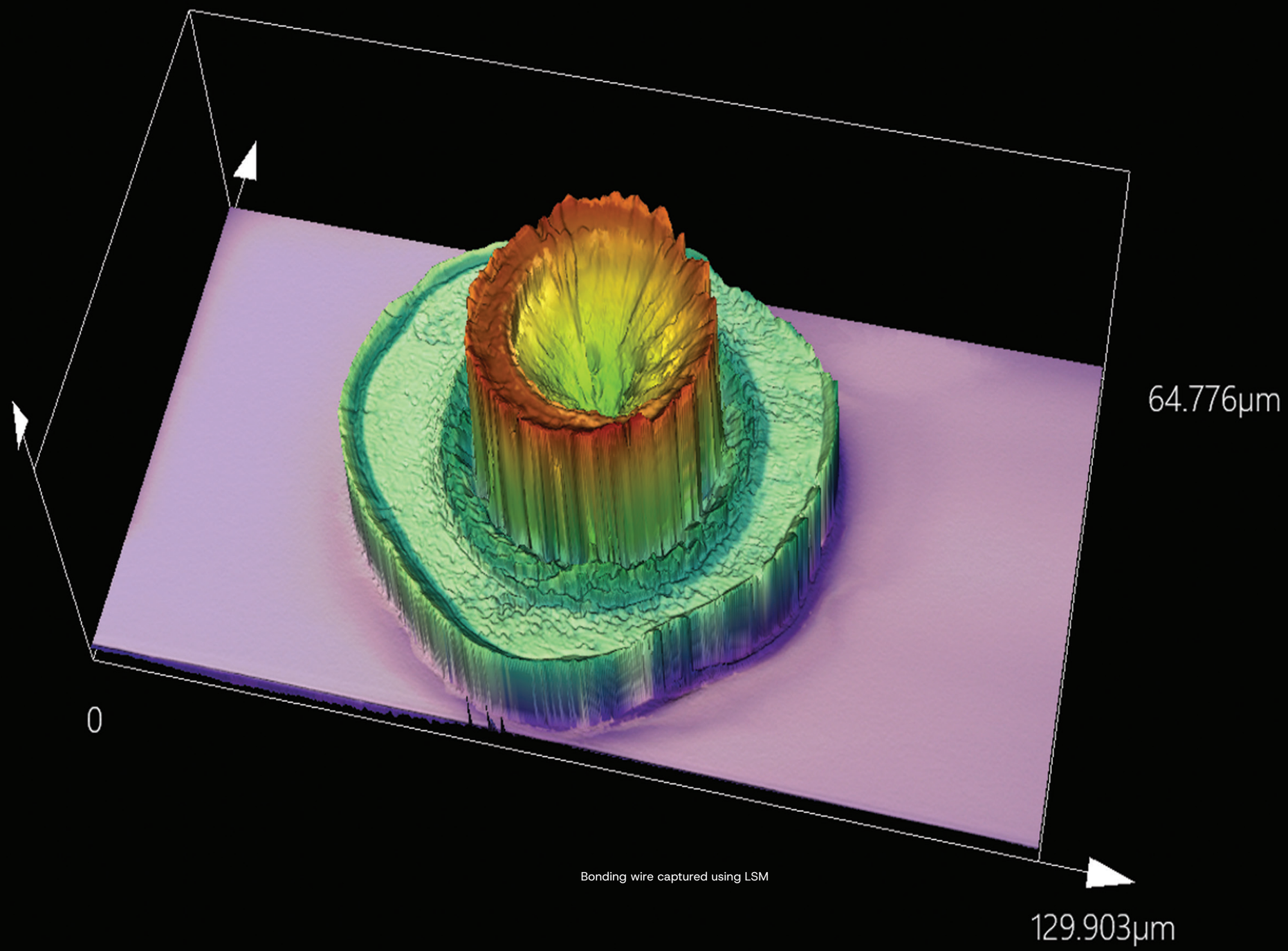
Illuminate the Unseen

Backed by over 100 years of optical excellence, Evident offers clarity and simplicity as a solutions provider—supporting industrial imaging from research to QC and beyond.

From routine quality checks to in-depth failure analysis, Evident's materials science and industrial inspection microscopes deliver the resolution, contrast, and precision needed to push the boundaries of what's visible, measurable, and knowable.

Our 3D optical profilometer, digital, and measuring microscopes support a broad range of applications in electronics, metallurgy, manufacturing, and research, delivering optical technology that lets you uncover key details and confidently make critical decisions.

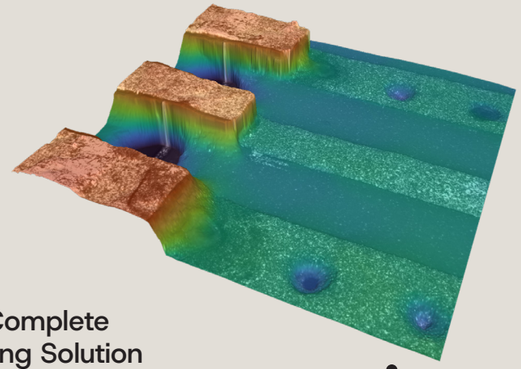
Whether you're developing a new industrial product, inspecting components for defects, or delivering results that support improved product quality and yield, Evident gives you the confidence to move forward with clarity.



Bonding wire captured using LSM

Exceptional Precision Imaging

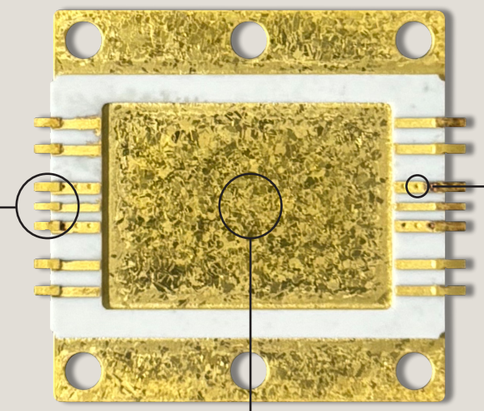
The Evident LEXT™ OLS5500 enables you to identify subtle features and surface variations with unparalleled clarity—use LSM, WLI, and FVM to detect defects, confirm designs, and make confident decisions.

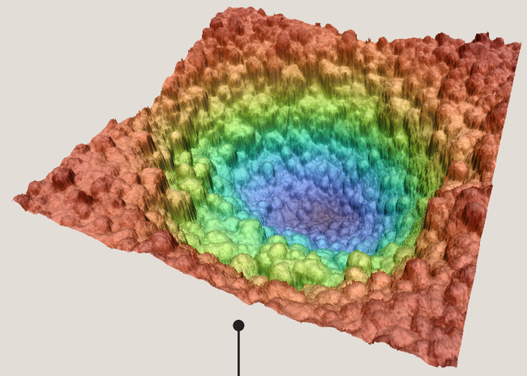


The Complete Imaging Solution

Measure any sample from nm to mm or flat to uneven with WLI (vertical), LSM (lateral), and FVM (macro to micro).

