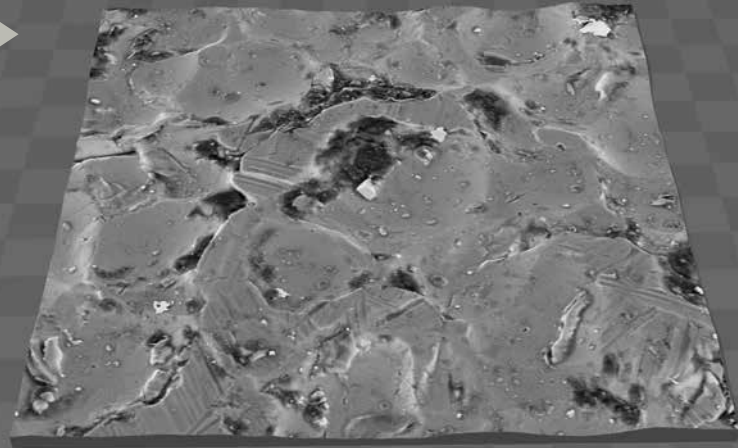


SEM topography

Live quantitative surface topography in SEM

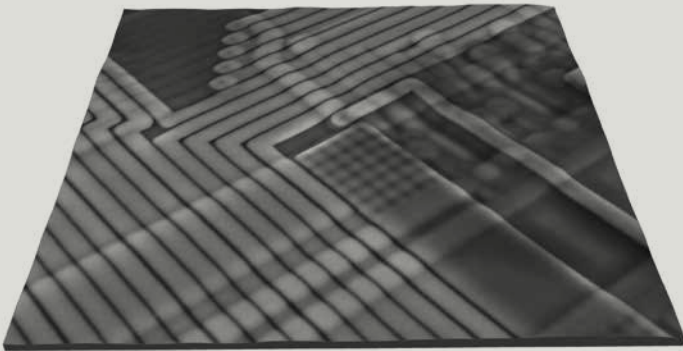
Measure surface topography with SEM

- Use conventional segmented BSE signals
- Get immediate feedback with automated topographic reconstruction
- Save topographic data in standard surface file formats



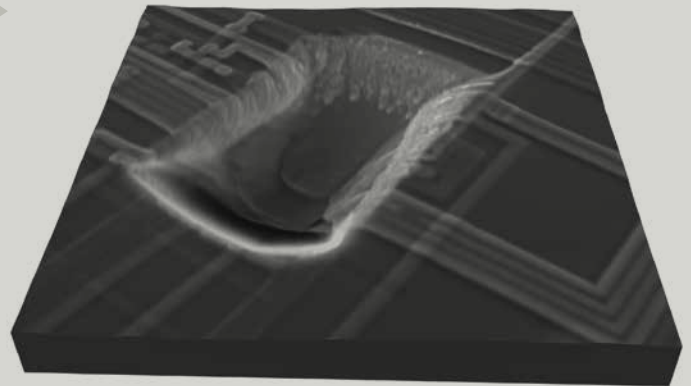
Distinguish between sample composition and surface topography

- Resolve ambiguities in image interpretation
- Reach a wider audience with 3D models, visualisation and printing
- Measure 3D distances, volumes and roughness



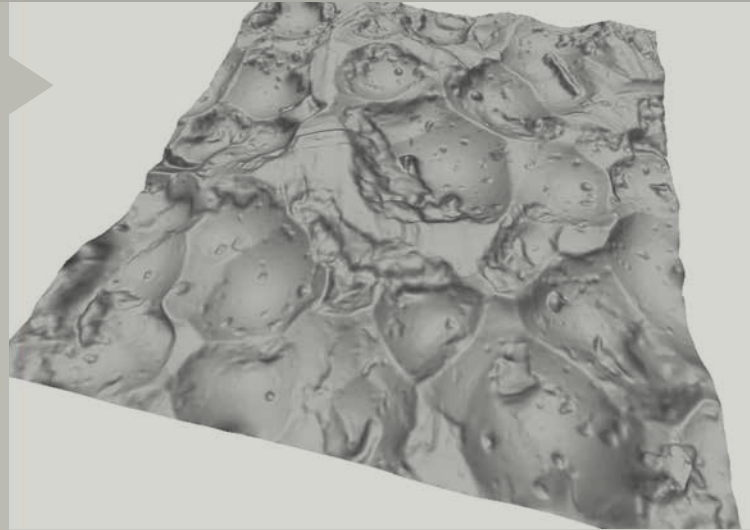
Monitor FIB milling and GIS deposition

- Improve yield of TEM and atom probe sample preparation
- Verify thickness of GIS deposited layers
- Monitor FIB milling depths and roughness



