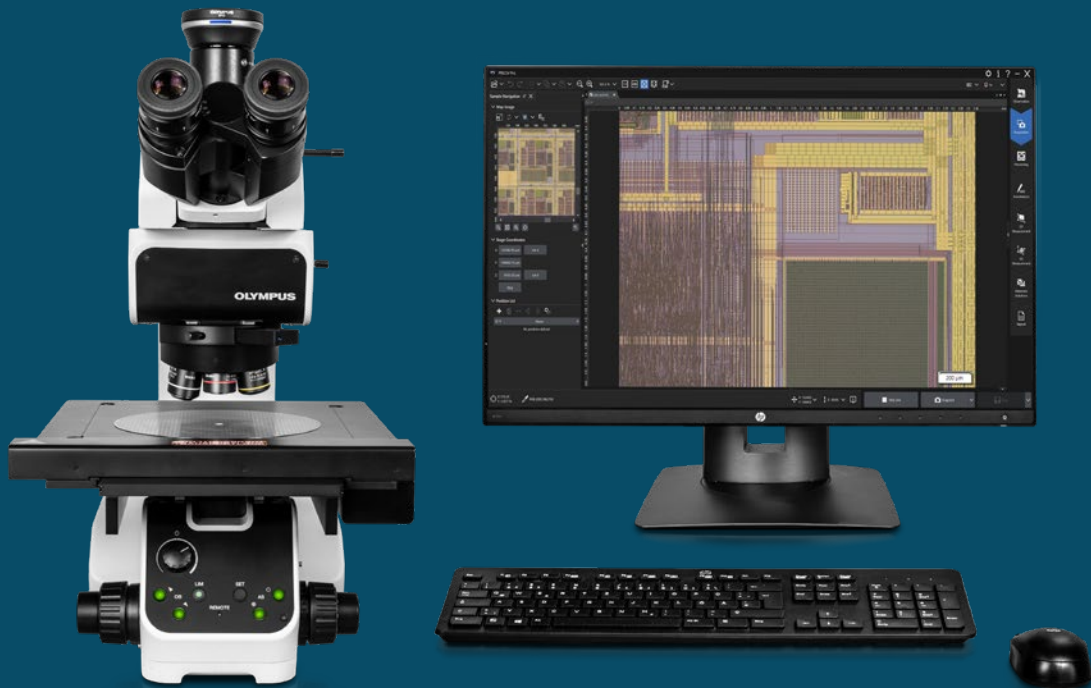# PRECiV

## Unified Software for All Industrial Microscopes

EVIDENT

Improve Efficiency without Compromises

One Interface for Digital and Conventional Microscopes and Accessories

PRECiV™ is a simple-to-use, unified software platform that enables you to control all our digital and conventional microscopes using the same convenient user interface. PRECiV software enables you to efficiently perform precise, repetitive measurements or conduct reproducible complex image analysis during production, quality control, and inspection. Obtain results that comply with the latest industrial standards and create professional reports that can easily be exported to your company's network. Take advantage of the software's powerful capabilities for manually supervised automated optical inspection and advanced 3D measurement. Custom solutions are also available to expand PRECiV software's functionality to meet your unique needs.
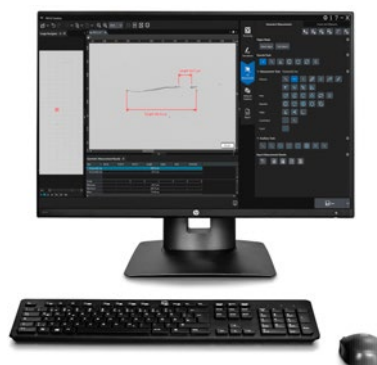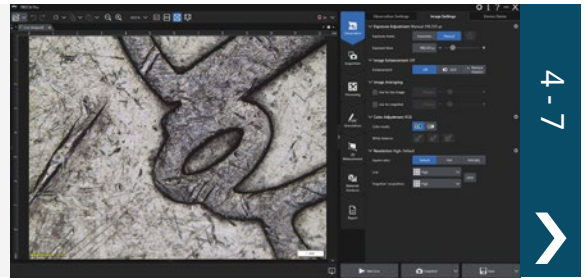
Image Capture > Measurement and Analysis > Sharing

Extend your Microscope Capabilities

PRECiV software's user interface is simple and easy to use, so you can start taking advantage of its powerful tools with minimal training.

Control Conventional Microscopes

The software works seamlessly with our manual and semi-motorized conventional microscope systems as well as microscope cameras and accessories, enabling you to capture images using a range of conditions, including brightfield, darkfield, polarization, and anti-halation.
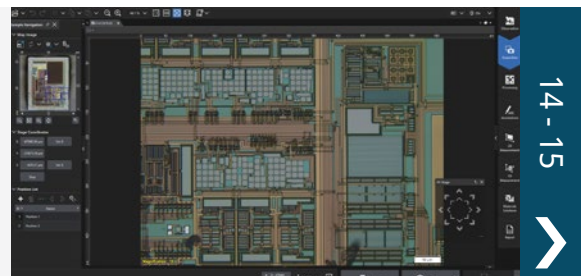
Digital Microscope Control

PRECiV software controls our DSX1000 digital microscope, offers 2D and 3D measurements, and integrates all Material Solutions.
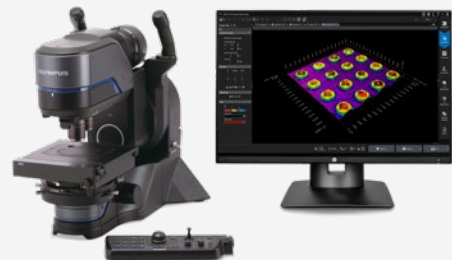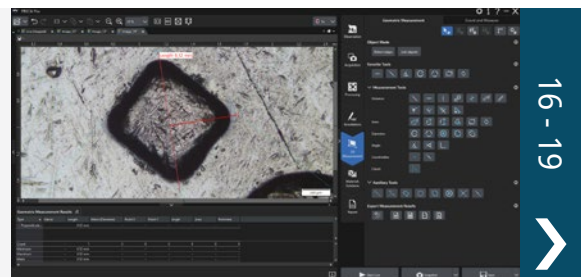
Automate with Motorization

The software enables you to control industrial and material science manual and semi-automated microscopes as well as motorized X, Y, Z devices.
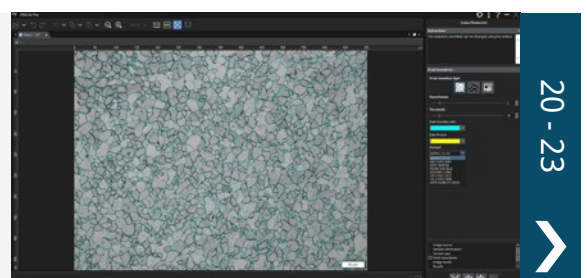
Advanced Measurements and Analysis

PRECiV enables precise, repetitive two-dimensional measurements and complex image analysis, including deep-learning technology.

Optimized for Industrial Applications

Add optional Material Solutions to PRECiV, and take advantage of dedicated workflows for material qualification and evaluation.

A Comprehensive Imaging and Measurement Platform

Don't compromise by using software designed for life science or other non-industrial applications. PRECiV software's convenient interface efficiently guides you through a succession of steps—from image acquisition to standard compliant measurements, report creation, and data sharing in most popular materials science and industrial applications.

Extend Your Microscope's Capabilities

The software is a comprehensive imaging and measurement solution for your microscopy lab. PRECiV™ software controls all Evident digital and conventional industrial microscopes, their coded functions, Evident motorized nosepieces, and Evident digital microscope cameras with same unified interface.

Stereo microscope

Digital microscope

Optical microscope
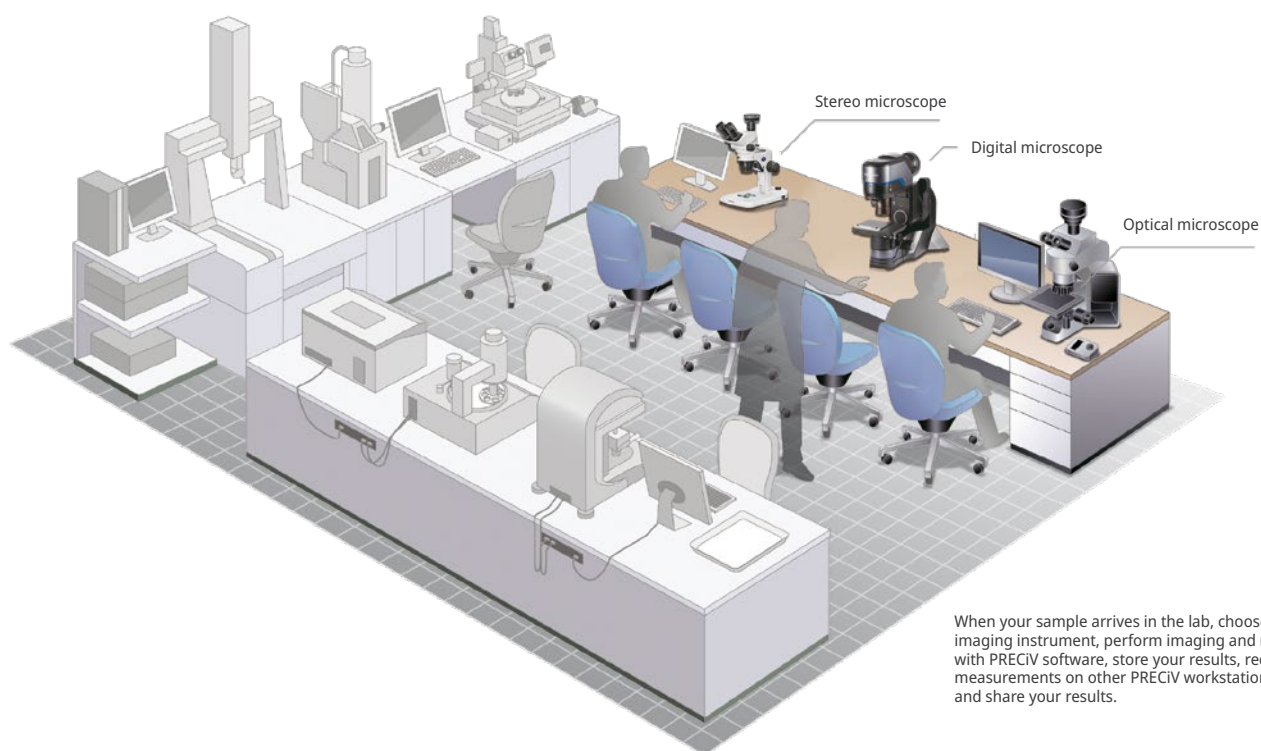
When your sample arrives in the lab, choose the right imaging instrument, perform imaging and measurement with PRECiV software, store your results, recall your measurements on other PRECiV workstations, create reports, and share your results.

Scalable for Your Changing Needs

PRECiV software is scalable and offers dedicated packages for conventional and digital microscopes. Different departments in your company can purchase a license for the level of software they require.

For Conventional Microscopes

PRECiV Capture

PRECiV Capture

PRECiV Capture is our entry-level package for customers who want to acquire digital images and make basic 2D measurements, transforming their existing microscopes into digital workstations for applications like incoming goods inspection.

PRECiV Core

PRECiV Core

Ideal for customers in QA labs and inspection rooms with a strong focus on images, PRECiV Core balances cost and features, adding extended focus images and measurement export capabilities for an excellent value.

PRECiV Pro

PRECiV Pro

PRECiV Pro is the most powerful and versatile version for conventional microscopy. The Pro version has the tools required for customers in QA/QC, failure analysis, and anyone who needs to produce analytical reports and measurements to validate a sample or production lot.

Intuitive and Collaborative

The user interface is simple and easy to use, so you can start taking advantage of the software's powerful tools with minimal training. The navigation tab makes it easy to access the software's functions. Via large, clearly labeled buttons, you are guided through every step of the inspection process such as observation, acquisition, measurement, image analysis, documentation, and sharing.
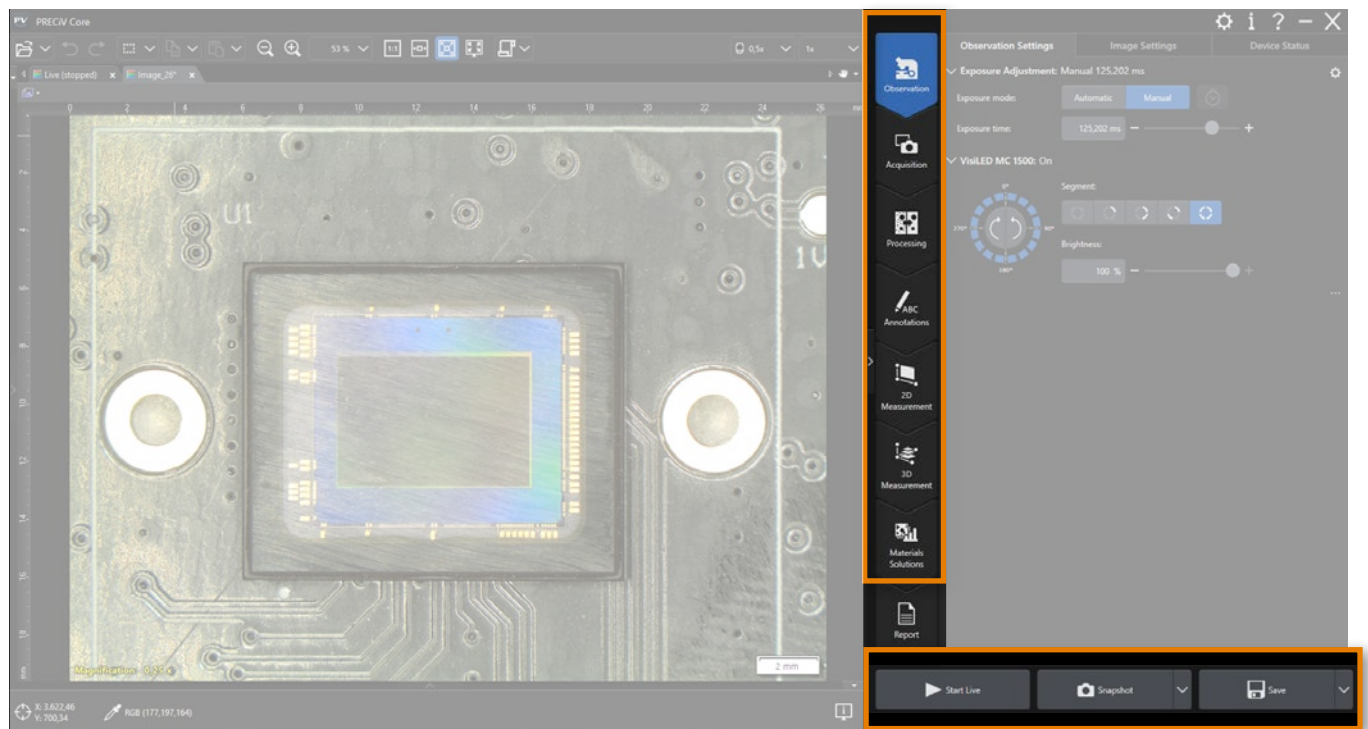
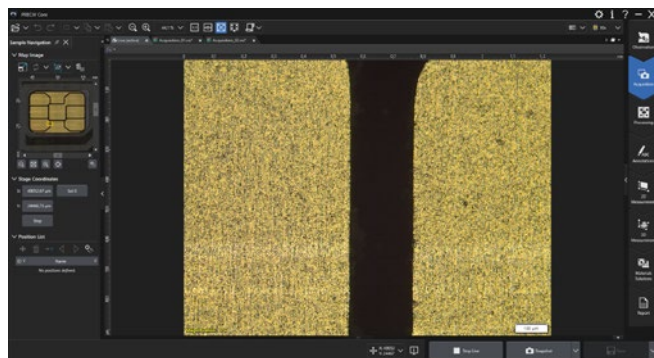The user interface groups functions according to their purpose