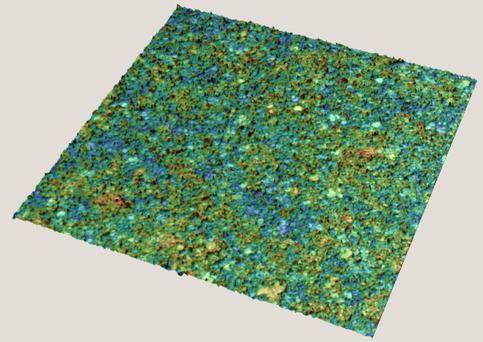
RF package imaged using three surface metrology techniques





Focus Variation Microscopy

Laser Scanning Microscopy

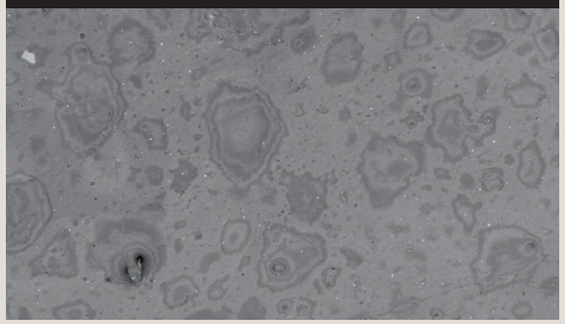


White Light Interferometry

Clarity That Uncovers the Unseen

From fine structures and subtle topography to transparent surfaces and low-contrast features, expose details invisible to conventional systems. 4K imaging, a top-surface detection filter, laser DIC, dual pinhole optics, and a high-sensitivity sensor work together to deliver exceptional clarity, contrast, and color fidelity—even on the most challenging samples.

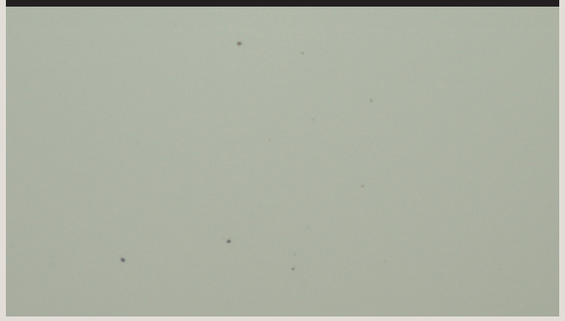
LASER IMAGE WITHOUT DIC



LASER IMAGE WITH DIC

Comparison images of a polymer film

COLOR IMAGE WITHOUT DIC



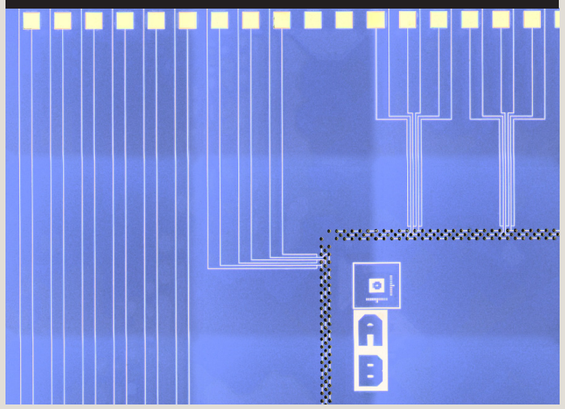
COLOR IMAGE WITH DIC

Comparison images of a hard disk landing zone

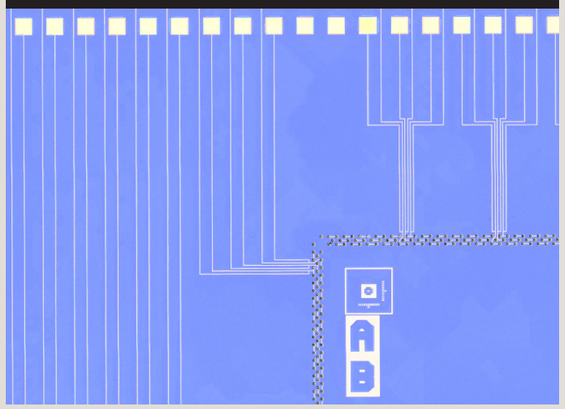
Seamless Large-Area Imaging

Inspect larger regions—without losing detail or image integrity. Intelligent Shading Correction minimizes image stitching artifacts and ensures seamless results, even on low-contrast or uneven surfaces.

WITHOUT INTELLIGENT SHADING CORRECTION



WITH INTELLIGENT SHADING CORRECTION



Comparison stitched images of a wafer

Precision Across Every Surface

Reveal true surface details—across flat areas, uneven patterns, steep slopes, and fine textures. In-house-engineered LSM objectives and high NA WLI lenses deliver high-fidelity imaging across a wide range of sample geometries.

Laser Scanning Microscopy

DEDICATED LEXT™ OBJECTIVES

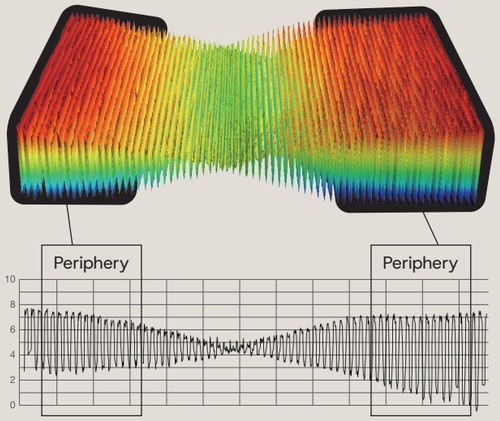
Dedicated LEXT objectives accurately measure peripheral areas, overcoming the measurement challenges of conventional lenses.

Long working distance
(20X/50X/100X)

High performance
(20X/50X/100X)

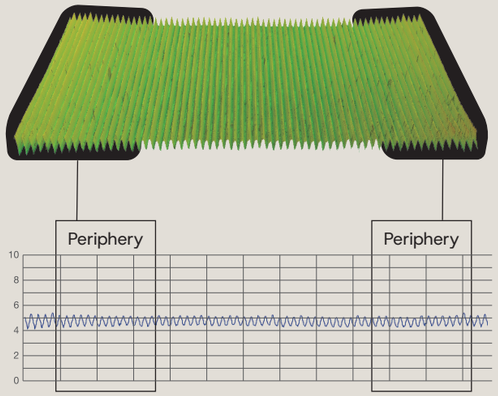
Low magnification
(10X)

Conventional lenses have difficulty making accurate measurements in peripheral areas