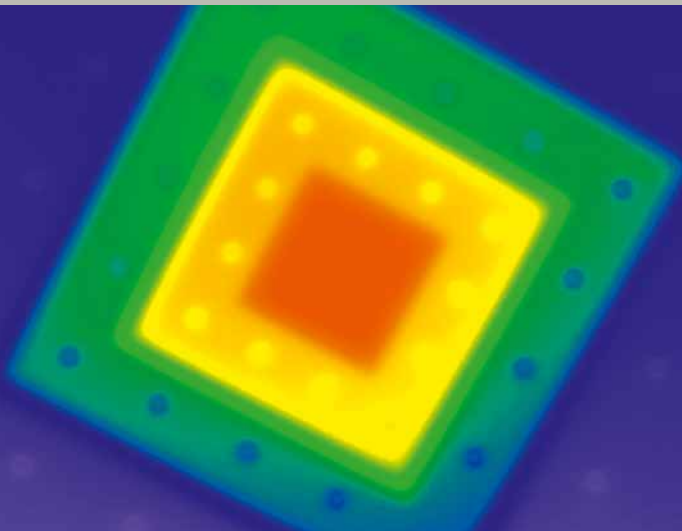
Visualise complex surfaces with ease

- Add texture from SE, EDS or EBSD maps
- Manipulate automatic colour textures
- Extract 3D screenshots for high-impact visualisation



Calibrate and measure height from offline BSE data

- Calibrate measurements with dedicated calibration structure
- Measure 3D positions, distances and angles
- Extract height and texture for visualisation and analysis



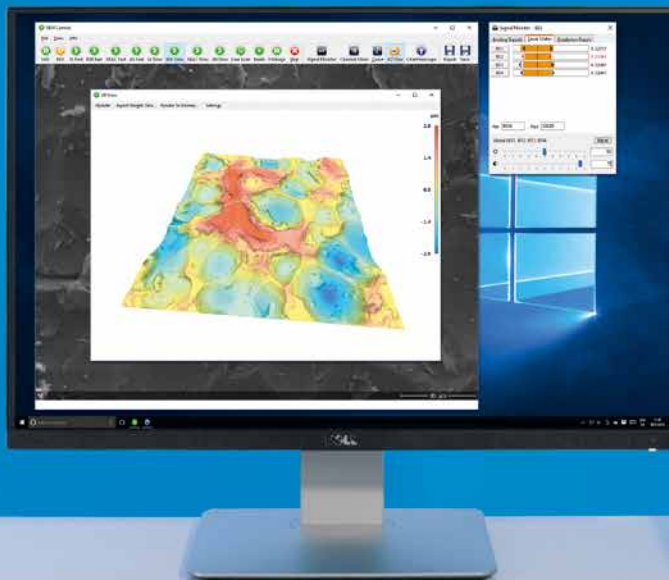
SEM topography

Continue surface topography workflow with analysis software

- Import data into full feature analysis software
- Measure surface roughness and analyse texture
- Analyse morphology, grain and particle distribution



Quantitative surface topography in SEM



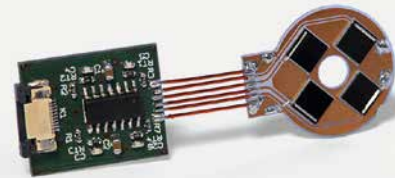
Turnkey SEM add-on system

- Backscattered electron detector
- Multi-channel video processor
- Scan generator and image acquisition
- Surface topography software



Multi-segment solid-state backscattered electron detectors

- Standard quadrant monolithic sensor for high resolution
- In situ pre-amplification for minimum noise
- Optional 4x chip-on-board discrete sensors



