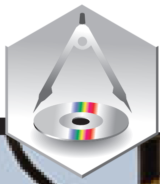
Large samples and automation

NTEGRA Maximus



What is the profile of your ideal assistant? – Smart? Autonomous? Efficient? Processes mountains of work without complaining?

NTEGRA Maximus fits the bill

NTEGRA Maximus is the instrument of choice when you have large number of routine analyses to conduct and really need that knowledgeable robot assistant to take the work off your hands. You won't feel how easily it does its work. You'll just get what's important: dozens of high quality images and related measurements, all presented in neat, statistical format… the key information to draw your final conclusions.

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Different applications… Universal effectiveness

Consider the following very different applications. Case A: you need to make multiple microscopic measurements in different regions on the surface of a large sample. Extremely useful, for example, in controlling roughness on optical lenses or wafers or testing magnetic properties on disk drives. Case B: You are working on a new formulation and need to characterize multiple properties on a large selection of micro samples. One example: the polymer industry where several parameters of a new material are optimized based on the microanalysis of a great number of samples. **NTEGRA** Maximus has the solution for these and many more similar applications.

Expanded sample positioning

Clearly, to analyze either large samples or multiple small samples, you need more than XY motion. To meet that need, NT-MDT has designed an "RL" (Rotary-Linear) stage for **NTEGRA** Maximus. Rotate it to any angle (Rotary) and move the sample along a line (Linear) by software control. Fully motorized, the new RL stage is driven by software which includes mark-and-find programming, expanding your ability to measure automatically at dozens of locations.

Optical viewing to confirm just the right location

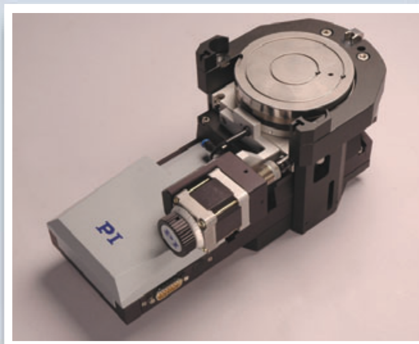
As with the full **NTEGRA** line, **NTEGRA** Maximus sports a zooming optical viewing system. Use the low magnification to find fields of up to 2 mm in diameter. After locating the general area, zoom in to mark specific small features or areas for measurement. This feature is especially useful when multiple microsamples are spotted onto one substrate or when locating test sites on single large substrates such as hard drives or wafers. Coupling a camera to the viewing system also provides light microscopy images which are stored along with your AFM images and measurements, providing important visual documentation of the areas analyzed.

Flexible, optimized algorithms for the production environment

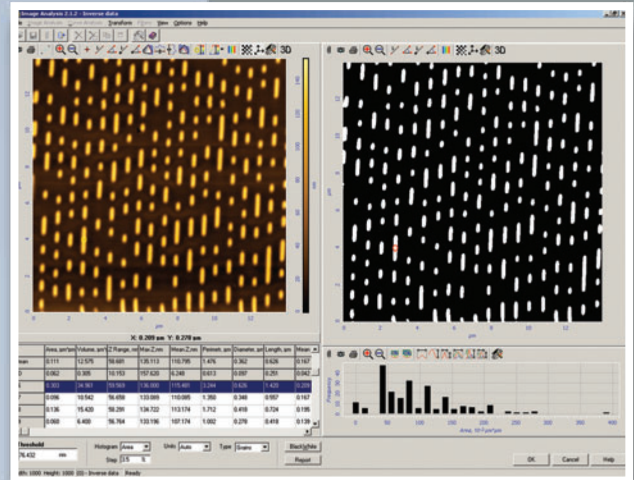
NTEGRA Maximus optimizes your production cycles. Need to analyze large numbers of field for grain analysis? Apply NT-MDT proprietary "Grain Analysis" option. Need to crunch data from multiple surface properties on a large variety of microsamples? **NTEGRA** Maximus has an algorithm to track the trends, showing how properties changes from one sample to another. Use it to select the optimal combination of properties based on the analysis of your whole data array. Ask about other algorithms to fit your production challenges.