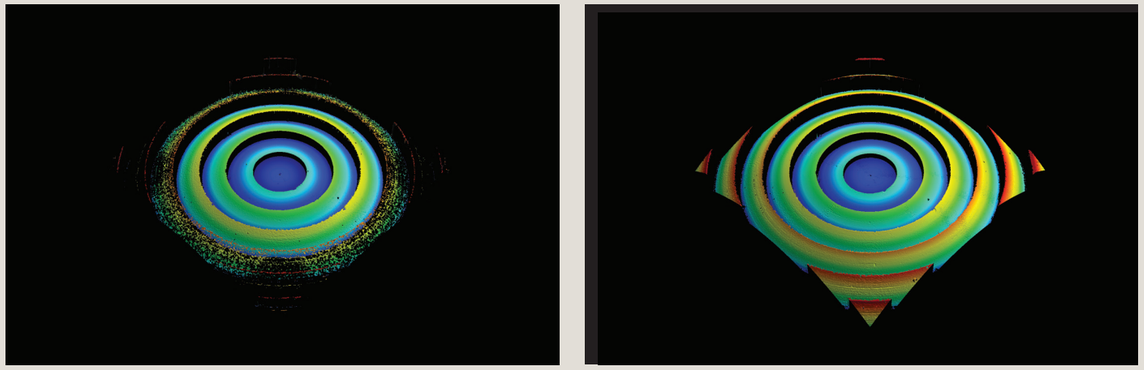
Distortion increases at the periphery

Dedicated LEXT objectives accurately measure peripheral areas

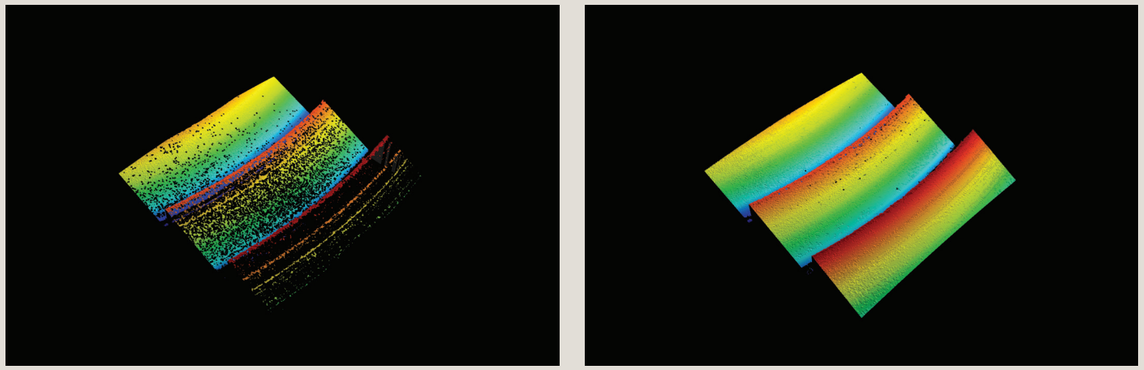


The periphery is reproduced free of distortion

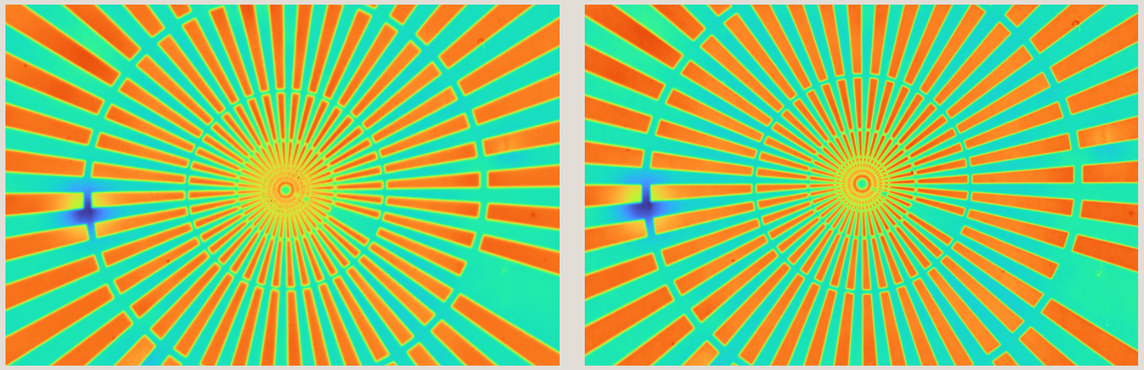
White Light Interferometry



Comparison images of a Fresnel lens sample taken with a conventional WLI 20X objective (left, NA 0.4) and Evident's 20X WLI objective (right, NA 0.6)



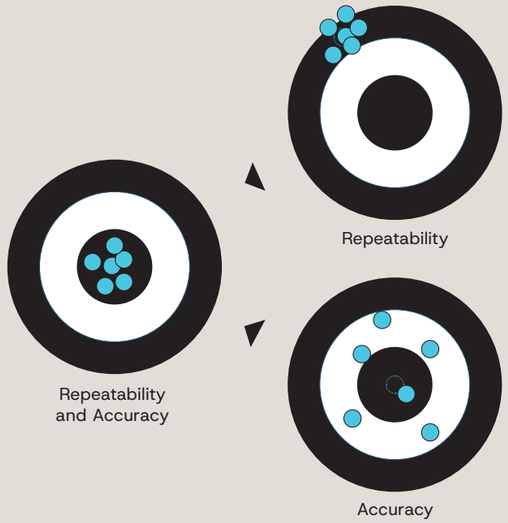
Comparison images of a Fresnel lens sample taken with a conventional WLI 50X objective (left, NA 0.55) and Evident's 50X WLI objective (right, NA 0.8)



Comparison images of a calibration sample taken with a conventional WLI 50X objective (left, NA 0.55) and Evident's 50X WLI objective (right, NA 0.8).

Accurate, Trusted Measurements

Fewer retests, reworks, and rejections—thanks to trusted measurements in LSM, WLI, and FVM that you can verify and prove.



Guaranteed Accuracy and Repeatability

Obtain consistent, high-precision measurements across applications—the OLS5500 is the world's first 3D optical profilometer that ensures guaranteed accuracy and repeatability* for both LSM and WLI.

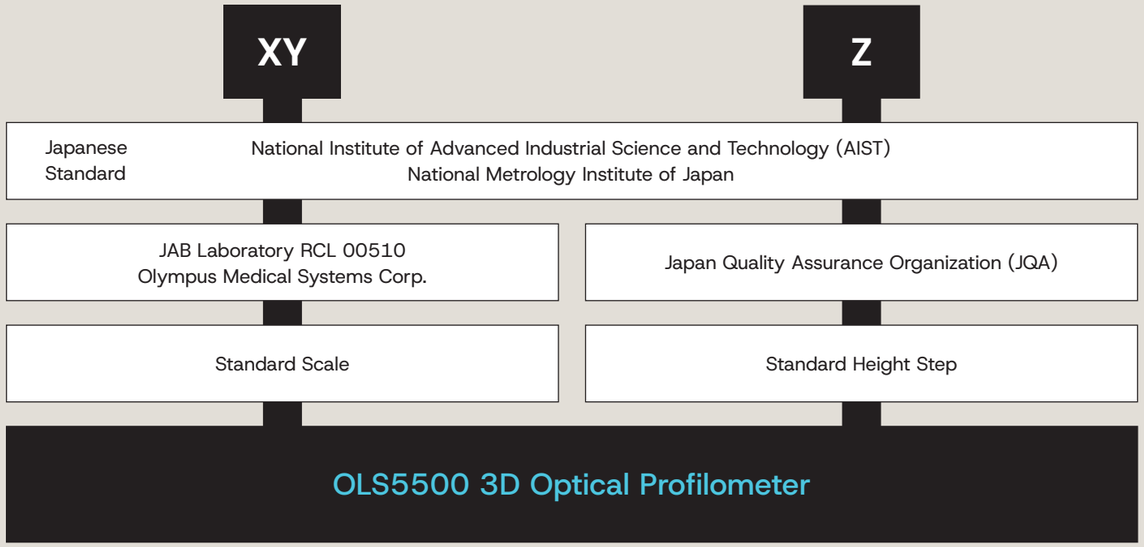
On-site calibration by Evident technicians ensures precise, repeatable measurements with time-stamped records that support alignment