The most powerful and versatile SEM scanning system – DISS 5

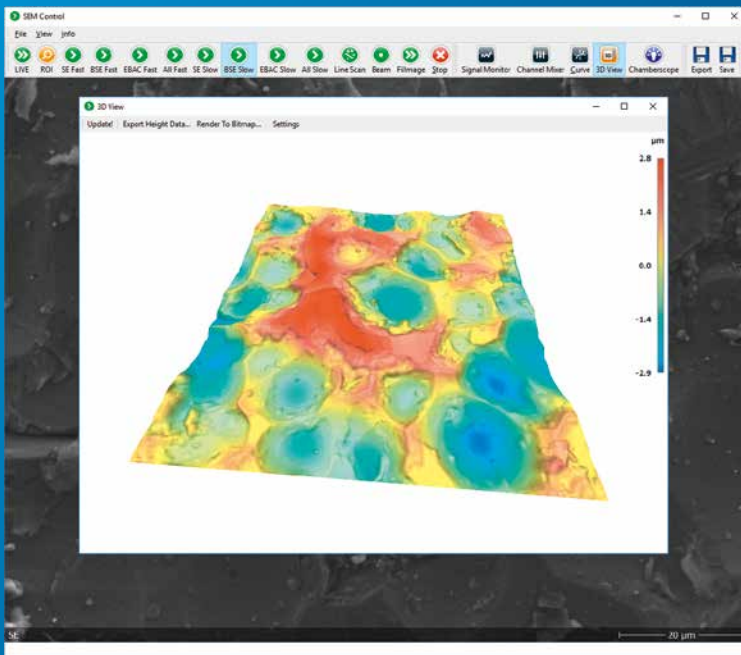
- Integrated scan generator and image acquisition
- Very large image resolution, up to 16k x 16k pixels
- Very fast scanning speed, down to 200ns dwell time
- Simultaneous 4 analog inputs and 12 digital inputs

SEM topography

Video processor for simultaneous data acquisition

- Channel independent BSE brightness and contrast control
- Mixed BSE output for simultaneous acquisition with SE, CL or EDS
- USB controlled and fully integrated with acquisition software



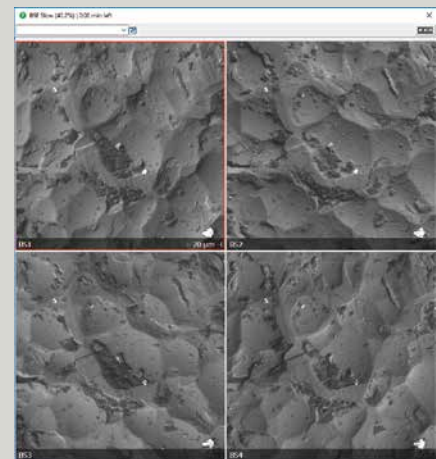


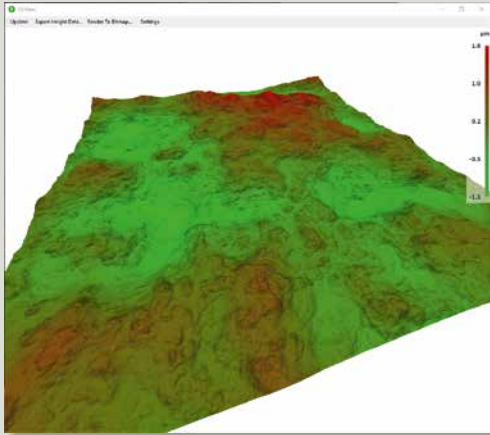
Completely integrated control and acquisition

- Live surface height reconstruction from BSE signals
- Built-in 3D surface visualisation tool
- Configurable workflows with integrated SE and BSE scan profiles

Reconstructed height is purely topographic and quantitative

- Surface normals are calculated from the 4x BSE gradients at each beam position
- Complete surface topography is assembled from all surface normals
- Height resolution depends primarily on beam/sample interaction volume





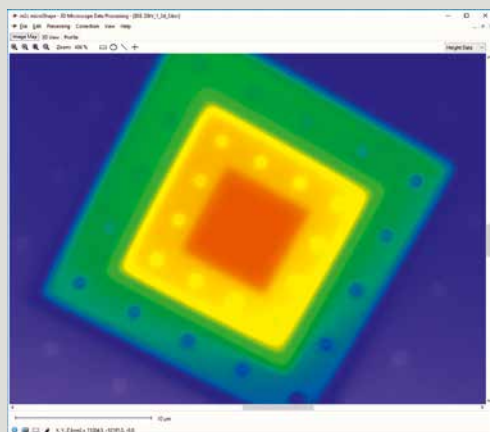
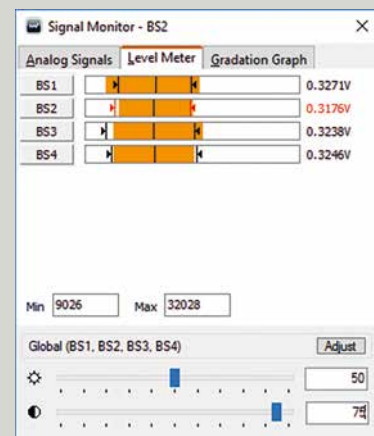
Live height visualisation tool