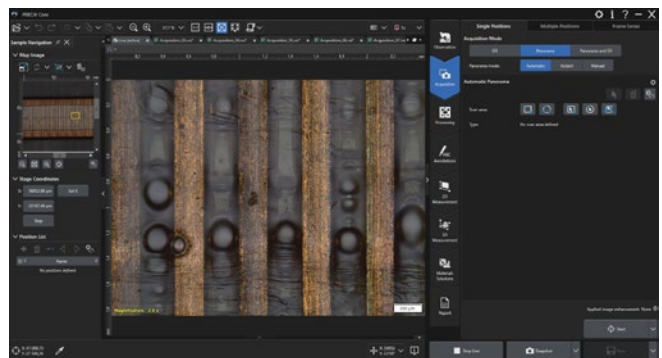Image acquisition layout—Sample Navigation

Image acquisition layout—automatically acquire panorama images

For Digital Microscopes	For Conventional and Digital Microscopes

PRECiV DSX

PRECiV DSX

PRECiV DSX enables you to fully control our DSX1000 series digital microscopes and their accessories. The software contains additional features for imaging and 2D/3D measurements.

PRECiV Desktop

PRECiV Desktop

The desktop version of PRECiV software is made for customers who want to post-process their data independent from the microscope with all the available measurement and analysis capabilities, but without the camera and image capture controls.

PRECiV Add-Ons

PRECiV Extras

Some tasks require additional analysis tools and often need to meet one or more of a number of national and international norms and standards. The PRECiV Add-Ons offer this and more, all accessible via the familiar PRECiV interface.

Requires Minimal Training

For new users, the advanced settings remain hidden, keeping the interface uncluttered. Experienced users can press the 'more' button to access all available features and functions. The home screen can be customized, enabling you to quickly access the functions that you use most often. When you turn on the software, the live image starts automatically, so you can get right to work.
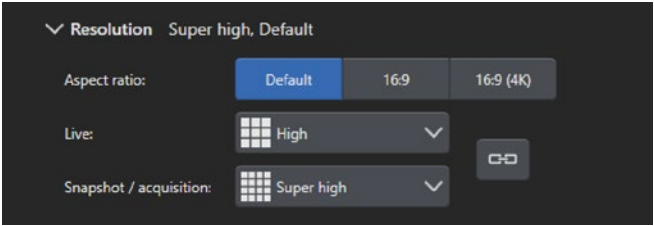

Easy-to-use functions make controlling the live image conditions simple and efficient
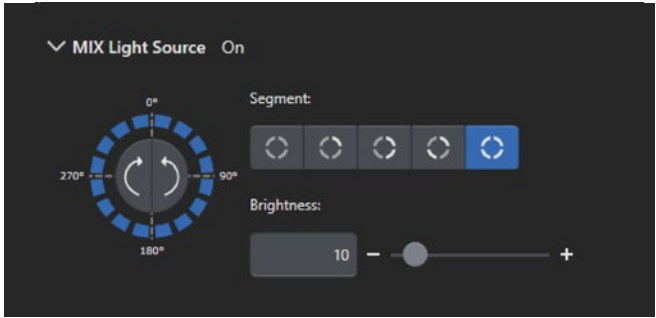

Powerful Imaging Filters

PRECiV software has a variety of useful filters for edge detection, smoothing, and other purposes. For example, the Separate Objects filter, DCE (Differential Contrast Enhancement) filter, and Grayscale filter help make threshold settings and particle detection easier.
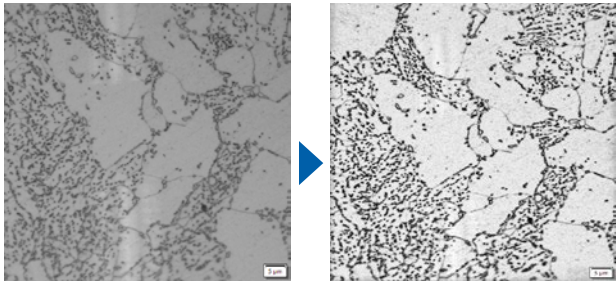
Enhanced contrast using the Differential Contrast Enhancement filter.
(Steel with intra granular corrosion)

Simple-to-Use Advanced Measurement and Analysis Tools

PRECiV™ software facilitates inspection, measurement, and analysis with a simple and reliable workflow. The software's dedicated 2D/3D measurement and analysis functions give you the tools to meet your production and inspection challenges. And PRECiV TruAI deep-learning technology offers image analysis beyond classical algorithms.
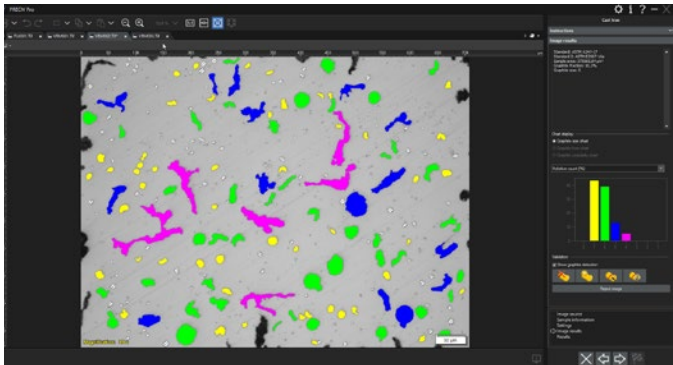
Efficient Report Creation

Creating a report often takes longer than capturing the image and taking the measurements. PRECiV software provides intuitive report creation to repeatedly produce smart and sophisticated reports based on predefined and customized templates. Editing is simple, and reports can be exported to Microsoft Word, Excel, or PowerPoint.
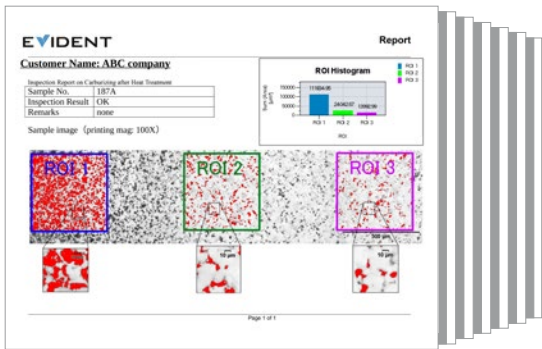

Professional report that summarizes particle count data, including image details using digital zooming
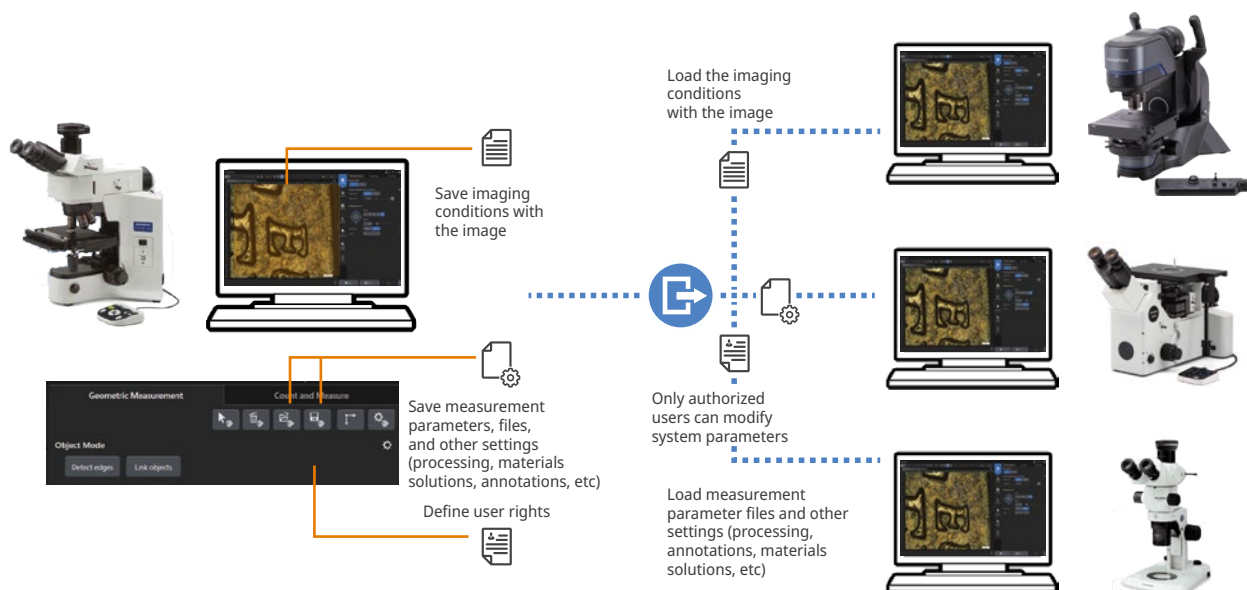
Guided Workflows for Compliant Measurements

With optional Materials Solutions, the software walks you through the steps required to acquire measurements that comply with the latest international standards. Selected Materials Solutions (Porosity, Phase Analysis, and Particle Detection) can be executed using TruAI™ Deep Learning Technology.

Materials Solutions workflows for applications like grain sizing and non-metallic inclusions guide users through the steps required to acquire measurements that comply with the latest international standards, including ISO, ASTM, and JIS.

Materials Solutions guide users through each step, from image acquisition to creating reports that comply with international standards
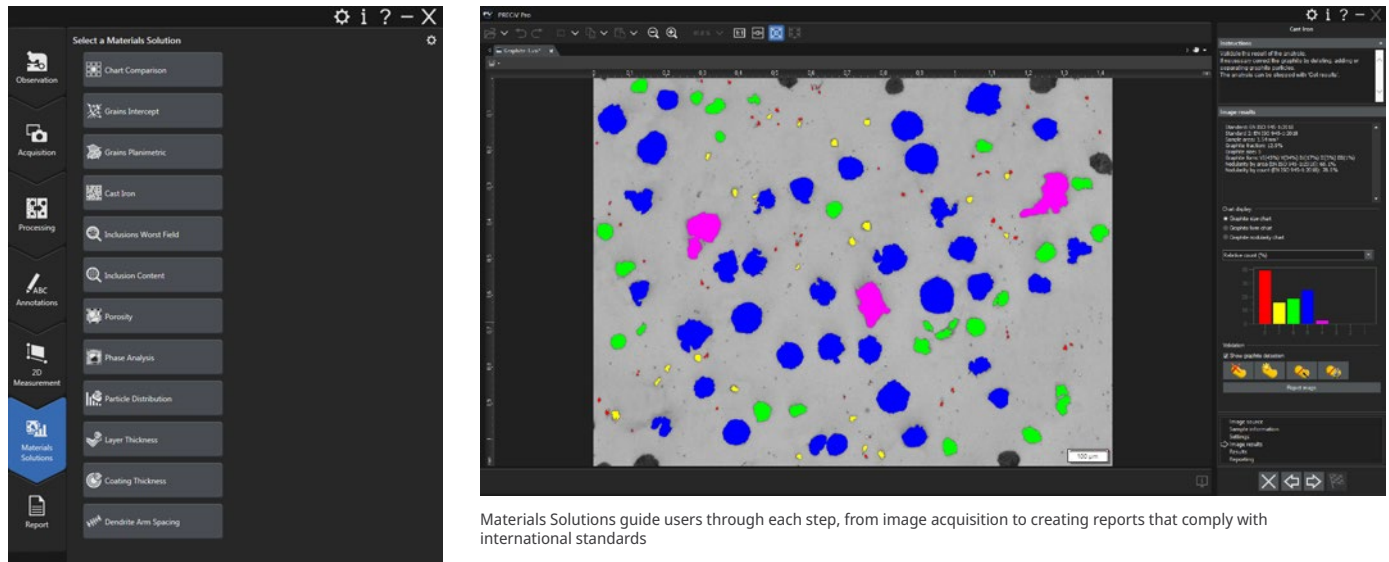
Connectivity that Enables Efficiency

With a connected workstation, you can easily save images and configuration files to the cloud or a network drive, receive automatic software updates and security patches, use a floating license, and upgrade to new versions. You can save and load images in multiple formats or save JPEG images with the calibration information for traceability. Sharing methods and configuration files—such as measurements, image processing settings, and materials solutions settings—between connected workstations makes it possible to get the right information in front of the right person quickly and easily.

Save imaging conditions with the image

Save measurement parameters, files, and other settings (processing, materials solutions, annotations, etc)

Define user rights

Load the imaging conditions with the image

Only authorized users can modify system parameters

Load measurement parameter files and other settings (processing, annotations, materials solutions, etc)

Sharing results and methods over your network improves results and reproducibility

Control Conventional Microscopy

The Capture, Core, and Pro packages work seamlessly with our manual and semi-motorized microscope systems, cameras, and accessories to enable a range of imaging conditions, including brightfield, darkfield, polarization, and anti-halation.