*The guaranteed accuracy and repeatability apply only if the device has been calibrated according to the manufacturer's specifications and is in defect free condition. Calibration must be performed by an Evident technician or an Evident-authorized specialist.

Guaranteed Measurement Noise

Trust your height measurements—even at the nanometer scale. The OLS5500 guarantees measurement noise levels** in accordance with ISO 25178-700:2022: 1 nm with MPLAPON 100X LEXT™ objectives and 0.08 nm with WLI objectives—ensuring high-resolution detection of subtle topographic changes.

**You will receive a measurement noise guarantee certificate. This is a representative value when measured under conditions specified by Evident and is different from the guaranteed value.



Example for the AIST standard.

Guaranteed Accuracy for Stitched Images

The OLS5500 incorporates a length measuring module in the motorized stage, and we guarantee the accuracy of the stitched image data.* While conventional laser microscopes and WLI equipment stitch data based on pattern matching, the OLS5500 adds the position information from the length measuring module to the pattern matching to provide highly reliable stitched data with guaranteed accuracy in both LSM and WLI.

*The guaranteed accuracy for stitched images applies only to the 100 mm motorized stage. (OLS5500-SAF is available for both LSM and WLI, and OLS5500-EAF is available only for LSM).

Length measurement module

Service and Support That Empowers

When it comes to protecting your investment and the integrity of your research, your needs come first. We stand behind our products with a commitment to prompt service and technical support to help you achieve your goals.

Maintain compliance and system uptime with our on-site calibration, global service network, and remote support—backed by 100+ years of expertise in microscopy.

Smarter Workflow

Streamline inspections and increase throughput with consistent, first-time-right results in LSM, WLI, and FVM.

Intuitive Operation for All Users

Intuitive software and smart automation support fast, reliable, and repeatable results at scale—even for non-experts.

Seamless Observations

Automatically generate a macro map as the stage moves, ensuring precise location tracking even at high magnifications. And with continuous autofocus, you can stay in focus without manual adjustments.

Simplified Tilt Adjustment

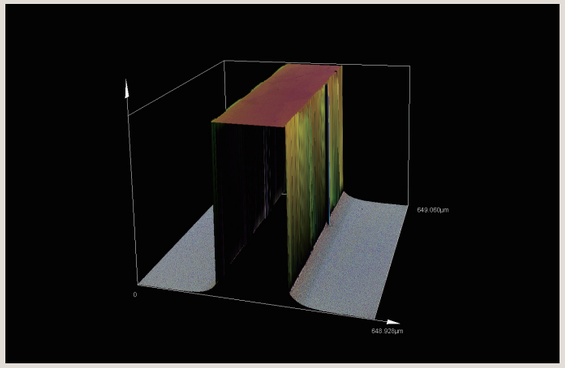
With Tilt Adjustment Assistance, tilt correction becomes simple. With one click, the software indicates the exact amount of adjustment needed to level the sample surface. Simply follow this guidance to operate the stage.

Reliable Data at the Push of a Button

Acquire data quickly and easily with Smart Scan II for LSM. Place the sample on the stage, press the start button, and the system does the rest.

PEAK algorithm provides highly accurate data from low to high magnifications and reduces the data acquisition time. When measuring the shape of steps on a sample, the data acquisition time can be reduced by skipping the unnecessary scanning range in the Z-direction.

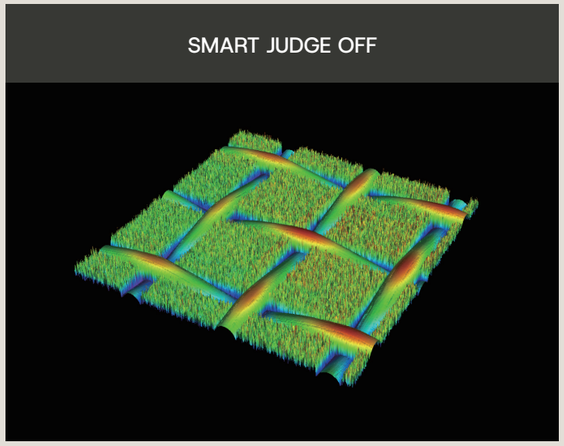
Tilt Adjustment Assistance

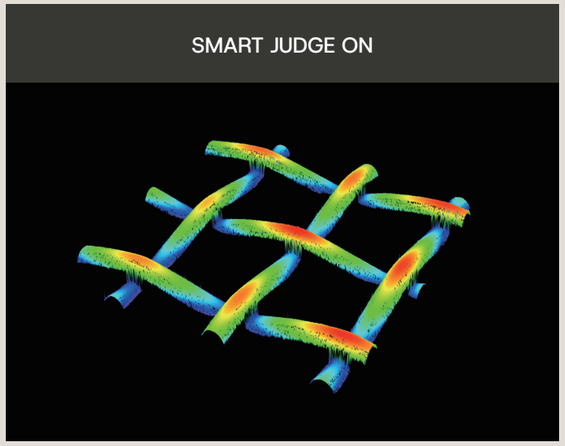


Resist pattern on a silicon surface.
Courtesy of Nanotechnology Hub at Kyoto University.

Smart Data Detection

Smart Judge automatically detects only reliable data, delivering accurate measurements without losing fine height irregularity data.



