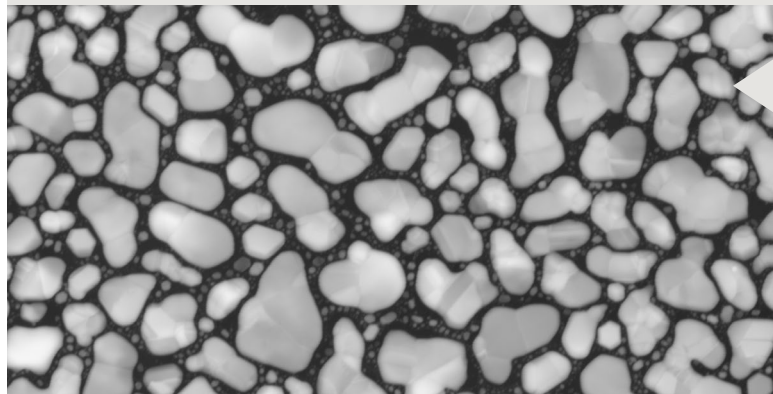
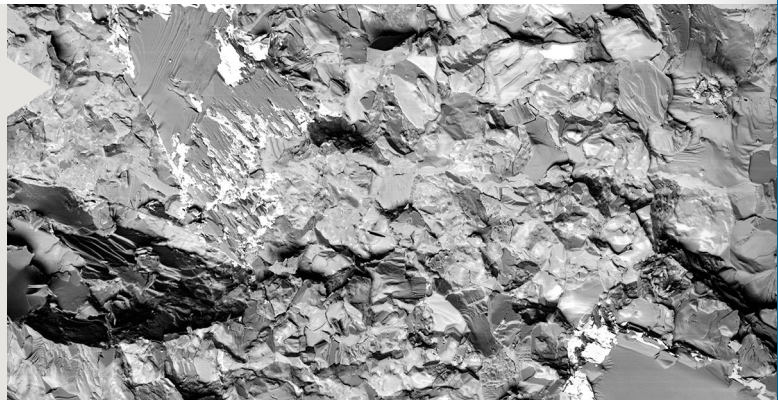


BSE acquisition

Quantitative BackScattered Electron (BSE) acquisition system

Reveal Z-contrast invisible to SE signals

- Reveal soil structure and identify mineral constituents
- Determine variations of content in biological structures
- Image shape, size and distribution of nanoparticles

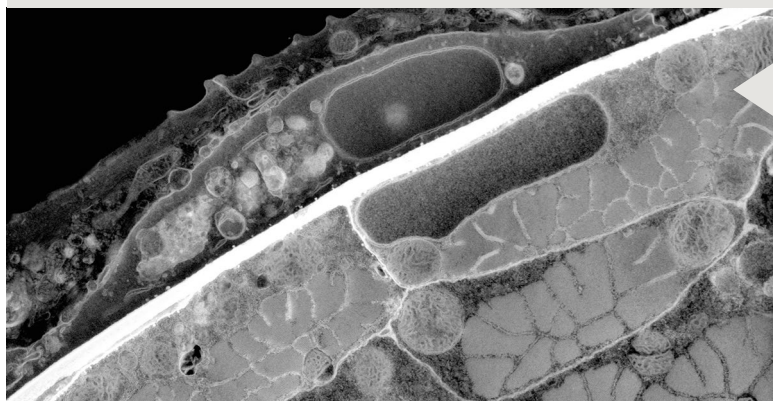
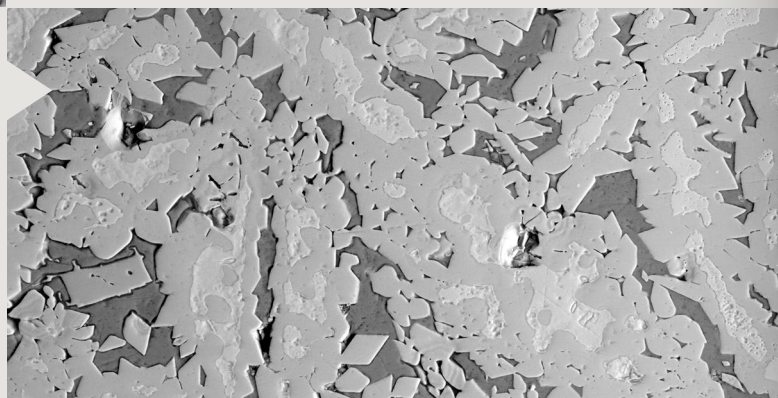


