

NANOS

Specifications

IMAGING MODE	Optical	Magnification range: 2 – 12x
	SEM	Magnification range: 50 – 200,000x
	Resolution	<10 nm
ILLUMINATION	Optical	Bright field
	SEM	Optimized thermionic source (tungsten)
	Acceleration voltages	Default: 1, 2, 5, 7, 10, 15 & 20 kV Adjustable range between 1 & 20kV
DETECTOR		Secondary electron detector (SED) Backscattered electron detector (BSD) – 4 quadrant Energy Dispersive Spectroscopy detector (EDS) – integrated
DIGITAL IMAGE DETECTION	Optical	Colour navigation camera
IMAGE FORMATS		JPEG, TIFF, PNG, BMP
USER INTERFACE		Communication, imaging and analysis use a single monitor with control via a wireless mouse & keyboard Remote control (eg iPad) enabled Basic & advanced modes
DATA STORAGE		Network, USB, workstation
SAMPLE STAGE		Eucentric tilt stage (-15 up to +40) Computer-controlled motorized X, Y: 25 x 25 mm
SAMPLE SIZE		25 mm diameter pin stub 60 mm diam round disk
SPECIFICATIONS	Detector type	Silicon Drift Detector (SDD), thermo-electrically cooled
	Detector active area	30 mm ²
	Energy resolution	@ Mn K α < 133 eV
	Max. input count rate	300,000 cps
	Hardware integration	Fully embedded
SOFTWARE		Integrated in NANOS user interface EDS analysis and mapping Export functions
SYSTEM SPECIFICATIONS	Imaging module	280 (w) x 630 (d) x 550 (h)
	Weight	60 kg
	Pumps	Turbo molecular pump with oil free membrane pre-vacuum pump
	Vacuum modes	High vacuum SEM (conventional SEM), and low vacuum (0.4 mbar) (low vac SEM) Controlled vacuum levels via the User Interface
	Workstation	Preconfigured All-in-One PC with a 27" monitor. SEM imaging and EDS Analysis software installed.

NANOS

The Next Generation Tabletop SEM



- High Performance SE & 4 Quad BSE Detectors
- EDX – Spot Analysis & Element Mapping
- Low Vacuum Capability
- Motorised XY Stage & Eucentric Tilt
- Filament Performance Optimisation
- Intuitive interface
- Low Service Costs

The **NANOS** offers SEM imaging at a low cost of ownership for high-resolution imaging and integrated energy dispersive spectroscopy (EDS) for rapid elemental analysis. It is designed for easy installation, ease of use and easy servicing.

NANOS—THE MICROSCOPE

The **NANOS** is a comprehensive and affordable tabletop scanning electron microscope (SEM). It is engineered using the latest technology, giving fast and high quality SEM images and elemental analysis. Its design is robust and modern, which makes it perfect for research & development, educational and industrial usage.

DETECTORS

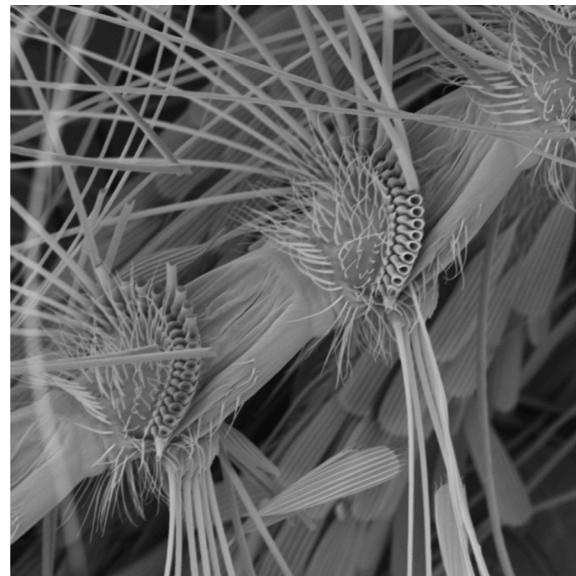
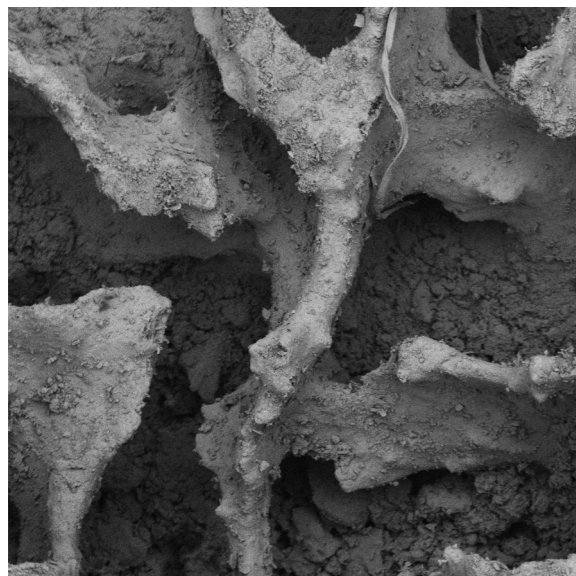
The **NANOS** comes with both a Secondary Electron Detector (SED) and a Back Scattered Electron Detector (BSD) as standard. The BSD is a 4-quadrant detector with fully controllable independent segments. By utilizing the segments in different combinations, it provides compositional or topographical detail from the sample, as well as images with a 'shading-effect' by highlighting the surface from multiple directions. An Energy Dispersive X-ray (EDX) Silicon Drift Detector (SDD) is installed for Elemental Analysis.