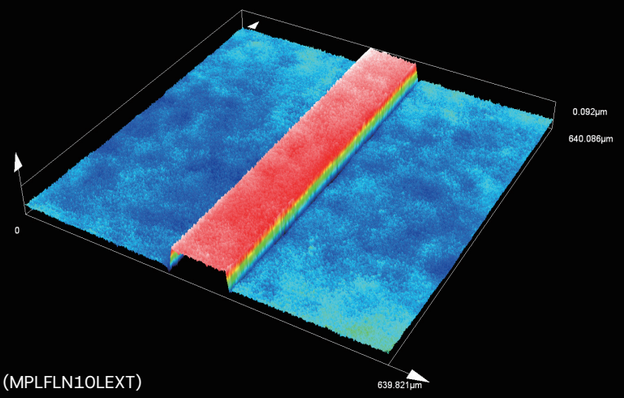


Consistency Across Reports and Users

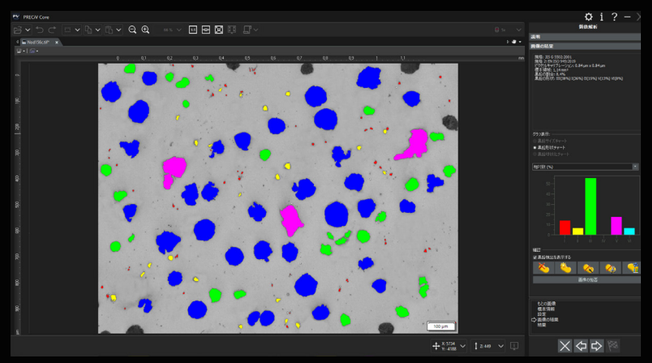
Automate inspections with macros—create, edit, and run procedures for reliable results. Pair with the Smart Experiment Manager to make pass/fail decisions in a single click. Save reports as templates to streamline repeated measurements and ensure consistent results across analyses and users.

Do More in 3D Metrology

PRECiV™ software integration for routine metallography, AI-enhanced workflows, and advanced 2D analysis supports specialized applications and high-throughput production environments.



VLSI standard 80 nm height sample (MPLFLN10LEXT)

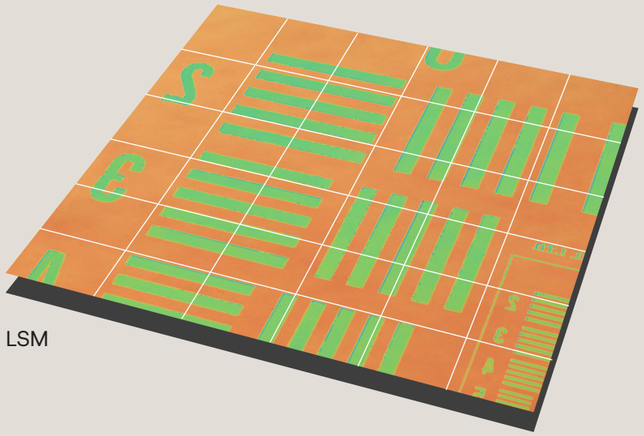


PRECiV Software

To learn more about our PRECiV software, scan this QR code or visit evidentscientific.com/preciv

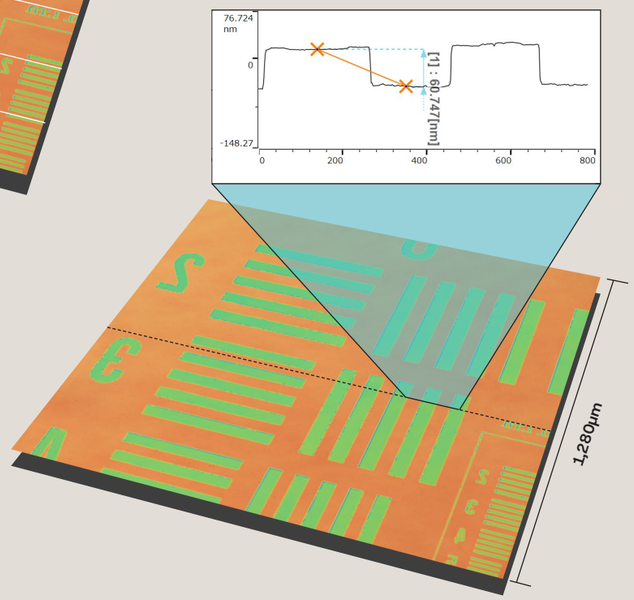
Maximized Throughput

The OLS5500's WLI improves throughput by up to 40 times compared to conventional LSM. Measure nanometer-scale surface textures—traditionally visible only at the high magnifications of an LSM—without being limited by objective magnification.



LSM

WLI



Sample: 60 nm step height, measurement area: 1,280 µm

LSM: Data acquisition time: 630 s; 6×6 stitched image acquired with an LSM 50X objective (NA 0.95)

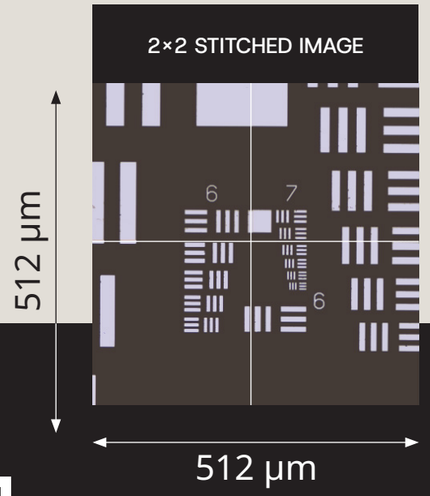
WLI: Data acquisition time: 15 s; single image acquired with a WLI 10X objective (NA 0.3)

Evident's Mirau objectives push the boundaries of what's possible in WLI, combining higher NAs with an expansive field of view to enhance efficiency and accelerate results.

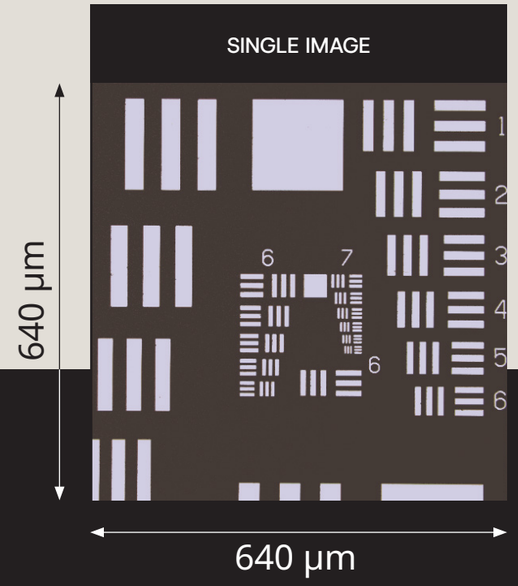
Our 20X and 50X WLI optics provide up to 6x and 4x the field of view of conventional 50X and 100X WLI objectives, respectively, with the same surface slope measurement capability and lateral resolution. The result: less image stitching, fewer step height measurements, and maximized throughput.

Left to right: 10X (NA 0.3), 20X (NA 0.6), and 50X (NA 0.8) WLI objectives

Acquired with a conventional 50X objective (NA 0.55)



Acquired with Evident's WLI 20X objective (NA 0.6)



40×
faster throughput than conventional LSM using WLI

6×
the field of view of conventional 50X WLI objectives using 20X optics

4×
the field of view of conventional 100X WLI objectives using 50X optics

To learn more about our WLI optics, scan this QR code or visit evidentscientific.com/wli

LEXT™ OLS5500 Basic Principles

The LEXT OLS5500 3D optical profilometer has two optical systems—color imaging and laser confocal—that enable it to acquire color and shape information, as well as high-resolution images.