Easy Set Up

PRECiV Capture, Core, and Pro integrate your microscope, Evident camera, stages, controllers, focus drives, and accessories. When you install your PRECiV package, all the necessary drivers are also installed, making it easy to change which products you're using.
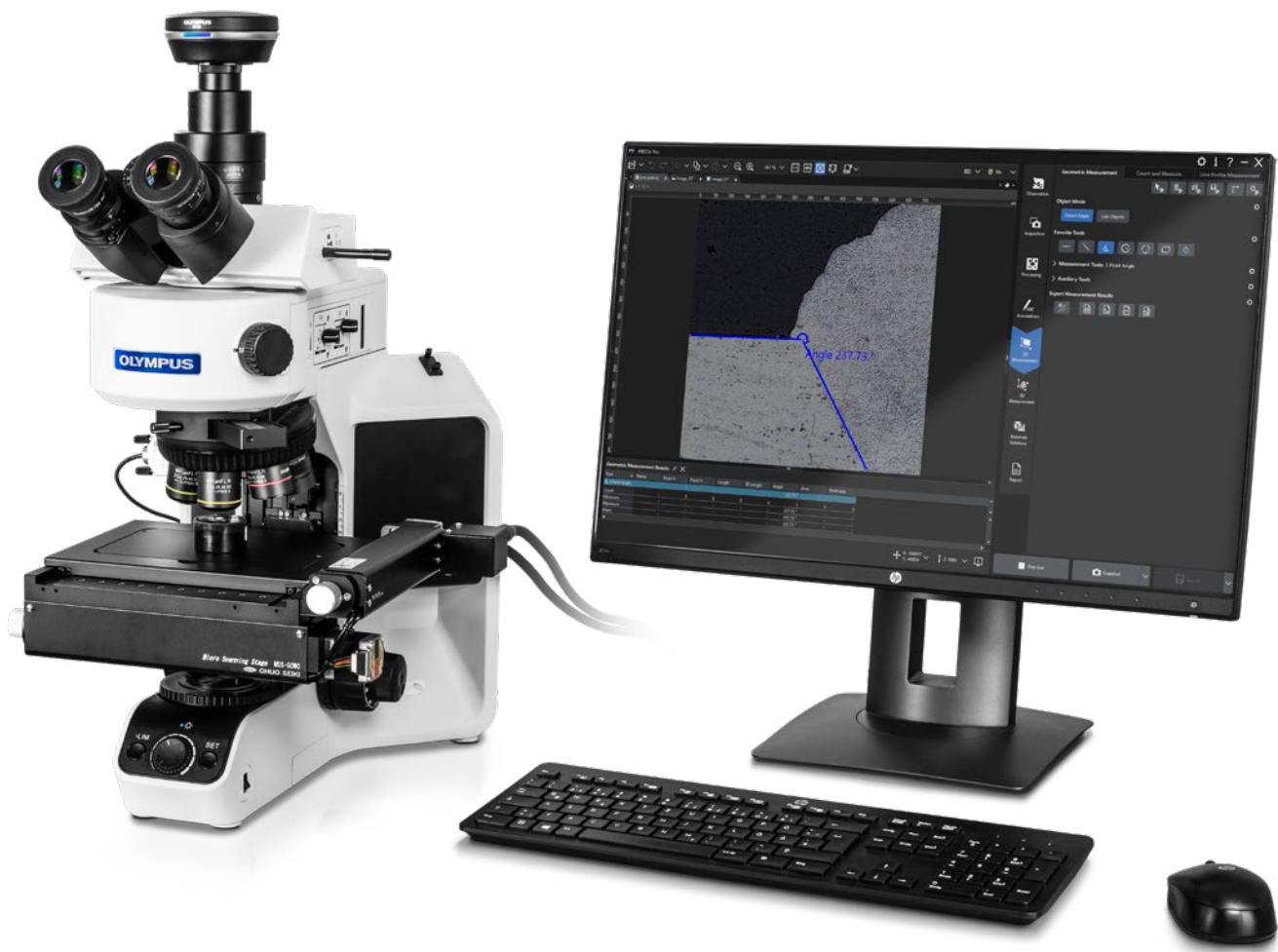
Supported Microscope Frames

PRECiV Capture, Core, and Pro support most of our conventional microscope frames.

Conventional
> BX41M-LED
> BXFM
> BX51
> BX51M
> BX53M
> BX3M-CB
> BX3M-CBFM

> GX41
> GX51
> GX53
> GX71
> MX63/
> MX63L
> MX51

Stereo
> SZ61
> SZX7
> SZX9

> SZX10
> SZX12
> SZX16

Supported Cameras

PRECiV Capture, Core, and Pro support our most popular digital microscope cameras.

	Outstanding Performance	Best Lateral Resolution	High-Quality Inspections with 4K	High-Quality Images	Monochrome Images	Excellent Cost Performance	For Infrared (IR) Observation
	DP75	SC180	DP28	DP23	DP23M	LC35	HAMAMATSU C12471-03
Image Sensor	1.1 inch	1/3 inch	1 inch	1/1.8 inch	1/1.8 inch	1/2.5 inch	2/3 inch
	Color CMOS	Color CMOS	Color CMOS	Color CMOS	Monochrome CMOS	Color CMOS	Monochrome InGaAs
Pixel Density (megapixels)	12–49	18.1	8.9	6.4	6.4	3.5	640 × 512
Pixel Size (µm)	3.45 × 3.45	1.25 × 1.25	3.45 × 3.45	2.4 × 2.4	2.4 × 2.4	2.64 × 2.64	20 × 20
Frame Rate (fps)	60–22	59–10.5	64–32	60–45	60–45	40–19	60
Connection	USB 3.1. Gen 2	USB 3.0	USB 3.1 Type-C	USB 3.1 Type-C	USB 3.1 Type-C	USB 3.1 Type-C	USB 3.0
Windows 10/11—64-bit	Y	Y	Y	Y	Y	Y	Y
Special Features	Switchable IR-cut filter	Focus Peaking, Smart Image Averaging	Global Shutter	Rolling Shutter	Rolling Shutter	Rolling Shutter	Peltier Cooled
ADC* *Analog-to-digital converter; the actual bit depth of the camera depends on the software used.	10-bit	12-bit	10-bit	10-bit	10-bit	10-bit	14-bit
Observation Bright conditions (e.g., brightfield)	●	●	●	●	●	●	-
Low-light conditions (e.g., darkfield, polarized light, DIC observation)	●	●	●	●	●	-	-
Very dark light conditions (e.g., fluorescence)	●	-	-	-	●	-	-
IR	● Up to 1000 nm	-	-	-	● Up to 1000 nm	-	●
Measurement / Analysis Find minute differences at low magnification	●	●	●				
High-accuracy measurement/analysis	●	●	●	●		-	
Thresholding analysis (B/W mode)	●	-	●	●	●	-	●

Supported Motorized Devices

Using the optional motorization module, PRECiV Core and Pro software can control several third-party X, Y motorized stages and third-party motorized Z focus drives for advanced image acquisition.

	CHUOSEIKI	LUDL	MÄRZHÄUSER	PRIOR
Electronics	QT-ADM3 [RS-232]	MAC6000 [RS-232 or USB*]	TANGO [RS-232 or USB*, PCI-e]	PROSCAN 3 [RS-232 or USB*]
BX3M X,Y Stage	MSS-50C-OB 50 × 50 mm MSS-50WC-OB 100 × 50 mm	96S100 100 × 75 mm (+Adapter)	SCAN 75 × 50 SCAN 130 × 85 SCAN 225 × 76	H101BX 114 × 75 mm
MX63 / MX63L X,Y stage	MSS-150C 150 × 150 mm MSS-300C 300 × 300 mm	99S103-6-LE 204 × 204 mm (+Adapter) 99S105-6-LE 305 × 305 mm (+Adapter)	SCAN 200 × 200 SCAN 300 × 300	H105 154 × 154 mm H112 302 × 302 mm
GX53 X,Y Stage		96S106-O3-LE 120 x 100 mm	SCAN IM 114 × 70	H117 114 × 75 mm
Motorized Focus Drive	MSS-FM1	96A404	MFD-2 (BX3M only) MFD	PS3H122R

* Virtual COM port [driver needs to be installed, supplied on the PRECiV setup disk]

Designed for Conventional Microscopy

The software supports brightfield, darkfield, MIX (directional darkfield), polarization, and differential interference contrast (DIC) for advanced imaging, while its robust color rendering and resolution provide the high-quality images required for industrial applications. It also has convenient tools that enable you to optimize the live image, including live high-dynamic range (HDR), a digital reticle, a focus aid, optional video recording, and time-lapse acquisition.
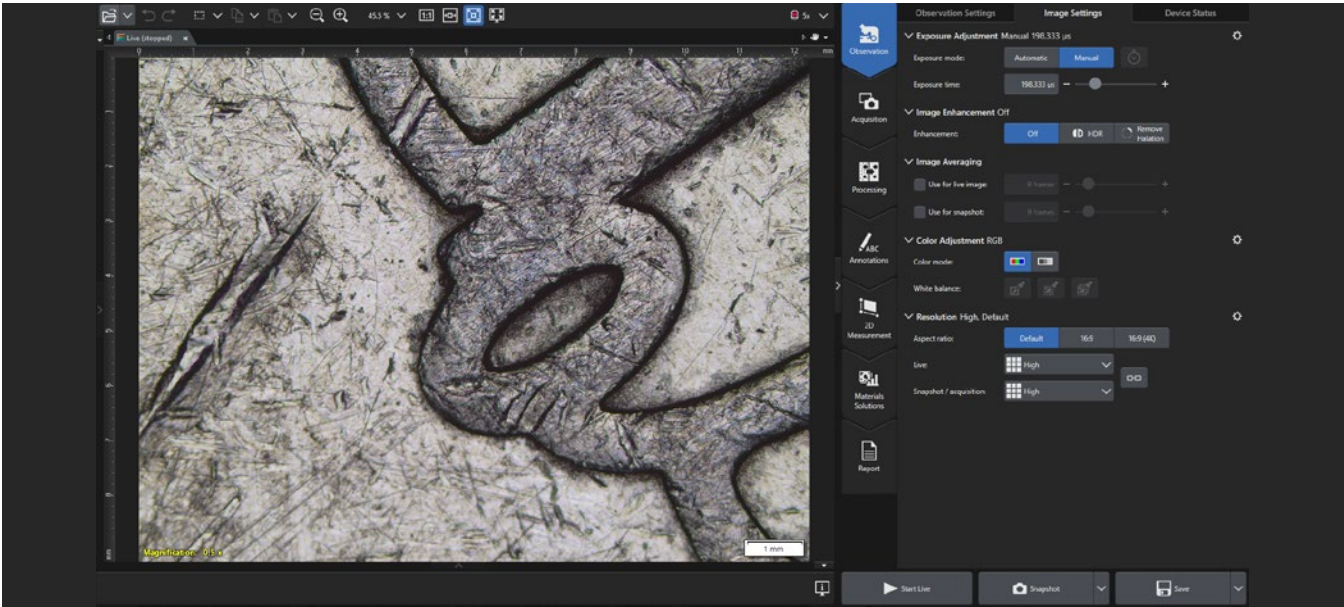
Control the live observation conditions for outstanding images

Image Acquistion in Real Time

All PRECiV packages comes with digital live processing technology so that you can perform many operations on the live image. For example, zooming into the live image enables you to proof the details, and interactive measurements can be completed quickly.

Acquiring high-quality, high-resolution images using PRECiV Capture, Core, or Pro is easy thanks to automatic exposure control, live histogram display, and an over-exposure indicator that helps ensure that the camera's entire dynamic range is used while minimizing blooming and glare. The focus indicator enables users to select a region of interest and bring it into focus. The digital zoom—operated with the mouse wheel—makes it easy to quickly check the live image window to be sure that the camera will capture the desired details before you acquire the image. As a result, the images have maximum fidelity and reproducibility independent of the user.

Image of a coin: acquired with the DP75 camera in a single image

Resolution and Color Fidelity

True-to-life images are important for reproducible and high-quality images measurements. Excellent spatial resolution combined with a high pixel count exploit the full optical resolution of the objectives and enable small structures and details within the samples to be imaged, even with low magnification objectives. High-resolution images acquired with PRECiV enable users to make observations exclusively on screen without using the eyepieces, making the system a truly digital microscope.
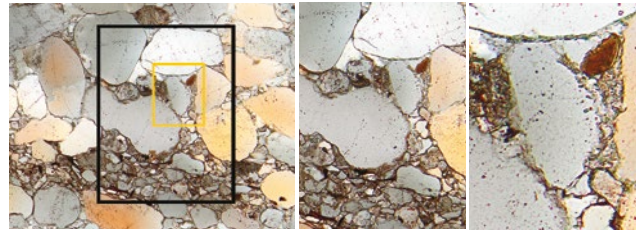
The low-noise, high-resolution images of an 8.9-megapixel sensor enable the user to zoom deep into the sample, revealing its structures (sandstone)

MIX Observation

PRECiV software supports MIX observation. This technique combines directional darkfield illumination, which uses a circular LED to illuminate one or more quadrants at a given time, and brightfield illumination, fluorescence, or polarization, enabling users to highlight defects and differentiate raised surfaces from depressions that are normally difficult to see with conventional microscopes. MIX observation helps reduce a sample's halation and is useful for visualizing a sample's surface texture.
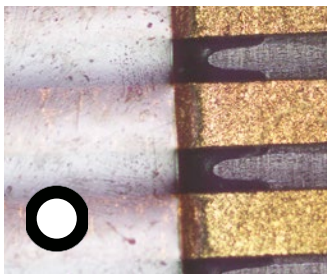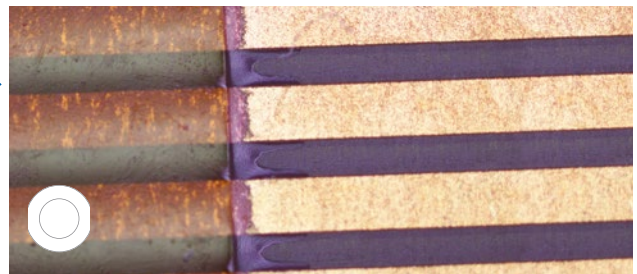

Brightfield

Darkfield

Conventional: brightfield shines the light straight down on the sample while traditional darkfield highlights scratches and imperfections on a flat surface by illuminating the sample from the side of the objective
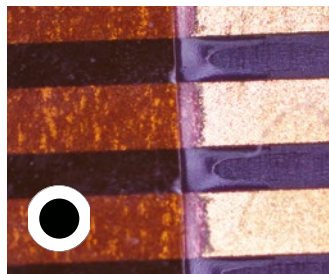

MIX: Brightfield + Darkfield

Advanced: MIX is a combination of brightfield and directional darkfield from a ring of LEDs; the LEDs can be adjusted to select which direction to illuminate from