Customize your application

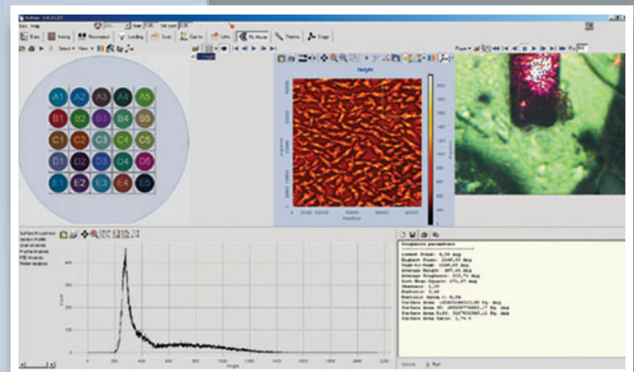
Need to drive **NTEGRA** Maximus according to your own analytical regime? Nova PowerScript provides the maximum freedom for choosing the most effective tactics of your measurement then creating the macros to implement repeatedly and consistently. Acquire, archive, even filter… all hands-off and automatically.



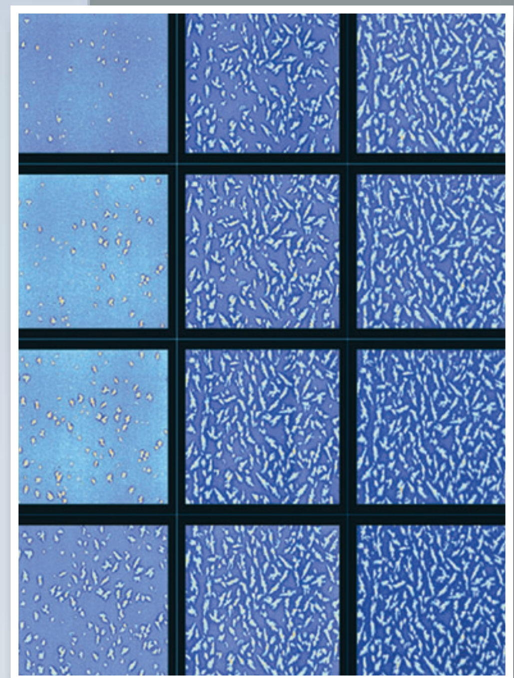
Design solutions. RL stage.



"Grain analysis" software.



Analysis software for multiple microsamples.



Growth of lamellar aggregates from LB film of 5 bilayers mel-7 at 75°C.

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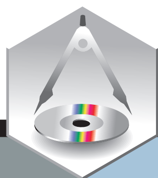

Scanning probe microscopy

AFM (contact + semi-contact + non-contact) / Lateral Force Microscopy / Phase Imaging/Force Modulation/ Adhesion Force Imaging/ Magnetic Force Microscopy/ Electrostatic Force Microscopy / Scanning Capacitance Microscopy/ Kelvin Probe Microscopy/ Spreading Resistance Imaging/ Lithography: AFM (Force and Current)

Specification

Sample size		Up to ∅100 mm, up to 15 mm in height
Sample weight		Up to 1 kg
XY sample positioning	Linear movement range	50 mm
	Positioning resolution	2.5 µm
	Rotary movement range	360°
	Positioning resolution	0.005°
Scan range		50x50x5 µm
Sample holder		Vacuum chuck
Non-linearity, XY (with closed-loop sensors)		⩽0.15%
Noise level, Z (RMS in bandwidth 1000Hz)	With sensors	0.06 nm (typically), ⩽0.07 nm
	Without sensors	0.05 nm
Noise level, XY* (RMS in bandwidth 200 Hz)	With sensors	0.1 nm (typically), ⩽0.2 nm
	Without sensors	0.01 nm
Linear dimensions estimation error (with sensors)		⩽1.2%
Optical viewing system	Optical resolution	3 µm
	Field of view	2.0 – 0.4 mm
	Continuous zoom	available
Vibration isolation	Active	0.7 – 1000 Hz
	Passive	above 1 kHz

* Built-in capacitive sensors have extremely low noise and any area down to 50x50 nm can be scanned with closed-loop control.

Articles:
• R. Neffati, A. Alexeev, S. Saunin, J. C. M. Brokken-Zijp, D. Wouters, S. Schmatloch, U.S. Schubert, J. Loos. Automated Scanning Probe Microscopy as a New Tool for Combinatorial Polymer Research: Conductive Carbon Black/Poly(dimethylsiloxane) Composites. Macromol. Rapid Commun. 2003, 24, 113-117.
• Daan Wouters and Ulrich S. Schubert. Constructive Nanolithography and Nanochemistry: Local Probe Oxidation and Chemical Modification. Langmuir 2003, 19, 9033-9038.

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