Color Imaging

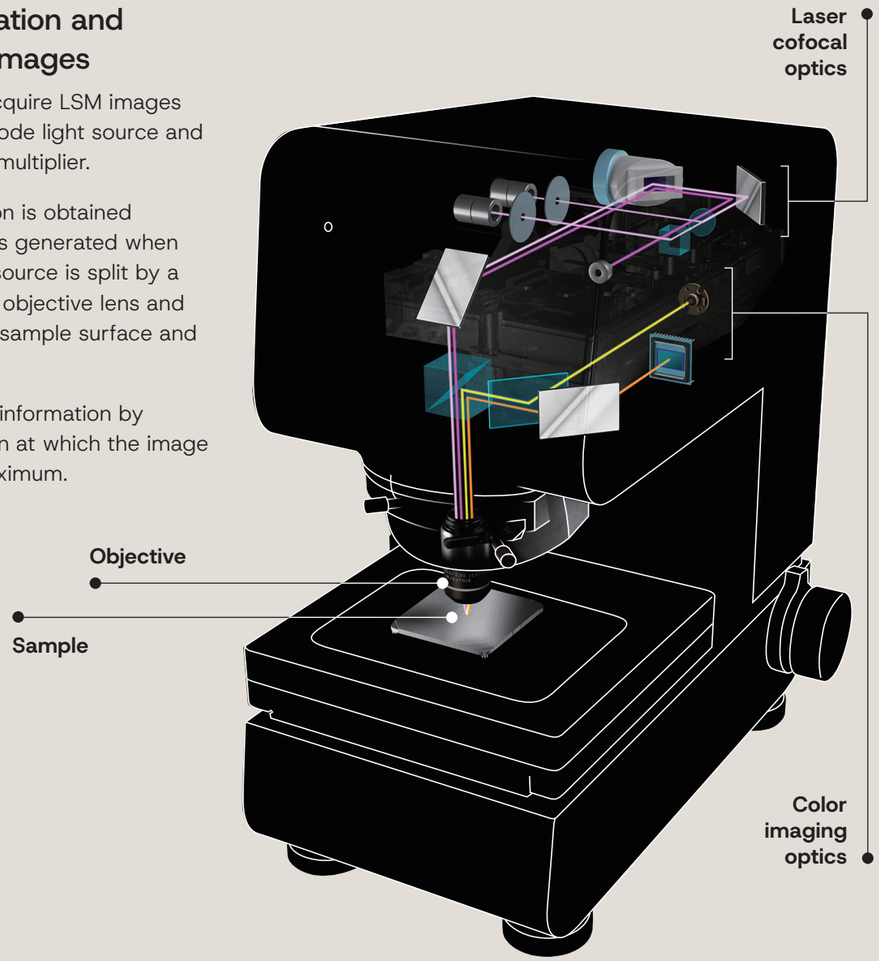
Color imaging optics acquire information using a white light LED light source and CMOS image sensor. This enables accurate color reproduction and clear visualization of surface features.

3D Shape Information and High-Resolution Images

Laser confocal optics acquire LSM images using a 405 nm laser diode light source and a high-sensitivity photomultiplier.

In WLI, height information is obtained from interference fringes generated when light from a white light source is split by a beam splitter within the objective lens and reflected from both the sample surface and a reference surface.

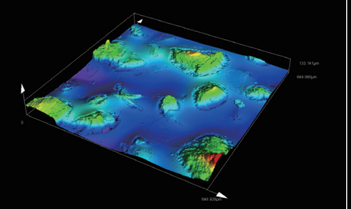
FVM determines height information by identifying the Z-position at which the image contrast reaches its maximum.



Configuration of the OLS5500 3D optical profilometer

Comparison of Surface Metrology Techniques

Each surface metrology technique of the LEXT™ OLS5500 offers unique advantages for exploring the shape, texture, and fine details of your samples.

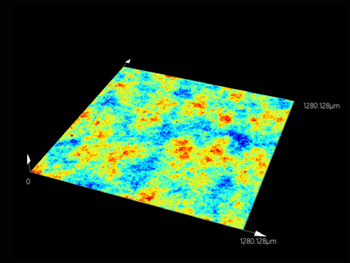


Laser Scanning Microscopy (LSM)

This method has high measurement resolution in both the horizontal and vertical directions and allows for balanced measurements.

Suitable for measuring fine surface textures from submicron to several hundred microns

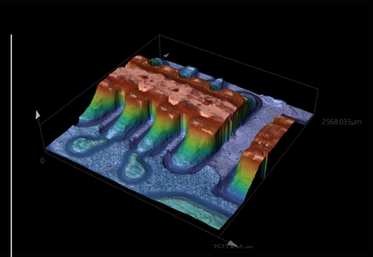
Shapes with steep angles can also be measured.



White Light Interferometry (WLI)

Suitable for smooth and sloped surfaces and for measuring steps on the order of nm.

Constant height measurement performance can be obtained at any objective magnification.



Focus Variation Microscopy (FVM)

Suitable for capturing the macro shape of the sample.

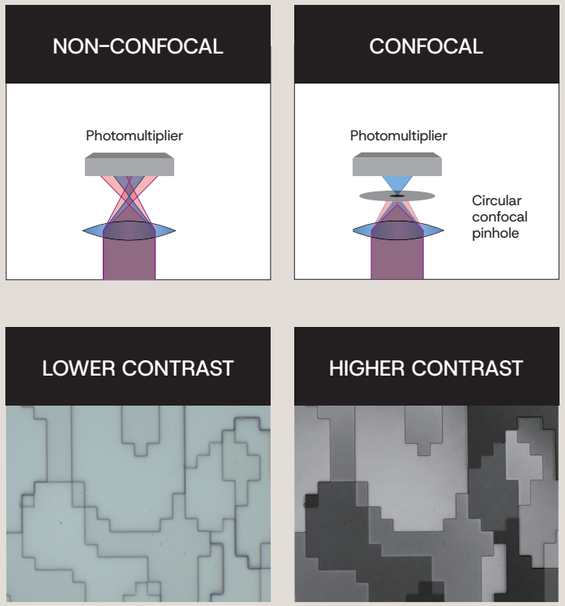
By combining FVM with LSM or WLI, it enables shape acquisition from macro to microstructures.