Enhanced Contrast

High dynamic range (HDR) imaging improves image contrast in difficult conditions (very bright areas together with very dark areas in the same image). All cameras supported by PRECiV software can be used in this mode, and dedicated cameras have an available live mode.
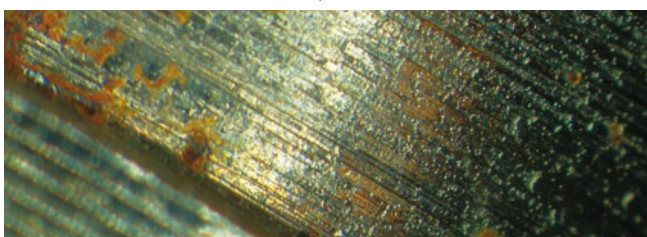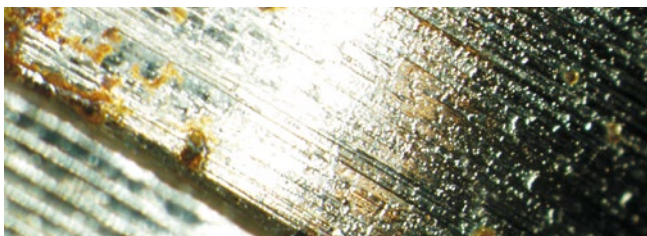
Clearly exposed for both dark and bright parts using HDR (sample: fuel injector bulb)

Reveal More with Infrared (IR)

IR imaging mode is a fundamental tool for quality control and in R&D laboratories. IR mode enables nondestructive inspection through silicon layers of packaged products during the back-end stage of fabrication. PRECiV has a dedicated shading correction mode for monochrome cameras.
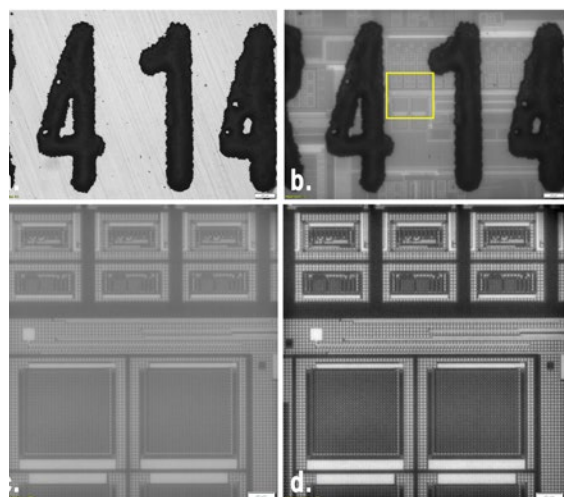

a. Brightfield image 5x, b. IR image 5x (BP1100 nm filter), c. Cropped detail 20x IR, d. Cropped detail 20x IR with DCE filtering

Digital Microscope Control

PRECiV DSX enables you to control DSX1000 digital microscopes. Using the software to control your digital microscope streamlines your inspection workflow with fast macro-to-micro viewing, multiple observation methods at the push of a button, and a large selection of lenses that are easy to change.
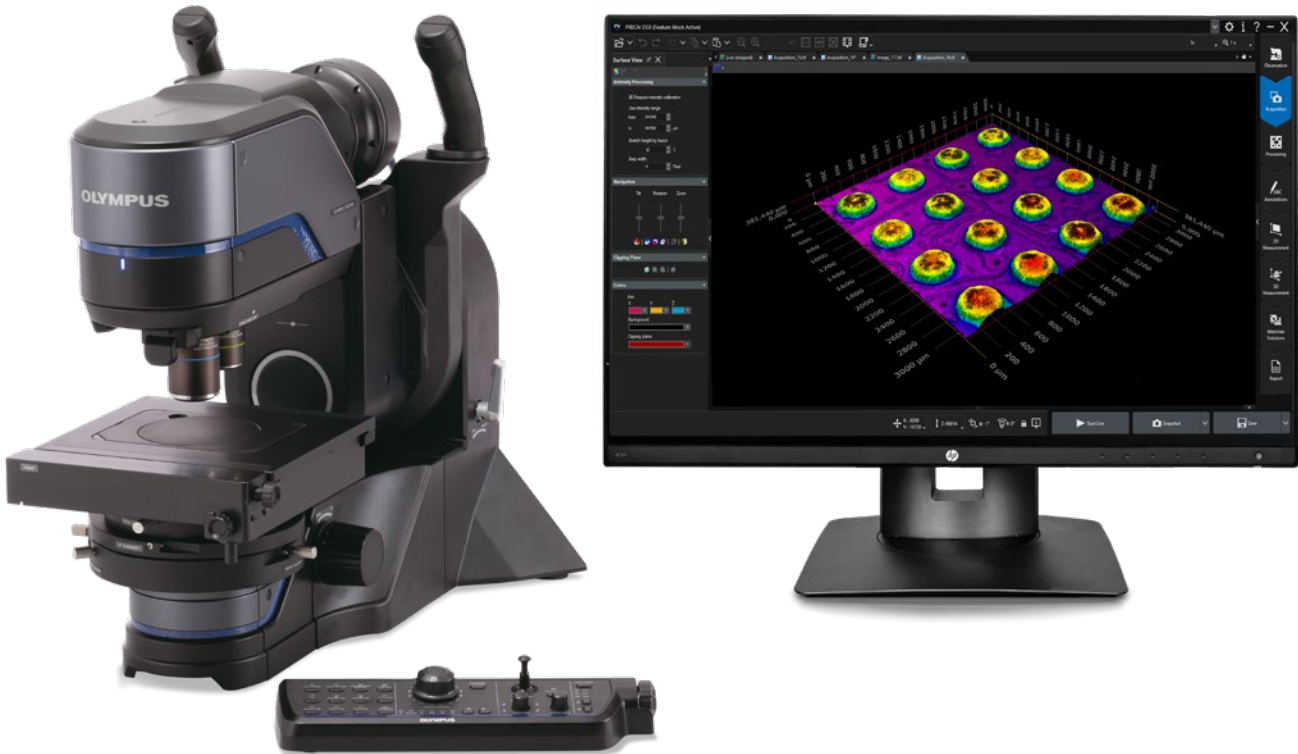
Supported Hardware (Frames, Zoom Heads, Stages, and Console)

PRECiV DSX works with all DSX1000 models, including the tilting (DSX10-TF) and upright frames (DSX10-UF), universal and standard zoom heads, the DSX console, and manual, motorized, and rotatable motorized stages.

| Entry Model	Tilt Model	High-Resolution Model	High-End Model
Easy to Use with Basic Functionality	See Your Sample from Many Angles	High-Resolution Images for Advanced Analysis	6 Observation Methods and Advanced Measurement Functions
Standard zoom head, offering 5 observation methods.	Offers all the features of the Entry model and adds a tilting frame, motorized XY stage, and console.	Universal zoom head adds differential interference contrast imaging, enhanced depth of focus, and high-resolution 3CMOS mode	Packed with advanced features, this model features the universal zoom head and adds a tilting frame and motorized XY stage with rotation (+ 90°).

Supports DSX1000 Objective Lenses and the DSX Console

There are 17 objective lenses available for the DSX1000, including super long working distance and high numerical aperture options. PRECiV DSX software supports the complete portfolio. The DSX1000 console is supported for all configurations.


Supports DSX1000 Best Image Observation

With a single click, PRECiV DSX can instantly display sample images captured using six different observation methods. Choose the image that works best for your sample, and the settings will automatically be configured to make the best out of that observation method.
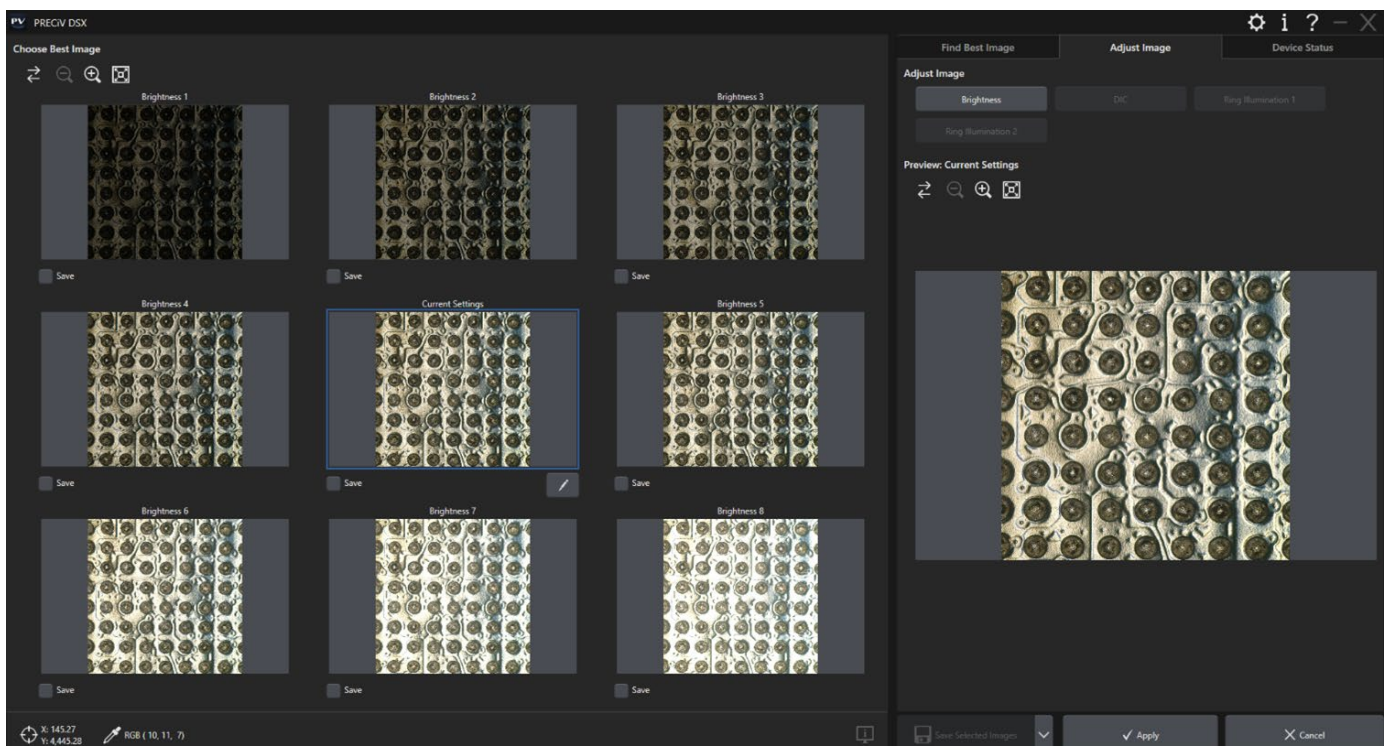
Automation by Motorization

PRECiV™ software enables you to control industrial and material science manual and semi-automated microscopes and motorized X, Y, Z devices. A dedicated user interface enables experienced users to efficiently control a motorized stage and focus drive to acquire time-lapse images, movies, or 3D stacks. Within the UI, you have direct access to:

› Image map functionality for full control of motorized stages
› Editable stage coordinate dialogues
› Position list and stage alignment
› Easy navigation between panorama/multiple positions or other modes
› Focus mode with automatic sample tilt correction using 3 points or the focus map technique
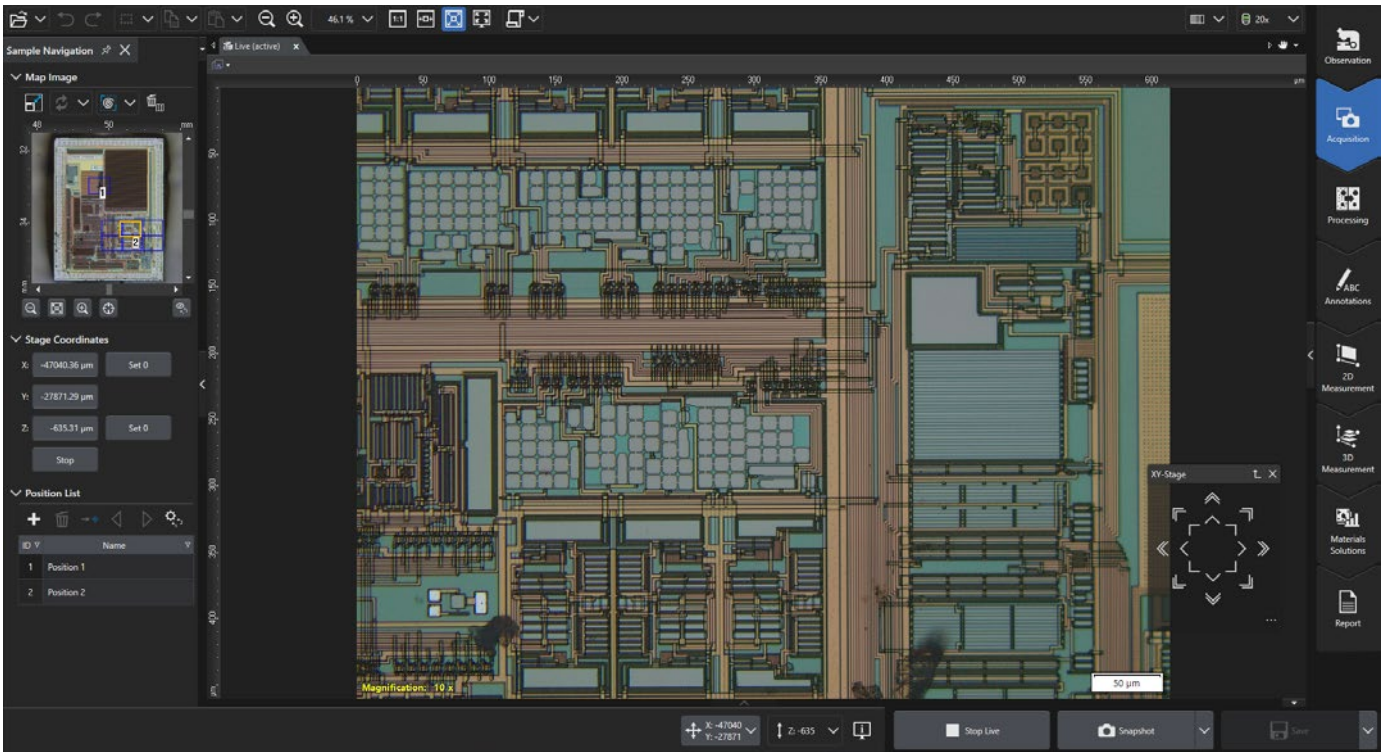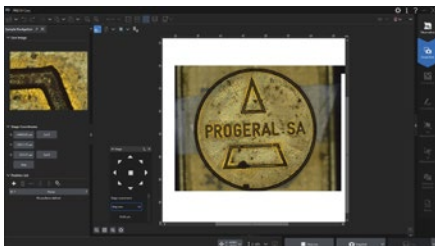