Explore Electron Channelling Contrast Images/Orientation Contrast

- Identify dislocations, stacking faults and grain boundaries – in the SEM
- Image crystallographic orientation of grains
- Map distortions in crystal lattice

Measure density with highest resolution

- Image distribution, shape of grains in steels and alloys
- Measure variations in mineral concentrations in bone
- Identify phases and measure area fractions in metal matrix composites



Speed up your BSE workflow

- Navigate large samples with the high speed BSE
- Align the SEM without switching to SE imaging
- Minimise specimen charging with high-speed line and frame averaging

Discover the benefits of high-performance BSE



Acquire colour images and animations

- Colourise SEM images with BSE signals
- Produce high quality images for publications
- Acquire time or rotation based series for videos

BSE acquisition

Record dynamics of in-situ heating

- Observe crystallisation, recovery and sintering
- Record growth dynamics with in-situ ESEM
- Quantify creep and fracture at high temperatures



cold



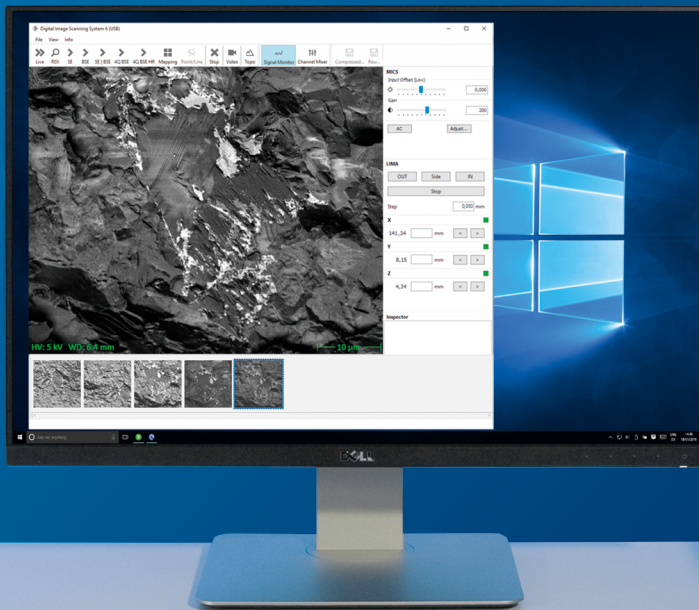
hot



Reconstruct 3D information from BSE data

- Measure surface heights with live SEM topography
- Discover volume of biological specimens with 3D SEM
- Obtain microscopic 3D models with 3D scanning

Quantitative BSE for any SEM or FIB-SEM



Complete system for quantitative BSE acquisition

- BSE detector
- DISS6 imaging
- MICS-4 amplifier
- BSE reference samples



BSE detector

- Segmented 4Q sensor with detector grade Si diode
- In-situ preamplifiers for low-noise and high-speed
- Port-mounted and motorised insertion/retraction
- Integrated touch alarm
- Full alignment under vacuum conditions



DISS6 imaging

- Signal amplifier, scan generator and image acquisition
- Simultaneous acquisition of all signals
- Advanced offset and gain normalization
- Very large image resolution