- Pan, rotate, tilt and Z scale
- Enhance with shadow and custom colour coding
- Export to standard binary AL3D and plaintext SDF formats

SEM topography

Live signal monitor for data acquisition and device calibration

- Live signals are displayed as line scans or level meters
- Multiple live signals are displayed simultaneously
- Each BSE channel is individually calibrated



One step calibration software for dedicated topography standard

- Scale calibration in all three spatial directions
- Orthogonality of all axes (shearing)
- Analysis of nonlinear deviations

Detailed technical specifications

■ Backscattered (BSE) detector

Sensor segments	4x rectangular diodes, hybrid sensor 4x quadrant diodes, monolithic sensor
Sensor energy range	5keV min., for standard diodes 1keV min., for low-kV diodes
Sensor mount	Mounted below the objective lens, fixed
Sensor height	1.2 mm
Pre-amplifier mount	In situ mount, for minimum noise Ex situ mount, for space restricted configurations
Pre-amplifier gain	fixed 10 ⁷ V/A
Pre-amplifier size	22 x 18 mm

■ Video processor module

Control interface	USB 2.0
BSE signal inputs	4x max.
SE and AUX signal inputs	3x max.
Simultaneous output signals	4x max.
Mixed BSE output	1x conventional topo./compo.
Gain	1 ... 100x
Output offset	1.25 V max
Brightness & Contrast control	Integrated software control
Signal inversion	Yes
Low-pass filter	8 levels

■ SEM acquisition module (DISS5 Topography)

Hardware interface	USB 2.0
Simultaneous inputs (i.e. SE, BSE)	4x, 12-bit
Mapping signals (i.e. EDS)	12x, 16-bit
Scanning interface	Pre-configured for SEM and analytical add-ons
Synchronization interface	Pixel, line, frame
Scan size	16,384 x 16,384 pixels max.
Pixel dwell time	200 ns ... 6 milliseconds
Pixel over-sampling	32,000x max.
Line averaging	50x max.
Frame averaging	256x max.
Synchronisation	mains power
ROI scan	Yes

■ PC/Laptop, Display

PC/Laptop	Intel Core i3 minimum 2x USB 2.0 minimum
Displays	1,280 x 1,024 resolution minimum 2x displays recommended
Operating systems	Windows 10 ... Windows XP Network connection recommended

■ Acquisition software (DISS 5)

BSE detector control	Complete software integration
SEM mag, kV information	Automated SEM communication
Live signal monitor	Yes
Live image caption overlay	Yes
Surface reconstruction	Automated surface-from-shading
Surface topography display	3D visualisation, mountain view
Surface topography control	Live rotation, pan, tilt, zoom, Z-rescaling.
Surface topography texture	Black/white or coloured height
Default BSE file formats	8 and 16-bit multi-page TIFF
Export BSE file formats	BMP, JPEG, PNG, GIF
Default topography file formats	AL3D, SDF
Export topography file formats	BMP
Context sensitive help	English, German

■ Analysis software (microCal and microSurface)

XYZ calibration	One step calibration with dedicated FIB structure
Data extraction	Point and line profiles
3D measurements	Distances, angles
Export file formats	PLY, TIFF, BMP, JPG, PNG, GIF, TXT, DAT
Save file formats	BCR, BCRF, AL3D, NMM, ASC
Operating system	Windows 10 ... Windows XP
Context sensitive help	English, German

SEM topography

SEM topography

■ Parts and Cables

BSE detector	Optional	1x
Video processor module	Standard	1x
SEM acquisition module	Standard	1x
Topography calibration sample	Optional	1x
BSE & SEM mixed control & acquisition cable	Standard	1x
USB cables	Standard	2x
USB memory stick with software	Standard	1x
PC, keyboard, mouse	Optional	1x
Displays	Optional	2x