Acquire Combined Panorama and EFI Images

The extended focal imaging (EFI) function enables you to obtain fully in-focus images by serially acquiring multiple images at different focal planes with manual and motorized devices. In the manual mode, the panorama function enables you to acquire images larger than the microscope's field of view by moving the stage across the sample manually or fully automated. Using PRECiV software, you can now combine the instant EFI and panorama functions — even for manual microscope stages— while keeping both hands on the microscope. A colored frame indicator shows the quality of each image being stitched together, while a split screen shows the live image and stitched image side by side. With motorized devices, the acquisition of such combined panorama and EFI images runs completely automatically.
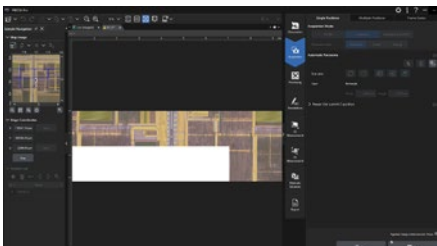
Easily access panorama mode to automatically or manually acquire panoramic images

EFI enables you to quickly acquire all-in-focus images manually or automatically
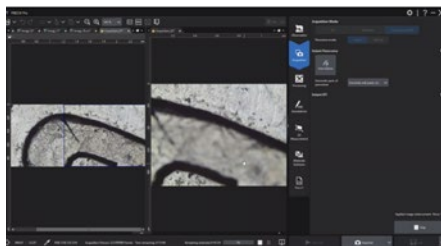
Combine the panorama and EFI functions to obtain large, fully in focus images
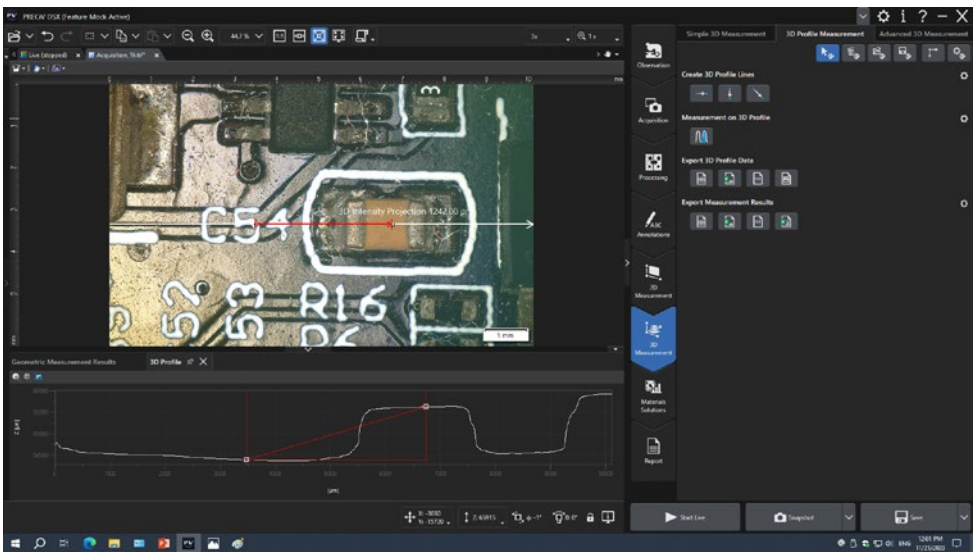
3D Solution

New materials, new techniques, and the drive toward nanotechnology demand higher standards of measurement and quality control. Without the appropriate tools for 3D imaging, it is impossible to quantitatively analyze images from a sample. The PRECiV 3D solution provides coded and motorized Z-control with height mapping capabilities to measure height profiles on a three-dimensional sample.
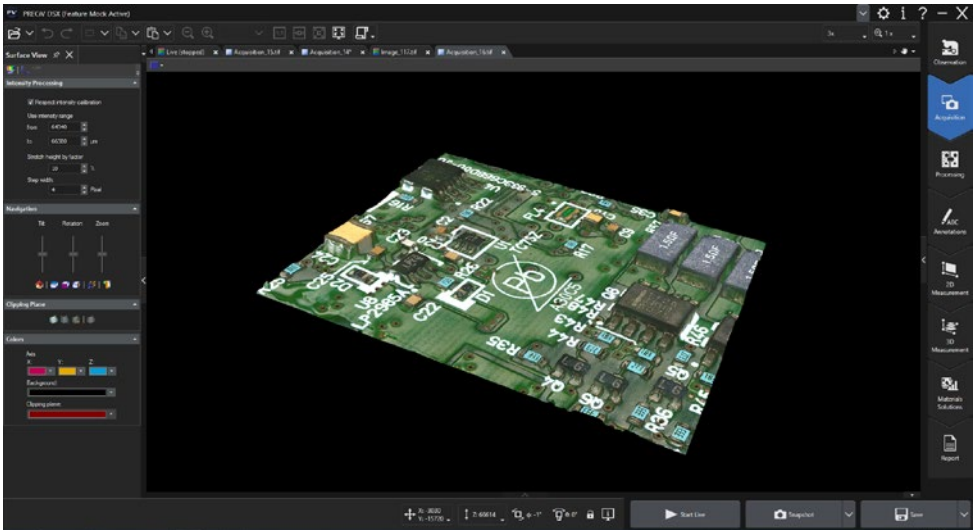

3D surface view

3D profile measurement

Customized Software Solutions Supporting X,Y,Z Motorized Stages

The following solutions were specially developed for X,Y,Z motorized stages.

| Macro to Micro	Navigate on Wafer	Measuring with Stage
Take advantage of your X, Y, Z motorized stage		
Detect structures from an overview image and transform their outline into a scan area for acquisition at higher magnification and further processing.	Define points of interest on a wafer and navigate to various points for image acquisition. Reposition the sample, apply three-point alignment, and navigate using the row and column index on wafers with dies.	The coordinates from a motorized or coded stage are read to set the start and end points of an individual length measurement. The result of the 2D measurement includes the X, Y, Z positions.

Advanced Measurement and Analysis
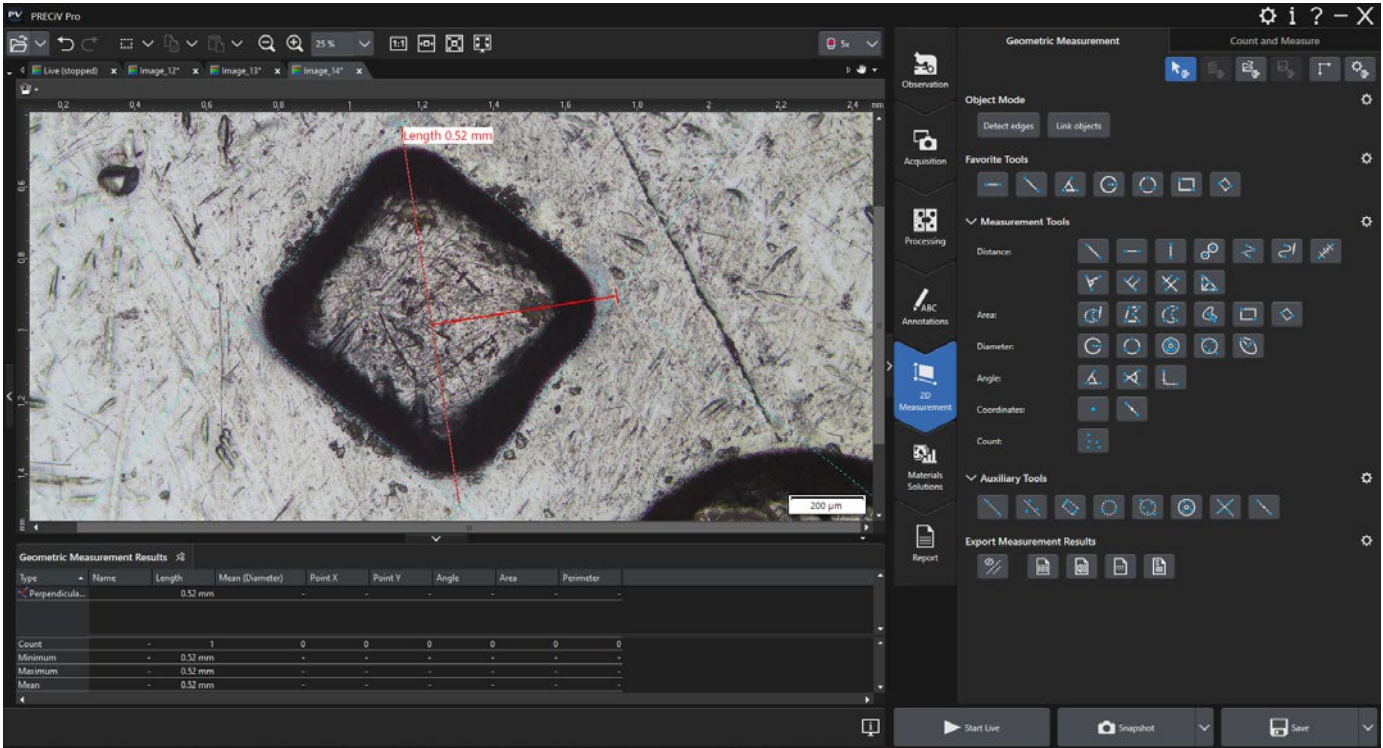
Helpful measurement functions include auto edge detection, edge-detected circles, and auxiliary lines

Repetitive 2D Measurements

PRECiV™ software enables precise, repetitive two-dimensional measurements on a live or recorded image through a combination of a simple user interface and powerful functions like auto edge detection, which makes it easy to reliably measure the distance between points. Other helpful measurement features include:

> Edge-detected circles
> Magic wand for automatic area detection
> Auxiliary lines* to easily make complex geometric measurements
> The ability to link objects to connect existing measurements
> Measurement results can be compiled in a workbook and easily exported to Excel
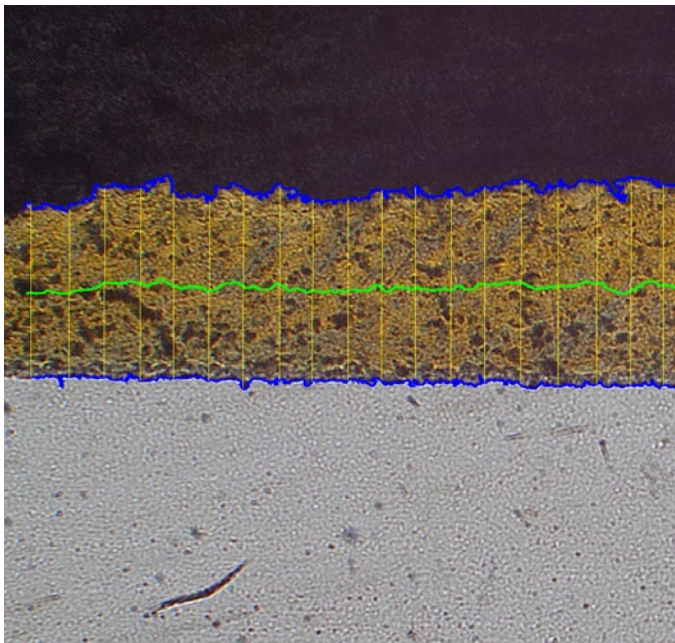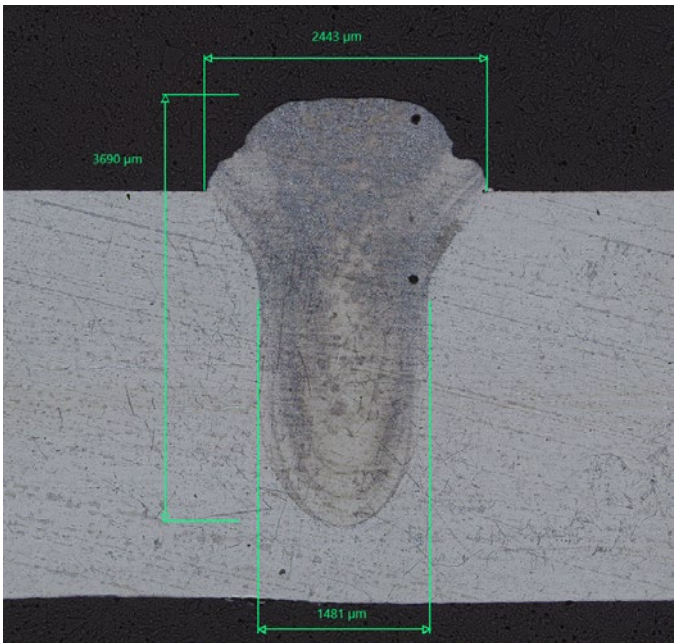
Automate Repetitive Tasks with Macros

The PRECiV™ macro manager supports macros to automate repetitive tasks and simplify workflows, including interactive measurements (chain measurement). Simple macros can be recorded and replayed, while an extended set of commands can also be recorded, including image processing with a neural network and create batch processing.
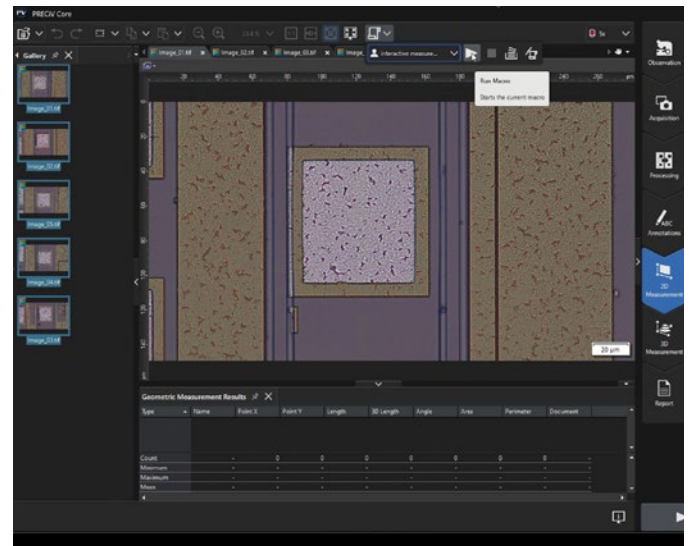
3D Roughness Analysis