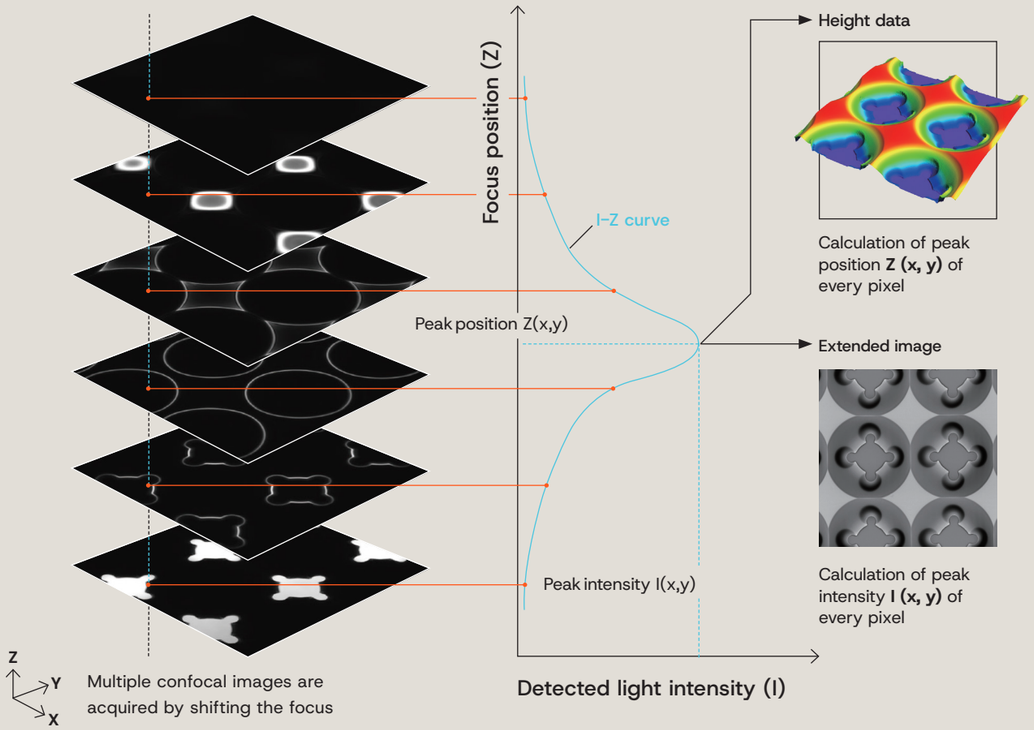
Principles of Height Measurement

Laser Scanning Microscopy

The laser confocal optical system receives only the light focused through the circular pinhole, rather than capturing all the light reflected and scattered from the sample. This helps eliminate blur, making it possible to acquire an image with higher contrast than can be obtained with an ordinary microscope.

To measure height, the microscope acquires multiple confocal images by automatically shifting the focus position. Based on the discrete focus position (Z) and detected light intensity (I), the system estimates the light intensity variation curve (I–Z curve) for each pixel and obtains its peak position and peak intensity. Since the peak positions of all the pixels correspond to the sample's surface irregularities, it provides 3D shape information for the sample's surface. Similarly, the peak intensity data forms an image where all positions on the sample's surface are in focus (extended image).



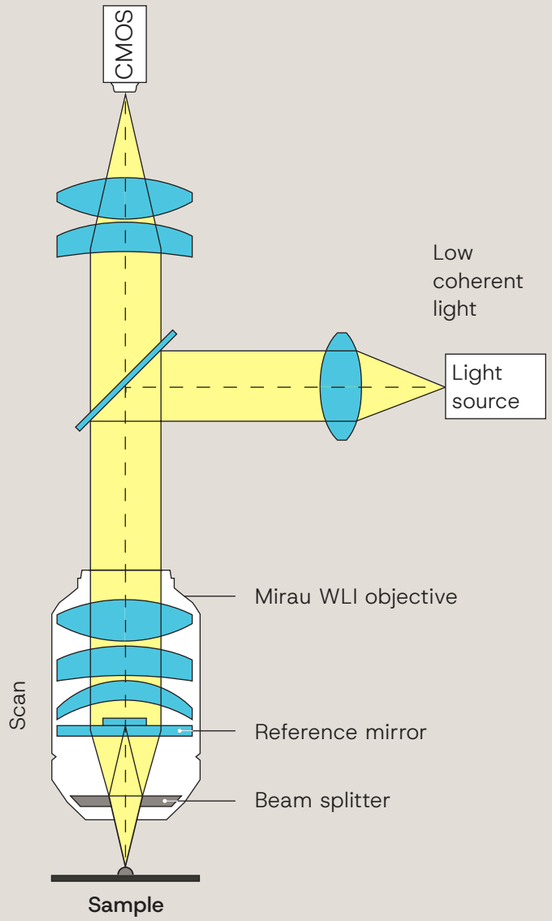


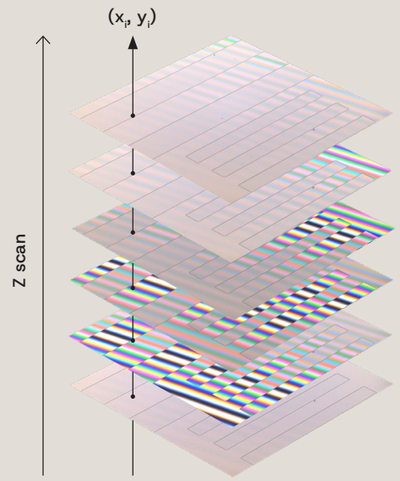
White Light Interferometry

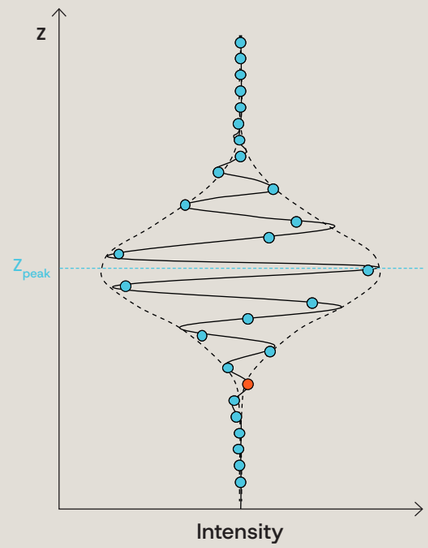
The light flux from the light source is branched by the beam splitter inside the white interference objective mounted on the white interferometer, and it is reflected by the specimen surface and the reference surface, causing interference fringes.

White interference is generated by using a white LED with a short coherent length, and interference fringes are generated only when the optical path length of the light from the sample surface matches that of the light from the reference surface.

By scanning the specimen perpendicular to the plane (Z-direction), the peak positions of the interference fringes at each point on the surface are obtained, and height data is constructed.