■ Software packages

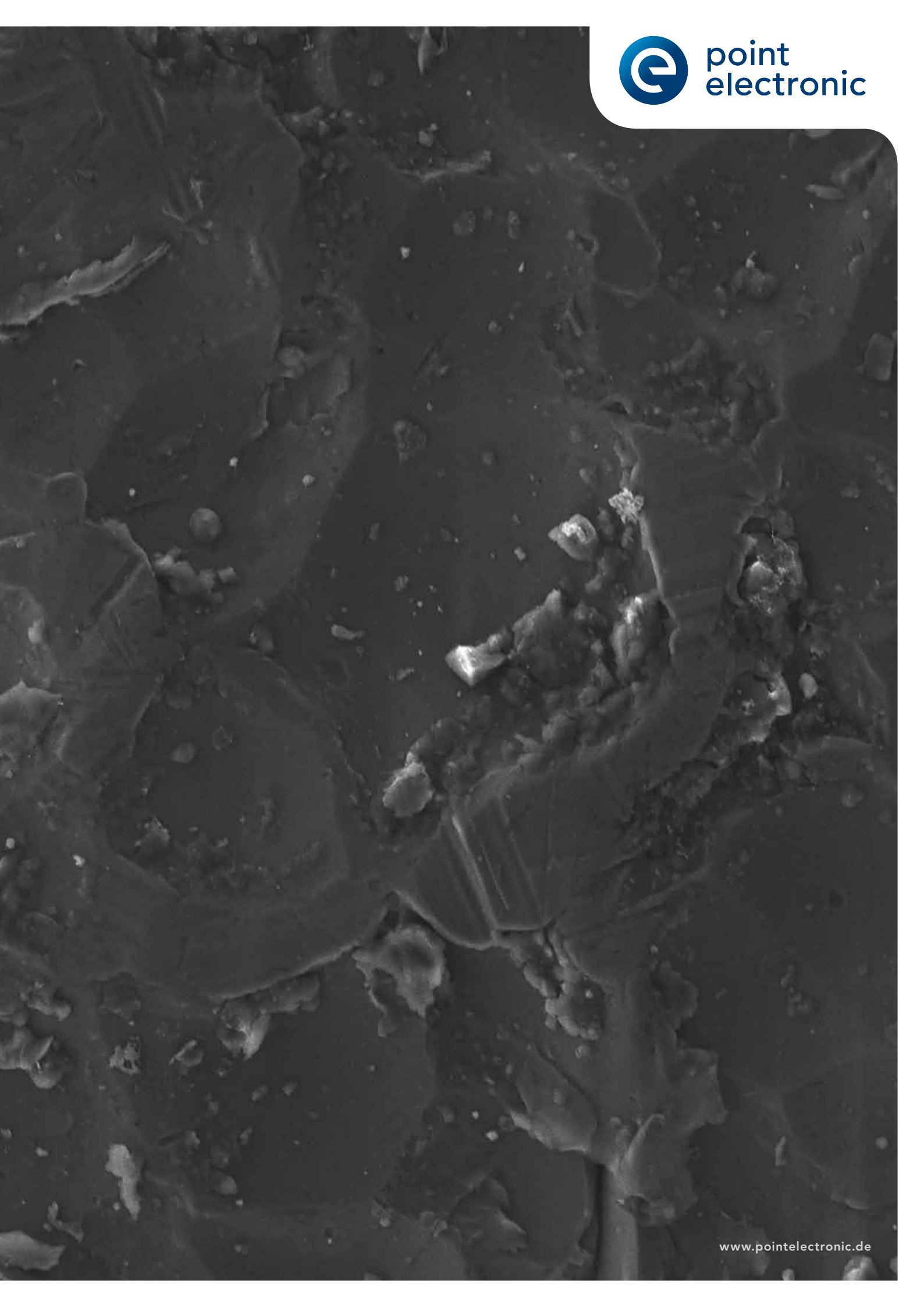
Video processor USB driver	Video processor
SEM acquisition USB driver	Digital Image Scanning System 5
Shape-from-shadow library	m2cMicroShape
Acquisition software	DISS 5
Analysis software	microShape (m2c) MountainsMap (DigitalSurf), optional SPIP (Image Metrology), optional
Calibration software	microCal (m2c)