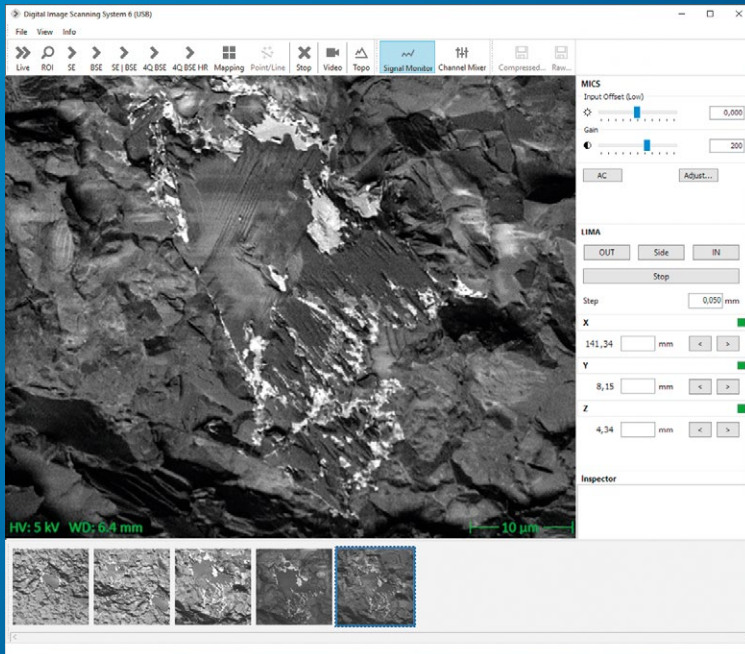
BSE acquisition

MICS-4 amplifier

- Integrated into BSE detector, DISS6 or stand-alone
- Calibrated amplification for quantitative acquisition
- Up to 16x multi-channel signal amplifier
- Independent brightness and contrast for each signal
- Global brightness and contrast for 4x signal groups



Full quantitative data workflow

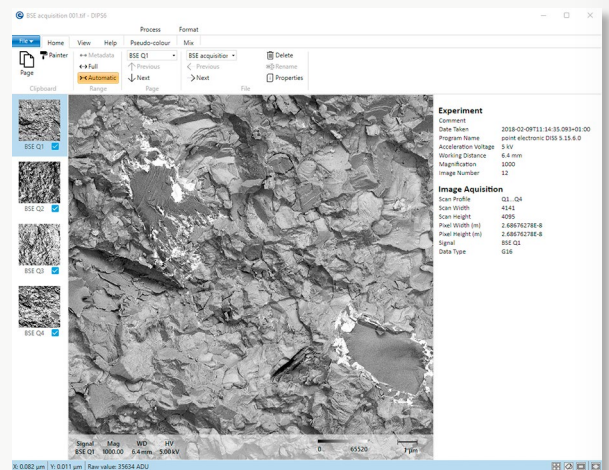


DISS6 app - detector control and image acquisition

- BSE detector control
- BSE and AUX image acquisition
- Live measurement of BSE intensities
- Standard file formats

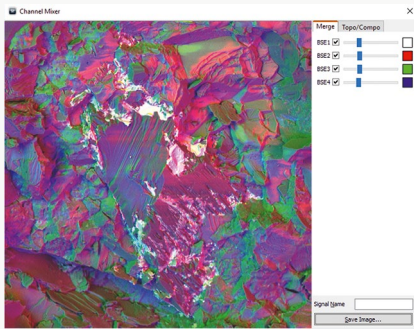
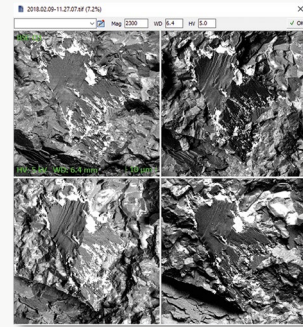
DIPS6 app - quantitative image processing

- Automatic quantification from metadata
- Advanced pseudo-colours with gradients
- Detailed view of metadata from DISS6
- Export to CSV data, or PNG images



Simultaneous 4Q BSE

- Signals are acquired from the same sample location
- Data is kept together in multi-page TIFF files
- Calibration is stored in standard XMP metadata



Live colour mixing

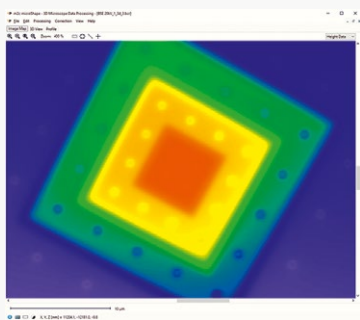
- Software mixing for grayscale/colour representation
- Advanced "TOPO" and "COPMO" mixing modes
- Optional hardware mixed BSE for convenience

BSE acquisition

Live quantitative acquisition

- Live inspection of measured BSE values
- Enabled by calibrated amplification and imaging
- Add own quantification formulas, including working distance, acceleration voltage, or beam current

BSE1	33248	<div></div>
BSE2	33512	<div></div>
BSE3	33940	<div></div>
BSE4	33012	<div></div>
BSE1 Current	0.1766 pA	
BSE2 Current	-0.4336 pA	
BSE3 Current	2.426 pA	
BSE4 Current	-0.6022 pA	