Specifications

LEXT™ OLS5500 Main Unit Specifications

Model			OLS5500-SAF	OLS5500-EAF	OLS5500-LAF
Total magnification			54X–17,280X		
Field of view			16 µm–5,120 µm		
Measurement principle		Optical system	Reflection-type confocal laser scanning microscopy		
			Reflection-type confocal laser scanning DIC microscopy		
			Focus variation microscopy, color, color-DIC		
			White light interferometry	—	
		Light receiving element	Laser: photomultiplier (2ch), Color: CMOS color camera		
LSM	Height	Repeatability σn-1 *1 *2 *5	5X: 0.45 µm, 10X: 0.1 µm, 20X: 0.03 µm, 50X: 0.012 µm, 100X: 0.012 µm		
		Accuracy*1 *3 *5	0.15 + L/100 µm (L: measuring length [µm])		
		Measurement noise*1 *4 *5	1 nm (typical)		
	Length	Repeatability 3σn-1 *1 *2 *5	5X: 0.4 µm, 10X: 0.2 µm, 20X: 0.05 µm, 50X: 0.04 µm, 100X: 0.02 µm		
		Accuracy *1 *3 *5	Measurement value ±1.5%		
Maximum number of measuring points in a single measurement			4096 × 4096 pixel		
Maximum number of measuring points			400 megapixels		
XY stage configuration		Operating range	100 mm × 100 mm (3.9 × 3.9 in.) motorized		300 mm × 300 mm (11.8 × 11.8 in.) motorized
Maximum sample height			100 mm (3.9 in.)	210 mm (8.3 in.)	37 mm (1.5 in.)
Laser light source		Wavelength	405 nm		
		Maximum output	0.95 mW		
		Laser class	Class 2 (JIS C 6802:2018, IEC60825-1:2014, EN60825-1:2014/A11:2021,GB/T 7247.1-2024)		
Color light source			White LED		
Electrical power			240 W		278 W
Mass		Microscope body	Approx. 31 kg (68.3 lb)	Approx. 43 kg (94.8 lb)	Approx. 50 kg (110.2 lb)
		Control box	Approx. 12 kg (26.5 lb)		

LEXT™ OLS5500 WLI Specifications

WLI	Height	Repeatability σn-1 *1 *5	0.3%
		Accuracy *6	1% (typical)
		Surface topography repeatability *5 *7	0.08 nm
		Repeatability of RMS *8	<0.008 nm
	Maximum sample height		68 mm

*1 Guaranteed when used in a constant temperature and constant-humidity environment (temperature: 20 °C ±1 °C, humidity: 50% ± 10%) specified in ISO554(1976), JIS Z-8703(1983). *2 For 10X or higher, when measured with dedicated LEXT objectives. *3 When measured with a dedicated LEXT objective. *4 Typical value when measured with a MPLAPON100X LEXT objective, and it may differ from the guaranteed value. *5 Guaranteed under the Evident Certificate System. *6 This is a representative value measured using step height standards of 83 nm traceable to national standards under conditions specified by Evident, and it differs from the guaranteed value. The guaranteed value is 0.15+ L/100 µm. *7 Equivalent to the measurement noise. *8 Verified under conditions specified by Evident.

Specifications, design, and accessories are subject to change without any notice or obligation on the part of the manufacturer.

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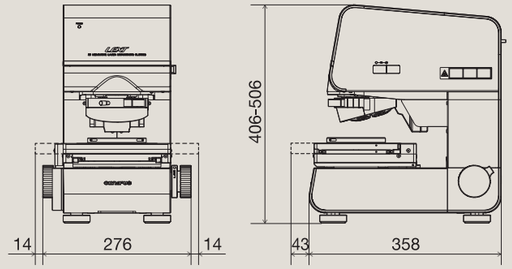
System Configurations

OLS5500 3D Optical Profilometer

OLS5500-SAF

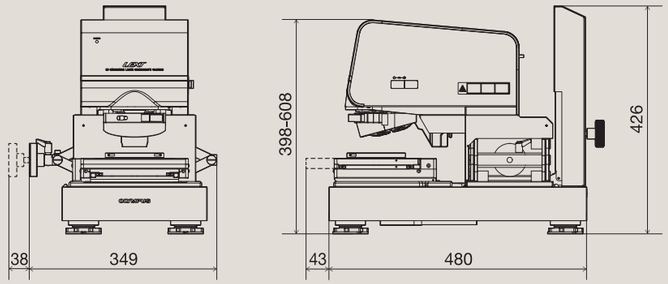
- 100 mm motorized stage
- Max. height of sample 100 mm (3.9 in.)



OLS5500 3D Optical Profilometer

OLS5500-EAF

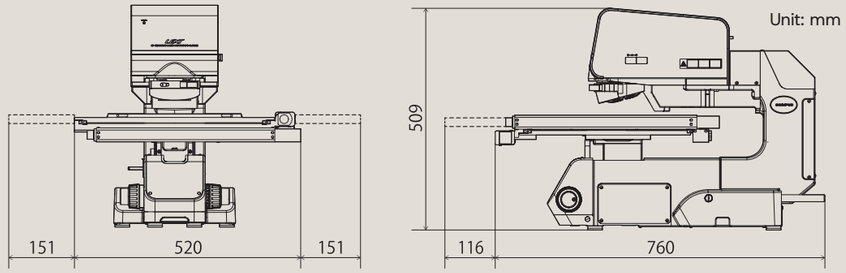
- 100 mm motorized stage
- Max. height of sample 210 mm (8.3 in.)



OLS5500 3D Optical Profilometer

OLS5500-LAF

- 300 mm motorized stage
- Max. height of sample 37 mm (1.5 in.)



OLS5500 Application Software

Standard Software: Data acquisition app/Analysis app (simple analysis)	OLS55-BSW
Motorized stage package application*1	OLS50-S-MSP
White light interferometry application	OLS-S-WLI
Focus variation application	OLS-S-FV
Advanced analysis application*2	OLS50-S-AA
Film thickness measurement application	OLS50-S-FT
Auto edge measurement application	OLS50-S-ED
Particle analysis application	OLS50-S-PA
Experimental total assist application	OLS51-S-ETA
Sphere/cylinder surface angle analysis application	OLS50-S-SA

*1 Including Auto-stitching data acquisition and Multi-area data acquisition functions.

*2 Including Profile analysis, Difference analysis, Step-height analysis, Surface analysis, Area/volume analysis, Line roughness analysis, Area roughness analysis and Histogram analysis.

OLS5500 Objective Lenses

Series	Model	Numerical Aperture (NA)	Working Distance (WD) (mm)
UIS2 objective lens	MPLFLN2.5X	0.08	10.7
	MPLFLN5X	0.15	20
	LMPLFLN10X	0.25	21
LEXT dedicated objective lens (10X)	MPLFLN10XLEXT	0.3	10.4
LEXT dedicated objective lens (high performance type)	MPLAPON20XLEXT	0.6	1.0
	MPLAPON50XLEXT	0.95	0.35
	MPLAPON100XLEXT	0.95	0.35
LEXT dedicated objective lens (long working distance type)	LMPLFLN20XLEXT	0.45	6.5
	LMPLFLN50XLEXT	0.6	5.2
	LMPLFLN100XLEXT	0.8	3.4
Super long working distance lens	SLMPLN20X	0.25	25
	SLMPLN50X	0.35	18
	SLMPLN100X	0.6	7.6
Long working distance for LCD lens	LCPLFLN20XLCD	0.45	8.3-7.4
	LCPLFLN50XLCD	0.7	3.0-2.2
	LCPLFLN100XLCD	0.85	1.2-0.9
White light interferometric objective lens	WLI10XMRTC	0.3	8.2
	WLI20XMRTC	0.6	1.0
	WLI50XMRTC	0.8	1.0

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