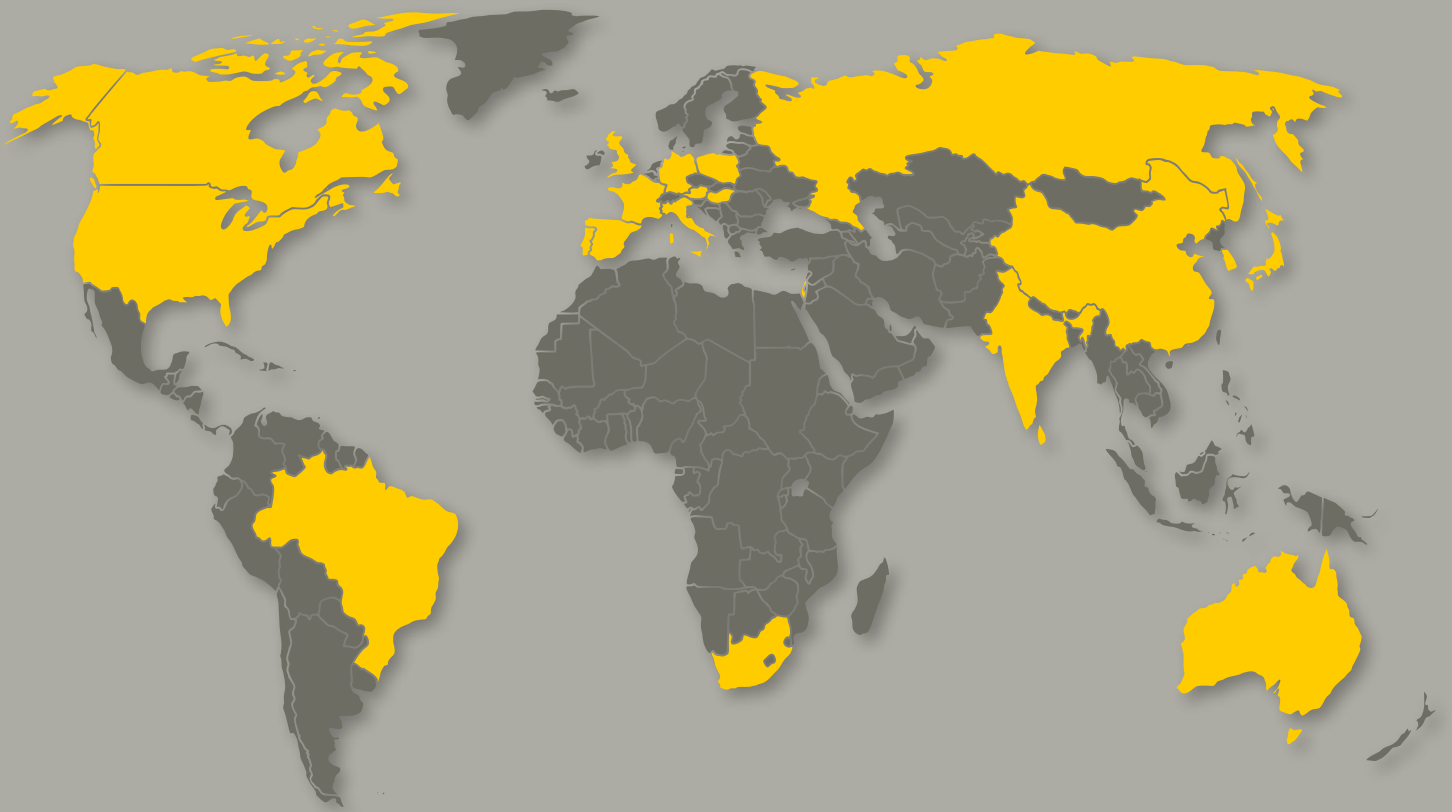
■ Weight and Dimensions

Video processor dimensions	19 x 10.5 x 5 cm
Video processor weight	1.1 kg
DISS5 module dimensions	23.5 x 8.7 x 29.5 cm
DISS5 module weight	3.4 kg
Shipping dimensions	typ. 36 x 32 x 56 cm
Shipping weight	typ. 6.0 kg

■ Site requirements

Power	2x mains 110/220 VAC single phase 50-60 Hz on the same earth as the microscope
Microscope	1x port for BSE detector power and signal electrical feedthrough 1x SEM earth connection 1x mixed scan interface and SEM signals connection
Space	SEM chamber must provide sufficient space for BSE detector SEM pole piece must provide means for mounting the BSE detector Video processor and DISS5 boxes may be placed on the SEM table





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