3D visualisation and measurements (optional)

- 3D views of height data from with SEM topography
- Additional texture from SE, EDS, EBSD or CL images
- Line and point data extraction for 3D measurements

BSE detector

Sensor	4Q segmented Si diode on ceramic board
	6 mm inner diameter
	20 mm outer diameter
	1...30 keV electron energy range
Preamplifier	mounted in-situ
	5 MHz bandwidth
	10 ⁵ or 10 ⁶ V/A gain
Mechanics	port mounted, with vacuum bellows
	motorised insertion/retraction motion
	manual lateral and height alignment
	integrated touch alarm

DISS6 imaging

Inputs	4x calibrated BSE analog inputs
	8x calibrated AUX analog inputs (SE, CL, AUX)
	12x digital inputs (D1...D12)
	3x trigger inputs (Pixel, Line and Frame)
	Scan pause/resume input
Outputs	4x BSE1...BSE4 signals
	2x BSE mixed signals (SUM and MIX)
	2x calibrated analogue scan outputs (X, Y)
	2x external control outputs (Blank and Scan)
	4x clock outputs (Pixel, Line, Frame and Blank)
Scanning	16-bit $\pm 3.5... \pm 12V$ analogue X, Y scans
	Gnd., 5V, 15V external bank/scan
	TTL pause/resume
	TTL clock and synchronisation
	0.5 GPixels maximum frame size (software limit)
	10 ns...10 ms pixel dwell time (selection dependent)
	1...32,000x pixel average (oversampling)
Digitization	12-bit for analogue signals
	16-bit for TTL D1...D12
	32-bit for TTL D1...D6 (optional)
MICS-4 amplifier	-1...1 V input offset BSE1...BSE4
	1x ... 1,800x gain BSE1...BSE4
	-0.5...0.5 V output offsets BSE1...BSE4
	3.4 MHz...34 Hz low-pass filter
	Automated 4Q global brightness and contrast
	Automated input offsets (dark correction)
	Automated gain normalisation (bright correction)

PC/Laptop, Display (optional)

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

DISS6 app

Detector control	automatic insertion/retraction
	contrast and brightness
	input offset and gain normalisation corrections
	hardware 'topographic' and 'compositional' mix
Quantification	formulas based quantification for pixel values
	automatic use of brightness and contrast values
	optional use of SEM parameters (HV, WD, etc)
	live inspection of calculated pixel values
Image scanning	workflow with predefined scan profiles
	live colour mixing tool
	live linescan and histogram tool
	advanced line and point scans
	automatic image range during acquisition
File formats	raw 16-bit multi-page TIF with XMP tags
	compressed 8-bit multi-page TIF with XMP tags
	compressed JPEG with XMP tags
Operating system	Windows 11...7

DIPS6 app

File inputs	raw 16-bit multi-page TIF with XMP tags
	compressed 8-bit multi-page TIF with XMP tags
	compressed JPEG with XMP tags
File outputs	PNG for colour export
	CSV for quantified data export
	compressed JPEG with XMP tags
Quantification	formulas based quantification for pixel values
	formulas from metadata or XML imports
Pseudo-colour	GGR gradient colours
	colour image mix view
Operating system	Windows 11...7

Software packages

	Drivers	PEUSB drivers
		DISS6Control library
	Server	EM Gateway
	Apps	DISS 6
		DIPS 6

Parts and Cables

	BSE detector	Standard	1x
	DISS6 imaging	Standard	1x
	MICS amplifier (if not embedded in DISS6/det.)	Optional	1x
	BSE reference sample	Optional	1x
	BSE detector cable	Standard	1x
	SEM cable	Standard	1x
	USB cable	Standard	2x
	USB drive with software	Standard	1x
	PC, keyboard, mouse	Optional	1x
	Displays	Optional	1x