ELEMENTAL ANALYSIS

The **NANOS** is equipped with a fully integrated Energy Dispersive X-ray (EDX) Silicon Drift Detector (SDD). The operator can select EDX Point Analysis or activate Elemental Mapping.

EUCENTRIC STAGE

The Eucentric Stage of the **NANOS** is truly the only one of its kind. It comes standard with the **NANOS**. The motorized XY movements can be controlled via the User Interface. Tilting the specimen while in SEM mode can be done by manually turning the stage. Thanks to the eucentric design, the sample stays in focus without the need for intermediate changes in SEM settings. The User Interface indicates the exact tilt angle. Samples can be tilted up to angles of 55°.



NAVIGATION CAMERA

At sample entry an optical image of the sample is made to serve as navigation image. It provides an image of the complete sample. Via the User Interface the user can easily navigate over the sample. It gives the user full control and even in high magnification they always know where they are looking at.

LOW-VACUUM REDUCES SAMPLE CHARGING

Specimens are observed in high vacuum SEM (conventional SEM) or in low vacuum (low-vacuum SEM). The low-vacuum is used to reduce or eliminate the effects of sample charging. When a non-conductive sample is observed under a high-vacuum state, electrons accumulate on the sample surface causing a charging phenomenon. The **NANOS** is equipped with low-vacuum mode to overcome this.

USER INTERFACE

SEM's are about imaging and the **NANOS** puts the image at the centre of the screen. The **NANOS** is simple to set up and with an intuitive GUI and requires minimal training to begin imaging samples. The software offers both Basic mode for those requiring a quick & simple start to SEM imaging and Advanced mode for in-depth sample analysis. The user is in full control of the **NANOS** via wireless scroll mouse & keyboard and can be set up to operate remotely controlled via an iPad or similar device. The Navigation Camera, (NavCam) is always enabled ensuring the user knows exactly where they are on their sample.

Key Features

CONFIGURATION: the **NANOS** is delivered with BSD, SED, integrated EDS and a Eucentric tilt stage.

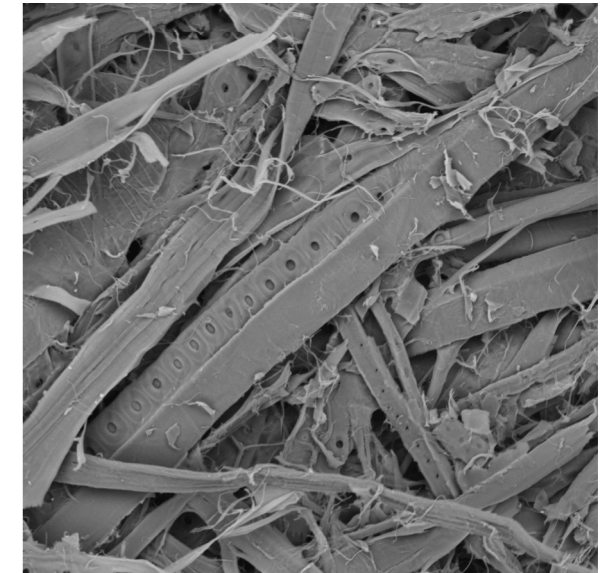
DESIGN: the **NANOS** has a robust modern design & is engineered using the latest materials and components.

SERVICING: the **NANOS** design allows easy access for maintenance and upgrades which can be completed at your premises.

ROBUST: with excellent stability and a small footprint the architecture of the **NANOS** ensures it can be used in non-laboratory environments.

EASE OF USE: in BASIC mode the **NANOS** will produce results in a short period of time, regardless of experience. ADVANCED mode provides further functionality for detailed analysis.

COST OF OWNERSHIP: the **NANOS** has been engineered to keep the cost of ownership lower than any benchtop SEM currently available.



ACCELERATING VOLTAGES

Adjustable accelerating voltage between 1kV to 20kV ensures high speed EDS analysis and mapping for identifying elements in your samples.

MAINTENANCE

The **NANOS** has been developed with service at the core of its design. Removable panels, modular components, a single control board and few moving parts keep service requirements to a minimum. Much can be undertaken by the user. Unique for the **NANOS** is that there are no moving parts within the vacuum chamber. Due to this smart design the risk for contamination has been eliminated.

ELECTRON SOURCE

The robust thermionic electron source in the **NANOS** is a tungsten filament controlled by electro-magnetic coil lenses & electrostatic deflectors. Using the optional 'eco'-setting, the filament lifetime can be extended up to hundreds of hours and still generate high resolution images. Any user can replace the electron source with a simple alignment tool, ensuring a minimum downtime. No need to wait for a service engineer to replace an expensive source.

Phe-nx is an innovative high-tech company based in Eindhoven, The Netherlands. Eindhoven is the crucible of Electron Microscopy with its origins at Philips Electron Optics during the middle of the last century. Phe-nx was founded in 2021 by seasoned electron microscopy experts. The NANOS is been developed by passionate innovators with an extensive network and deep-understanding of EM technology and engineering. Our mission is to make SEM accessible for anyone, everywhere.