PRECiV supports 3D line profile measurements, advanced 3D measurements, and surface roughness analysis of 3D images acquired with the DSX1000 using an analysis program we developed for our LEXT OLS5100 laser scanning microscope. The image is automatically transferred from PRECiV DSX to the 3D analysis application.
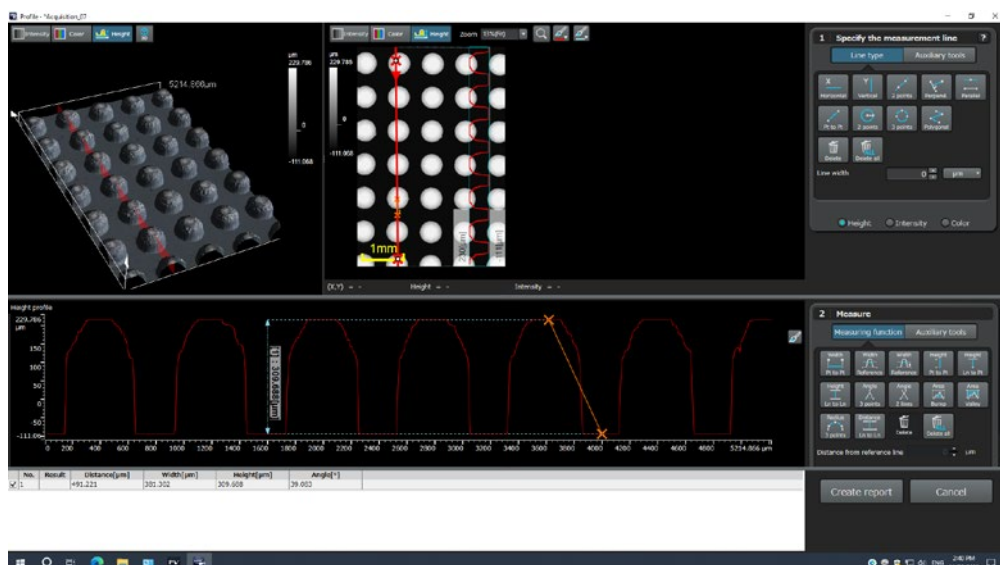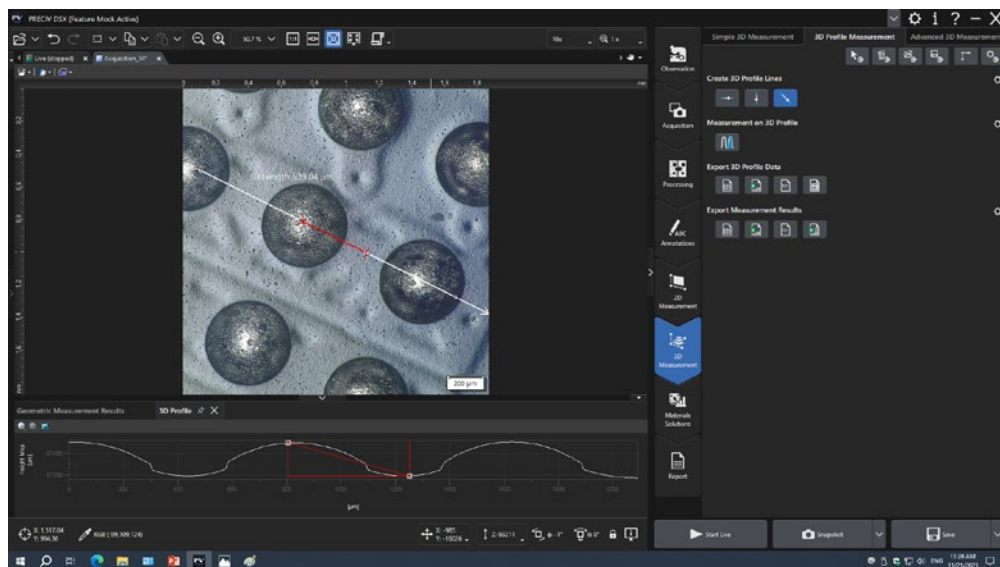

Simple 3D measurements (line profile) are available in PRECiV on all images with height information. For advanced measurements (e.g. surface roughness, volume measurement) PRECiV can export images directly to the 3D analysis application.

Easily Analyze Complex Images Using AI Technology

PRECiV software with TruAI technology offers image analysis beyond classical algorithms. You can apply a trained neural network to your samples for higher reproducibility and more robust analysis. Choose between semantic or instance segmentation methods for improved neural network training, enabling you to tackle difficult applications in just one step.
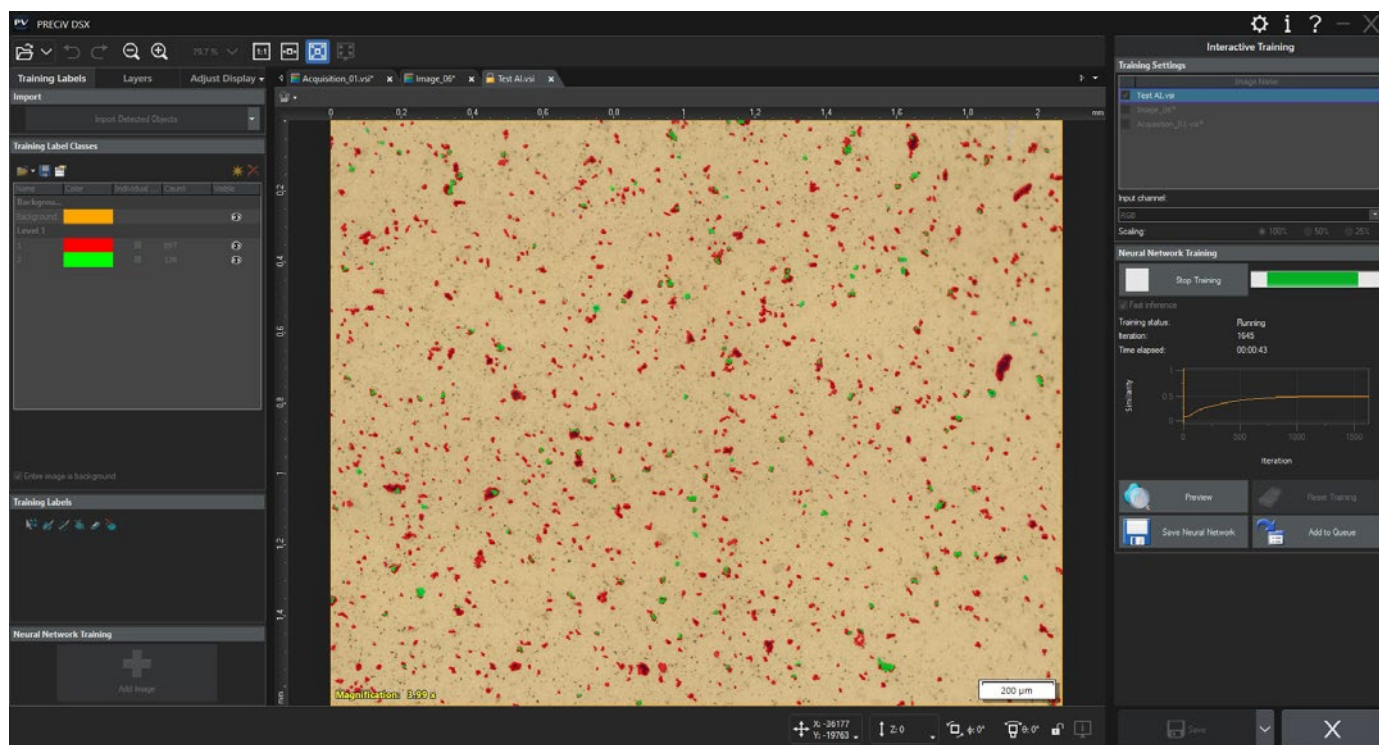
Live AI

PRECiV TruAI™ technology also supports Live AI, which uses a trained neural network (inference) to detect defects in your sample on the live image.* As an option, PRECiV TruAI technology can also count the defects it identifies on the live image as well.**

*Using the optional neural network training module.
**Using the optional Count & Measure or dedicated Materials Solutions (phase analysis, particle distribution, porosity).
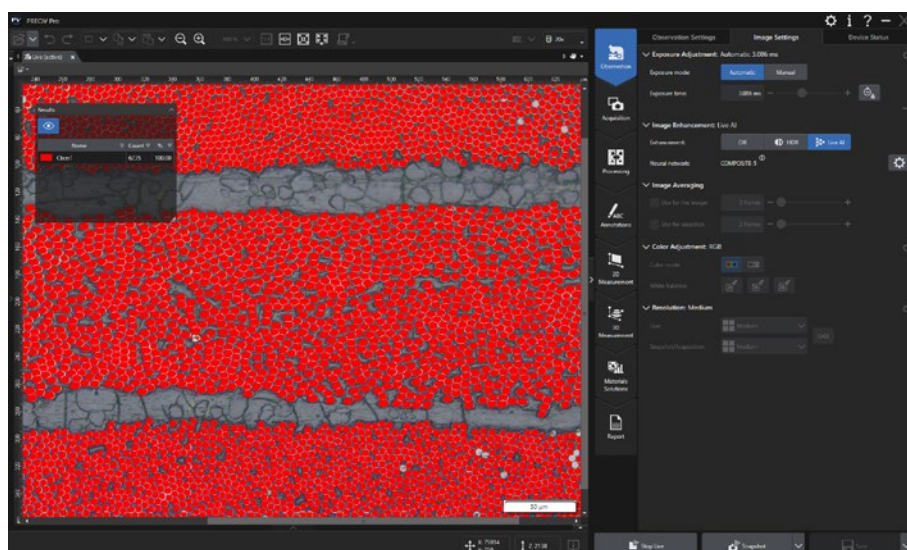
Neural Network Integration (AI)

› Ideal solution for demanding applications requiring complex image analysis
› Use trained neural networks for image segmentation in selected Materials Science solutions and Count and Measure
› Use trained neural networks to create a probability map for image feature discrimination
› Train neural networks using semantic (for well separated or when object separation is irrelevant) or instance
 (for objects that touch, like grains) segmentation methods
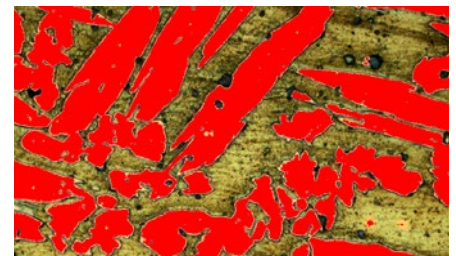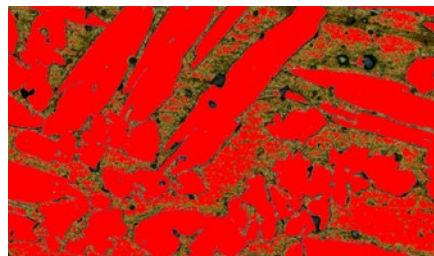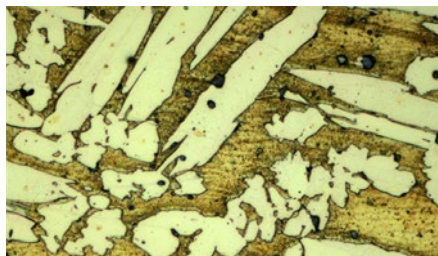
Multiphase analysis of composite materials is a typical industrial image analysis application using deep-learning technology.
After image deep-learning segmentation with PRECiV, different phases can be distinguished and detected accurately.
Combined with the PRECiV Count & Measure solution, users can easily extract repetitive and quantitative results out of the samples.
Left: original image of an etched copper. Middle: image segmentation using conventional thresholding methods. Right: deep-learning image segmentation

Count and Measure Solution

Detecting objects and measuring size distribution are among the most important applications in digital imaging. The PRECiV Count and Measure solution uses advanced threshold methods to reliably separate objects, such as particles and scratches, from the background. More than 50 object measurement and classification parameters are available, including shape, size, position, and pixel properties. Two classification parameters can be selected simultaneously. PRECiV software with the Count and Measure solution can also be used to support the DSX1000 digital microscope for particle analysis common to metallography evaluation and similar applications.

Data obtained: number of detected particles, individual measurement results, and class histograms.
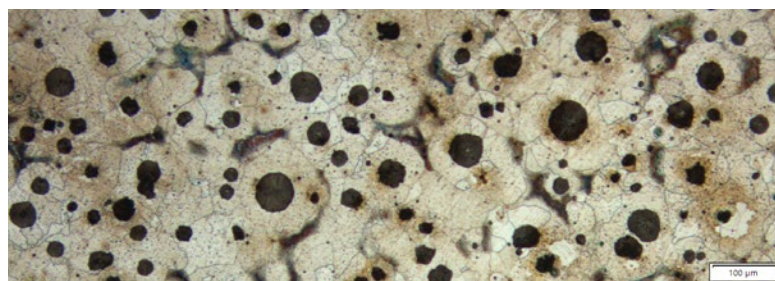
Cast Iron microstructure with spheroidal graphite
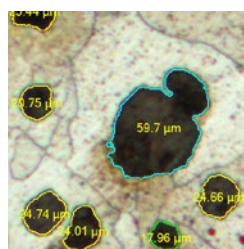
Pan and Zoom to a wrongly detected object

Manually select the object and automatically split it

Two objects are then properly measured

Solutions for Metallography

PRECiV™ software has guided workflows to streamline material science analyses. These step-by-step instructions enable reproducible and reliable results. A range of optional Material Solutions can be added with de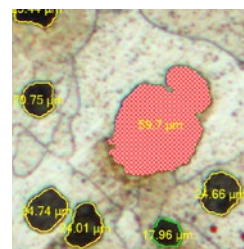dicated workflows for material qualification and evaluation. These solutions enable you to conduct an analysis according to common international standards (ISO, ASTM, JIS, and DIN) to check their quality before and after manufacturing processes.

