Introducing - µScanII

— fast, accurate, optical surface roughness measurement —

FAST

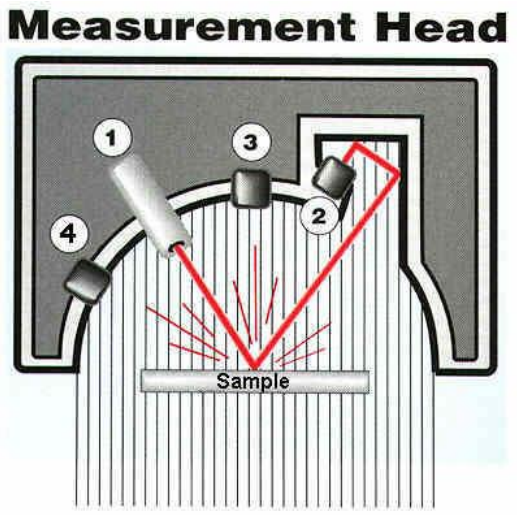
uScan uses analog amplifiers built right into the system for fast and configurable data capture.

NON-CONTACT

The illumination spot is located nomially 1 mm above the worksurface. Thus the uScanII can be fixtured to operate above the sample or placed directly on the surface of interest making it ideal for automated or lab environments.

FLEXIBLE SOFTWARE

Use our Windows10 application via the on-board USB or write your own with our open API allowing you to configure data acquistion rate, triggering, etc.



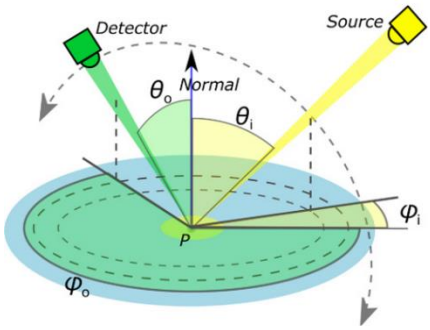
- Measure roughness, reflectance and BRDF with one simple, hand-held instrument
- Connects to a PC via USB or to your smart device via Bluetooth for remote operation and configuration
- Open API makes integration of this instrument as easy as a sensor. Connect to a terminal & send/recieve commands.
- Simple two point calibration proceedure allows accurate BRDF measurements across seven orders of magnitude.

With hundreds of the first generation instruents in the field, providing customers with needed data, we are proud to introduce the **µScanII.** This simple, hand-held, scatterometer measures RMS roughness of specular surfaces, specular reflectance, and BRDF. It can be operated entirely autonomously via it's internal battery and BTLE radio to transmit data to a smart device. The µScanII also can be tethered to a Widows10 PC via the integrated USB connector which aslo charges the internal battery. A version of the µScanII is available with the radio disabled in firmware for secure customer environments. Roughness, reflectivity, and BRDF can all be saved locally on the instrument to allow longterm and independent logging, or immediately transferred to the host.

One of the innovative elements of the new µScanII is its data aqusition capability. Using logarithmic amplifiers, the full sensitivity range of the Silicon sensors can be utilized – 7 orders of magnitude sensitvity. This allows for measurement of the shiniest mirrors to the least reflective surfaces. Pulse width modulation of the laser eliminates noise from background illumination for stand off applications.

We've taken everything we know from our experience with our larger CASI and TASC systems and integrated that along with customer feedback into our newest µScanII. We hope you like it!

BRDF and RMS from First Principles



We see things because they scatter light. Scatter is quantified in "BRDF" units which is simply scatter power per unit solid angle normalized by the incident power on the sample and the cosine of the scatter angle from surface normal. Most surfaces scatter more near the specular beam and a lot less far from it. Amazingly the BRDF tends to fall off as a straight line when plotted as the log of BRDF vs. the log of scatter angle. The µScanII takes advantage of this by sampling two points and then estimating the full BRDF. For shiny surfaces that are scattering from mild roughness (and not surface coatings or particulates) the BRDF (over a range of angles) can be converted the corresponding roughness (over a range of roughness wavelengths). The µScanII uses a diode laser as its light source and fixed detectors to measure the scatter and refected specular beam. The specular measurement gived the specular reflectance and the scatter measurements provide the BRDF as indicated above. The surface roughness is found uder the assumption that roughness is causing all of the scatter. This calculation is made over the default range of 0.01 to 1.0 µm, which is a commonly used range for light scatter. This provides context to the measurement. For example, stylus profilometers often have a tip radius on the order of 10 microns. It would be inconceivable to think that this stylus would measure spatial frequencies smaller than this. The µScanII let's you "tune" the portion of the power spectral density (PSD) curve over which it evaluates roughnesss to correlate to your other measurement techniques. Optical scatter is the only technique to allow evaluation of the surface across multiple instrument sensitivity ranges. As a result, roughness measured on a micro-interferometer or AFM can be directly compared to the µScanII yielding the same measurement value.

Reliability

To quote Robert Heinline: "The perfect machine has no moving parts" and that is the µScanII. A scatter patern is created by an incident laser aimed at the surface and measured by fixed detectors.The laser is guananteed to operate for a minimum of 20,000 hours – so expect a long shelf life!

TECHNICAL SUPPORT

Our commitment is to respond to you as quickly as we can. Give us a call, we're almost always available and happy to work through your application.

TURNKEY SOLUTIONS

If your applicatiion is more sophsiticated that than a simple reoughness or scatter measurement, we've got your coverd with a line of incident plane and total hemispherical scattering instrumetns. Lab measurements are also available on a fee-for-service basis.

System Specifications

Measurement Head

Dimensions	**5"h x 3½"d**
Weight	**1¼ lbs.**
Time of Measurement	**< 0.1 seconds**
Spot Size	**1 mm**
Repeatability	**±0.5%**
Accuracy	**±2% Reflectance**
	±3% Scatter
Wavelength	**670nm (others available)**

Measurement Range

Roughness – Ra & RMS

1Å up to 1100Å (0.004 to 4.3 µin.)
Over a bandwidth of 0.01 to 1.0 µm

Reflectance

0.1 to 1.0

BRDF

10^{-6} to 10 (sr^{-1})

SERVICES AVAILABLE

- Technical Support
- Installation and Setup
- Maintenance
- Application Support
- Hardware Support
- Guaranteed Warranty
- Custom measurements using our lab services