Weight and Dimensions

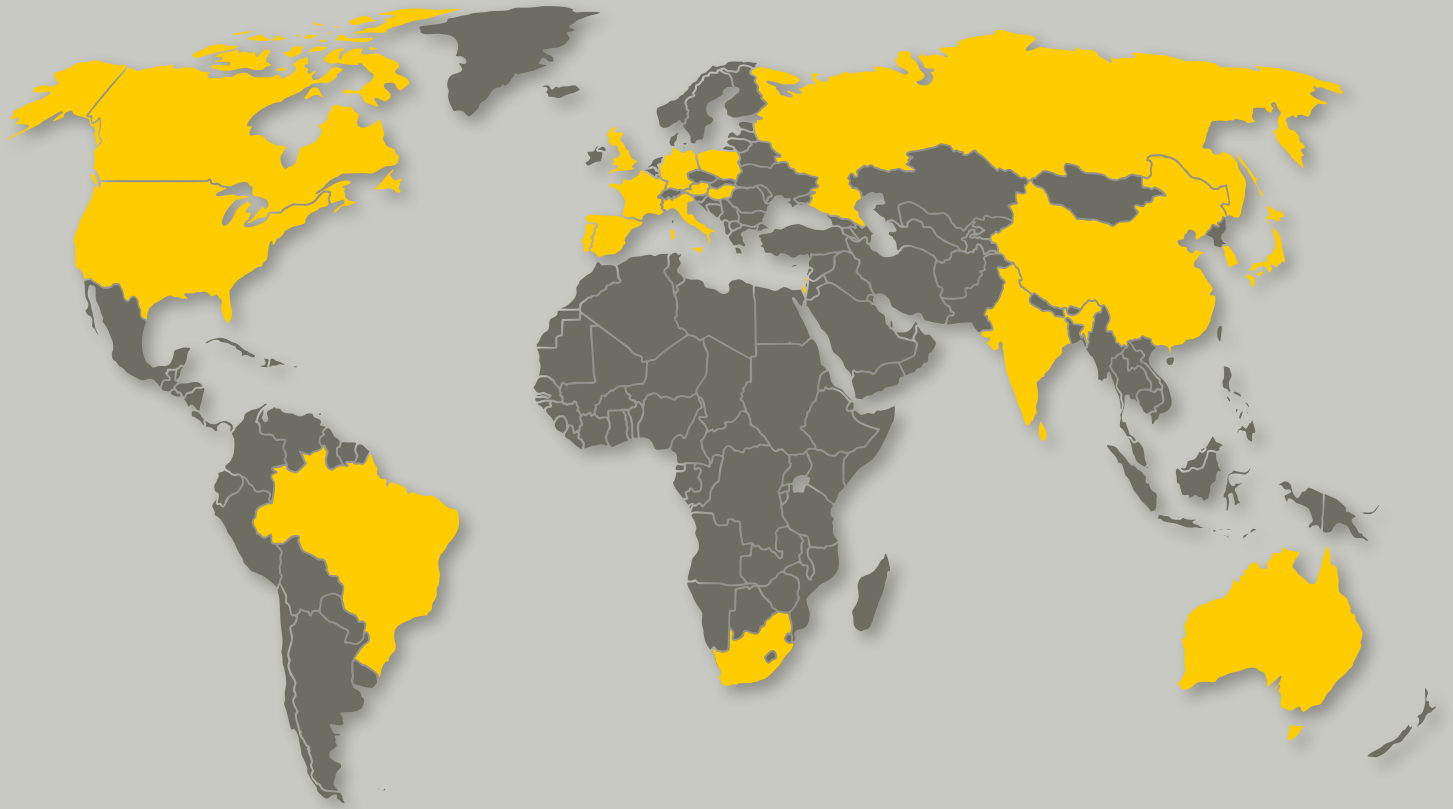
	BSE detector	15 x 20 x 40cm
		8.5 kg
	DISS6 imaging	23.5 x 8.8 x 29.5 cm
		4 kg

Site requirements

	Power	1x mains 110/220 VAC single phase 50-60 Hz on the same earth as the microscope
	Microscope	1x external scan interface 1x earth connection 1x detector port
	Space	DISS6 imaging unit can be placed on the SEM bench/table
		PC (optional) should be placed in the SEM room

A grayscale scanning electron micrograph (SEM) showing a fractured material surface. The image displays a large, irregular crack that runs diagonally from the upper left towards the lower right. The surface is highly textured, with numerous small, angular fragments and debris scattered across the field of view. The lighting creates strong highlights and shadows, emphasizing the three-dimensional nature of the fracture and the roughness of the material.

BSE acquisition

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