Grain Size

For metals and ceramics, grain size is one of the most significant metallographic measurements due to its direct effect on mechanical properties. PRECiV™ software calculates the grain size number using standardized methods, such as:

Grain Sizing Using the Jeffries Planimetric Method

This solution is for manual ferritic or austenitic grain size measurement of steel. It gives a single averaged value using the different available standards: ASTM E 112-13 (2021), EN ISO 643:2020, DIN 50601:1985, JIS G 0551:2020, JIS G 0552:1998, GB/T 6394-2017, GOST 5639-82, ASTM E1382-97 (2015))
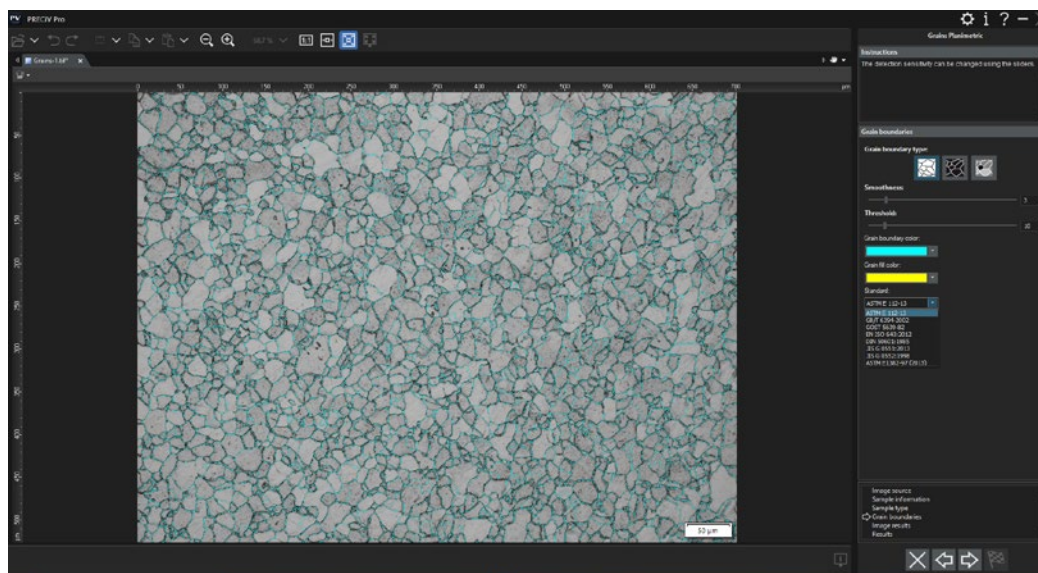
### Grain Sizing Using the Heyn Intercept Method

This solution is for automatic grain size distribution measurement on etched microstructures (it also works on aluminum microstructures) using the different available standards: ASTM E 112-13 (2021), EN ISO 643:2020, DIN 50601:1985, JIS G 0551:2020, JIS G 0552:1998, GB/T 6394-2017, GOST 5639-82, ASTM E1382-97 (2015)
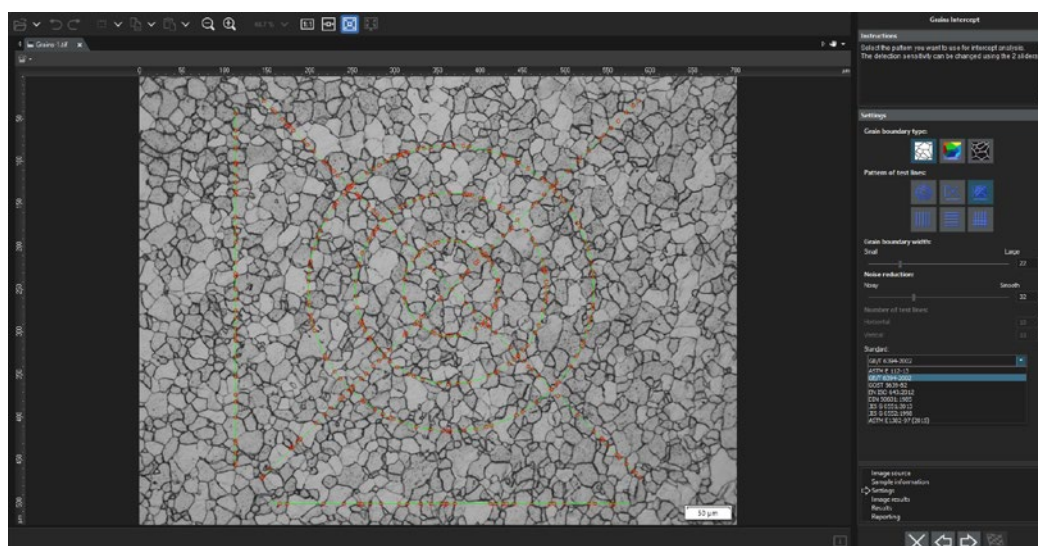
Grain Sizing Using the Chart Comparison Method

Easily compare live or captured images with autoscaled reference images. This solution includes reference images in each available chargeable set: ASTM E112:2010, ASTM E112:2013 (2021), ISO 643:1983, ISO 643:2012, DIN 50602:1985, ISO 945:2008, ISO 945:2019, SEP 1520:1998, SEP 1572:1971, SEP 1572:2019, EN 10247:2007, EN 10247:2017, and ISO 4505:1978.
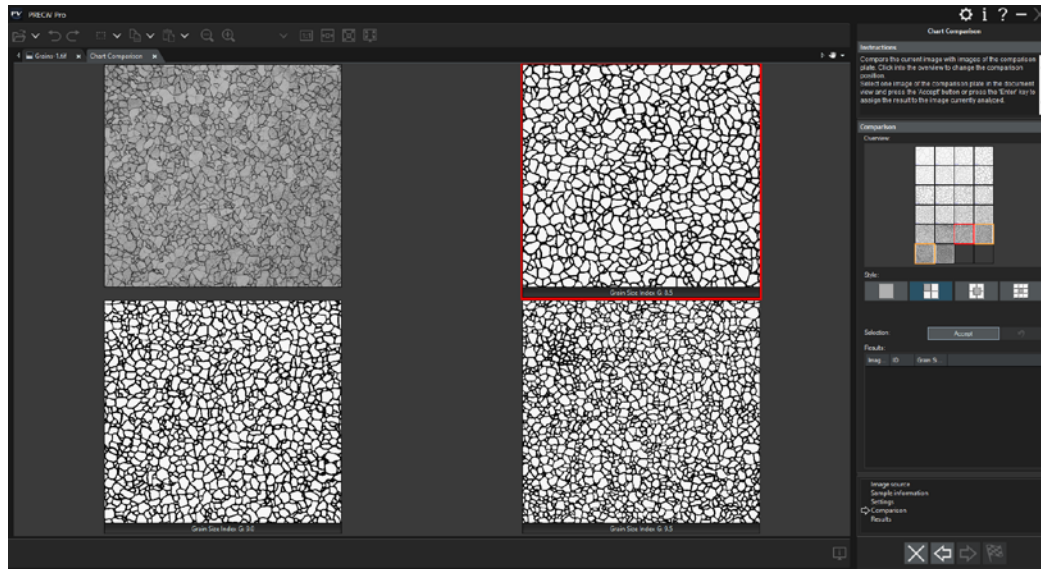
Graphite Nodularity Evaluation

In the metallographic laboratory, the task of analyzing cast iron for graphite nodularity, size, form, and distribution parameters, as well as the ferrite-to-pearlite ratio, is extremely important from a quality control perspective.

PRECiV™ software offers a workflow to analyze the following cast iron characteristics: graphite form, graphite distribution, graphite size, graphite nodularity, percent graphite, and percent ferrite to pearlite. (EN ISO 945-1:2019, ASTM A 247-19, JIS G 5502:2001, KS D 4302:2006, GB/T 9441-2009, ISO 16112:2017, JIS G 5505:2020 (compacted vermicular), NF A04-197:2017, ASTM E 2567-16a (for nodularity only)).
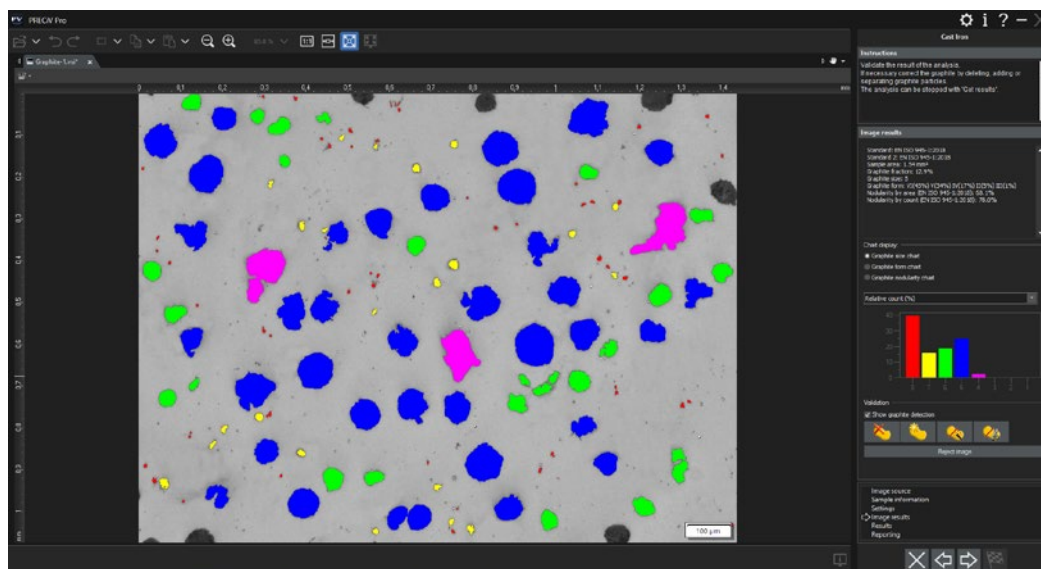
Rating Non-Metallic Inclusion Content in Certain Steel and Alloys

Nonmetallic inclusions (NMI) are compound materials embedded inside steel during the manufacturing process. Inclusions have a different chemical origin and give different mechanical properties to steel, such as formability, toughness, machinability, and corrosion resistance. As a general rule, the fewer or less severe the inclusions, the higher the quality of the steel. PRECiV™ software offers a guided workflow solution for nonmetallic inclusion rating in steel. This solution includes two different rating methods:

› Worst Field: ASTM E45-18a: Method A, ISO 4967:2013: Method A, EN 10247:2017: Method M, EN 10247:2017: Method P, EN 10247:2007: Method M, EN 10247:2007: Method P, DIN 50602:1985: Method M, JIS G 0555:2003: Method A, GB/T 10561:2005: Method A, UNI 3244:1980: Method A, SEP 1571:2017: Method M

› Average (Inclusion) Content: ASTM E45-18a: Method D, ISO 4967:2013: Method B, EN 10247:2017: Method K, DIN 50602:1985: Method K, SEP 1571:2017: Method K
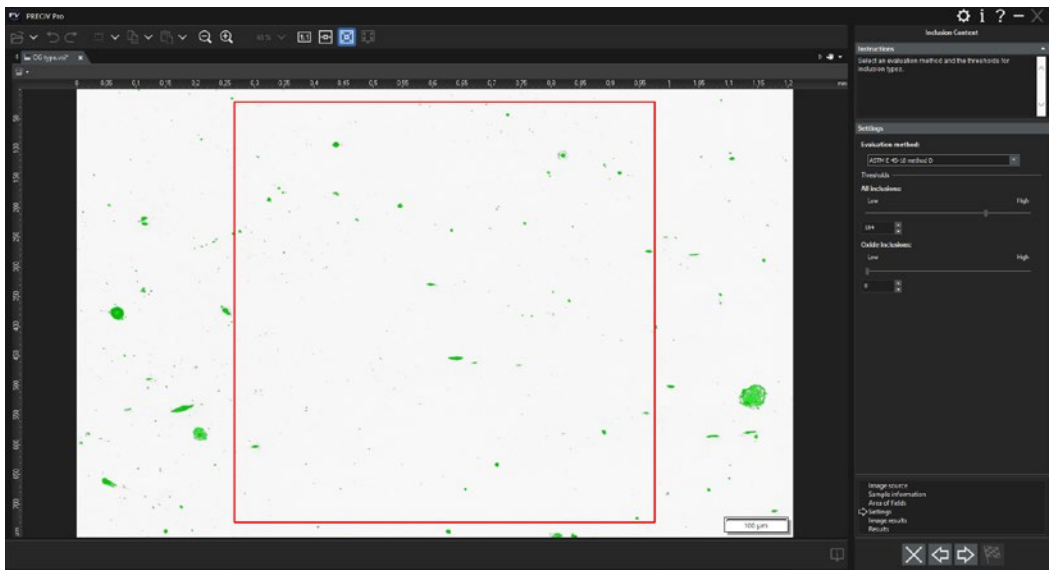
Layer/Coating Thickness Measurement

Many industries, such as automotive, aerospace, and oil and gas, use a multi- or monolayer coating as a protective layer against corrosion, fire, heat, stress, and ultraviolet (UV) light. Coatings can also be applied to add functional surface properties, such as waterproofing, and to fulfill decorative purposes, such as adding color and special texture to the surface. Producing a homogenous coating of a certain thickness is critical for product quality. PRECiV software offers a special workflow to measure coating layer thickness.
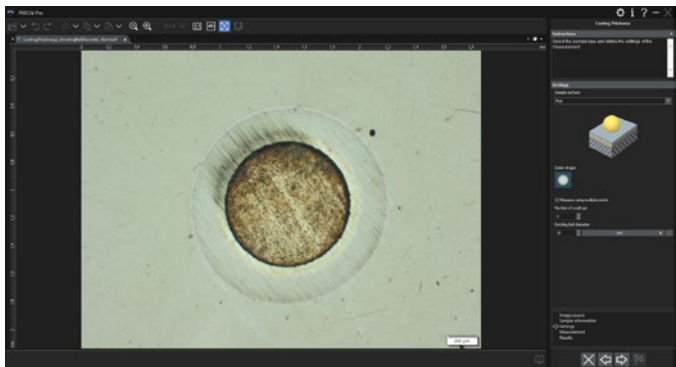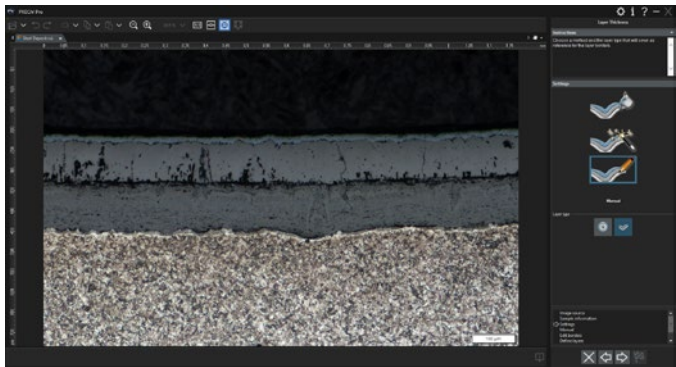
Particle Distribution

In many manufacturing processes, such as additive manufacturing, powder atomization, sintering, and powder metallurgy, or during cleanliness inspections a reliable analysis on powder particles is a crucial quality assurance step before starting the manufacturing process. PRECiV software offers a workflow for threshold-based and Neural Network -based detection and classification of individual particles with the creation of user-defined histograms . The analysis provides morphological information, such as area, perimeter, shape factor, and the minimum and maximum ferret diameter. The result also contains a distribution diagram.
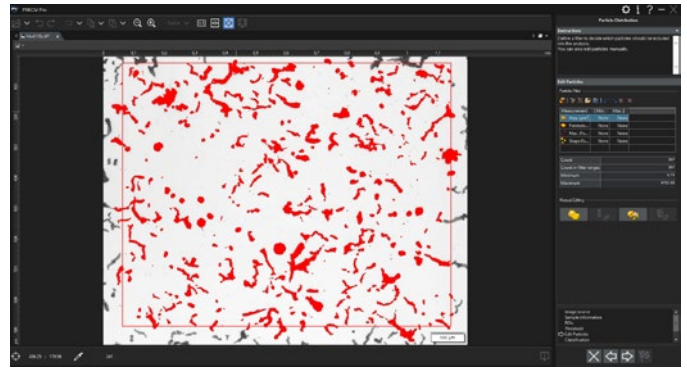
Phase Analysis

In many metal alloys, such as steel and cast iron, different phases can be seen in the microstructure. Phase analysis helps to quantify the ratio of the existing phases and provides important information for the materials scientist to make decisions about the manufacturing process, quality of the part, and post-processing steps, su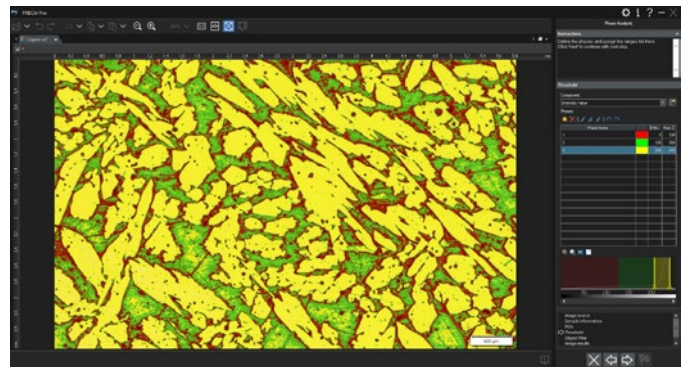ch as heat treatment. PRECiV software offers a reproducible workflow for phase analysis based on thresholding and neural networks.

Pore Fraction

Porosity is a persistent and common complaint of casting users. Porosity in casting parts can affect product quality, as well as component performance, design, and reliability. As a result, an accurate, reliable porosity analysis is essential. PRECiV software offers a reproducible workflow for porosity analysis based on thresholding and neural networks.
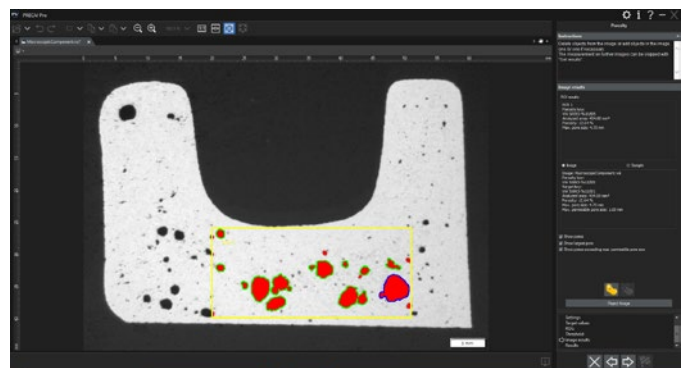
Dendrite Arm Spacing

Monitoring solidification time is a key factor for improving mechanical properties, such as tensile strength and elongation. The Dendrite Arm Spacing solution in PRECiV™ software automatically measures the mean secondary dendrite arm spacing in lightweight aluminum casting to monitor solidification time.
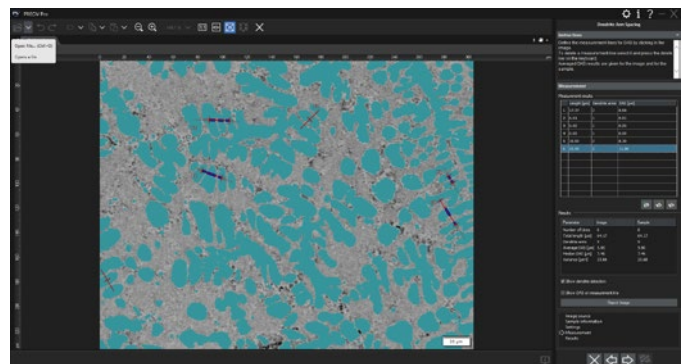
One Imaging and Measurement Software Solution for Manufacturing, Inspecting, R&D, and Quality

PRECiV™ is software designed for you. Whether you work in quality control, production, or material science, PRECiV software offers versatile, simple-to-use functions up to high-end techniques like artificial intelligence that enable you to:

› Acquire stitched images from multiple stage positions in panorama mode (with or without motorized support)
› See everything clearly in focus, even samples that exceed your focal depth, with the all-in-focus extended focus image (EFI) mode
› Record planar and height information
› Analyze your samples manually, semi-automatically, or fully automatically
› Take advantage of dedicated, ready-to-use workflows for multiple industries and industrial standards via dedicated materials solutions

Semiconductors

› Defect detection (materials solutions, macros, count and measure, neural networks)
› Packaging (2D measurement with edge detection, IR imaging)
› Wafer navigation—Define points of interest on a wafer and navigate to these points for image acquisition, simple 3-point alignment of multiple samples for reliable navigation to row and column index (on wafers with dies)
› Microscope control (reliable 2D measurements based on magnification calibration and compliant to international standards, edge detection measurement)
› Simple 3D measurements with coded or motorized Z
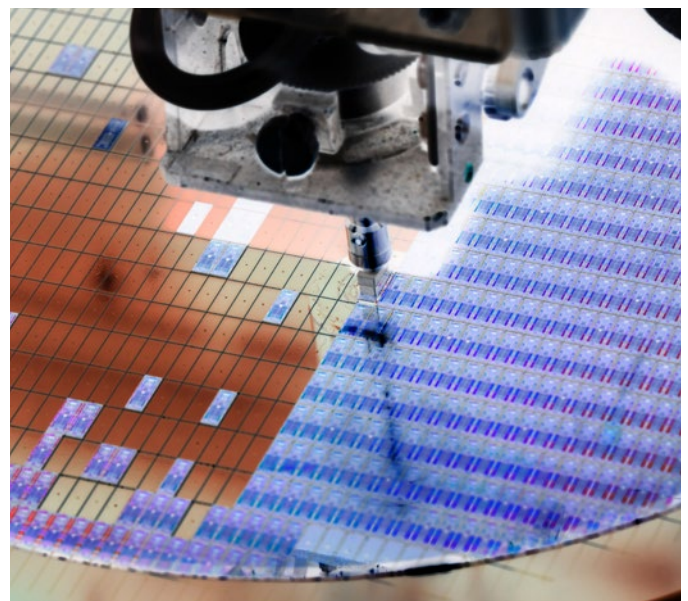
Electronics

### Printed Circuit Board Assembly

› Manual visual inspection for documentation with standardized and customizable reporting
› Extended focal imaging (EFI) to clearly image thick parts
› Micro sectioning (2D measurements, 3D measurements)
› Solderability and defect testing

Contamination Defect Testing

› Search for corrosion, degradation, metalization, or rapid deterioration of wire bond interconnects
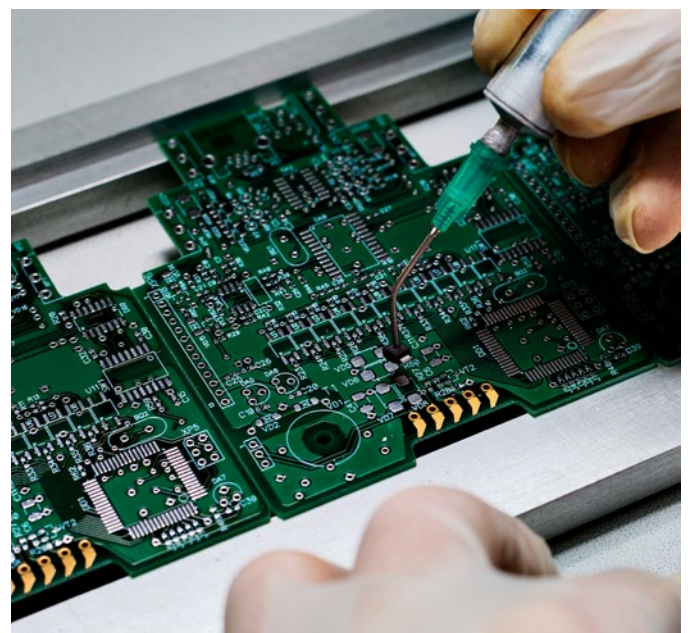
Metals

Macrostructural Analysis

› Test for macrostructural fractures of samples (grain flow, porosity, and cracks) using 2D measurements, materials solutions, panorama imaging, and EFI

Microstructural Analysis

› Simple parameter determination (grain size, coating thickness, cast iron nodularity, ferrite/pearlite ratio, phase analysis, count and measure, potentially supported with AI)
› Evaluate abnormalities, defects, and failure mechanisms (non-metallic inclusions, segregation, extent of carburization and decarburization)

Aerospace

Machined and 3D Printed Parts

› Validate quality (porosity) and document all individual parts in a standardized report

Carbon- or Glass-Fiber-Reinforced Plastics (CFRP or GFRP)

› Measure the fiber orientation in cross-sections (count and measure)
› Reconstruct large sections (automatic panorama and EFI with a motorized stage)

Pipes, Tubes, and Fluids

› Failure analysis searching for leakage (contamination analysis)

Automotive

Powertrain

› Examine all parts of the engine, transmission, and brake system (2D and 3D measurements, material validation, report creation)
› Inspect the transmission system (suspension, wheel barrel and brakes) in electric vehicles

Clips, Bolds, and Fasteners

› Quality control on parts produced by third-party suppliers

Welded Parts

› Weldment measurement and control (chassis, body)
› Coolers and heaters
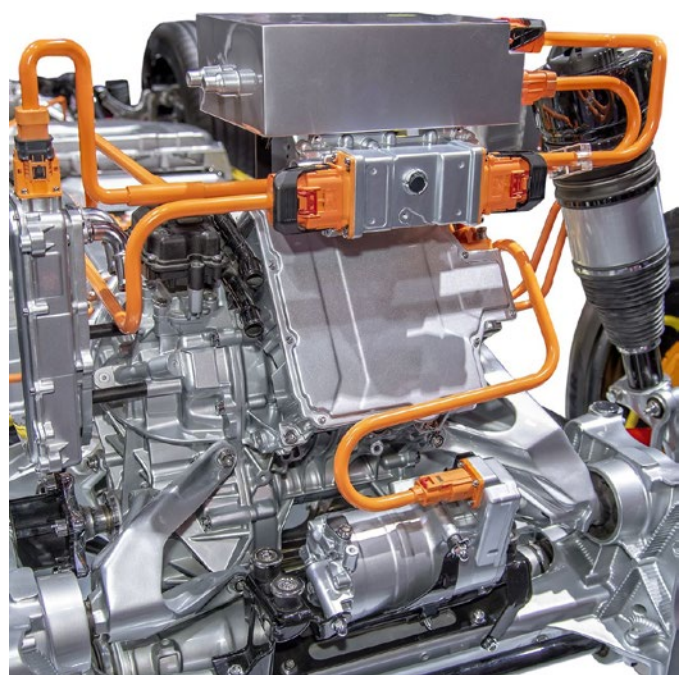
PRECiV™ Version v. 2.1.1 Specifications

●: Standard Feature; ○:Optional Feature; — Not available

	Capture	Core	Pro	DSX	Desktop
Image Acquisition					
Basic image acquisition from Evident cameras, including auto calibration	●	●	●	—	—
Extended image acquisition, including HDR, Live HDR (with the DP74 and DP75), and position navigator	●	●	●	—	—
Halation removal using the MIX slider (microscope) or LED ring light (stereo microscope)	—	●	●	—	—
Best Image Function (All Modes, Shadow Contrast, BF, OBQ, DF, MIX, PO, DIC)	—	—	—	●	—
Movie Recording	●	●	●	●	—
Time Lapse Acquisition	—	○	●	●	—
Extended Focal Image (EFI) using manual or instant mode	—	●	●	●	—
Large-size image acquisition (panorama) using manual or instant mode	—	○	●	●	—
Combined EFI and panorama using manual mode	—	○	●	●	—
Automatic EFI using Motorized Devices , including Quick scan mode	—	○	○	●	—
Automatic Panorama using Motorized Devices	—	○	○	●	—
Sample navigation and position list management using Motorized Devices	—	○	○	●	—
Combination of automatic EFI and Panorama using Motorized Devices	—	○	○	●	—
Image and customization tools					
User interface with functions grouped per purpose	●	●	●	●	●
Overlay information layer (scale bar, cross hair, digital reticle)	●	●	●	●	●
On screen magnification	●	●	●	●	—
Macro Manager	—	●	●	●	●
Static annotations	●	●	●	●	●
Live zoom	●	●	●	●	—
Measurements / Image Analysis					
Basic interactive measurements (horizontal line, vertical line, arbitrary line, polyline, 3-point circle, rectangle, rotated rectangle, 3-point angle, 4-point angle, perpendicular line, parallel line distance, polygon area, XY distance, distance between two crosslines, circle-to-circle distance, linear ruler, point coordinates)	●	●	●	●	●
3D Line profile measurement and simple 3D measurements	—	○	○	●	●
3D analysis applications like 3D line profile measurements, advanced 3D measurements, and surface roughness analysis of 3D images	—	○	○	○	○
2D Line profile measurements	—	○	●	●	●
Advanced interactive measurement, including auto-edge detection and auxiliary lines (angle ruler, 2-point circle, rotated ellipse, closed polygon, magic wand, interpolated polygon, multiple perpendicular lines, asymmetry lines, throat thickness)	—	○	●	●	●
Neural Network Labelling	—	●	●	●	●
Live AI	—	●	●	●	—
Offline EFI, Offline Panorama	—	○	○	●	●
Image enhancement filters (edge detection filters, smoothing filters, and sharpening filters), intensity and contrast adjustment, shading correction and background subtraction, dynamic contrast enhancement, morphological filters	—	●	●	●	●
Reporting					
Data export to an Evident workbook	●	●	●	●	●
Data export to Microsoft Excel	—	●	●	●	●
Report and presentation creation in Microsoft 365, Office 2019 and Office 2021	—	○	●	●	●
Device Support[*1]					
Evident microscopes[*2] and Evident cameras[*3]	●	●	●	—	—
3rd X,Y Motorized stages (LUDL, PRIOR, MAERZHAEUSER, CHUOSEIKI)	—	○	○	—	—
3rd X,Y Motorized Focus Drive (LUDL, PRIOR, MAERZHAEUSER, CHUOSEIKI)	—	○	○	—	—
3rd party SWIR camera	—	○	○	—	—
DSX1000 system and Console	—	—	—	●	—

●: Standard Feature; ○: Optional Feature; — Not available

	Capture	Core	Pro	DSX	Desktop
Optional Add-Ons					
Motorization	—	○	○	●	—
3D Acquisition	—	○	○	●	—
Count and Measure	—	○	○	○	○
Grain Sizing	—	○	○	○	○
Non-metallic Inclusions	—	○	○	○	○
CastIron	—	○	○	○	○
Layer Thickness	—	○	○	○	○
Porosity	—	○	○	○	○
Particle Distribution	—	○	○	○	○
Coating Thickness	—	○	○	○	○
Phase Analysis	—	○	○	○	○
Neural Network Training	—	○	○	○	○
Dendrite Arm Spacing	—	○	○	○	○
Chart comparison on select standards for grain size, graphite sizing, non-metallic inclusions, and hardened metals	—	○	○	○	○
Customized software solutions	—	○	○	○	○

1 Please contact Evident for supported device information
2 Supports BX41M-LED, BX51, BX51M, BX53M, GX41, GX51, GX53, GX71, MX51, MX63, MX63L, SZ61, SZX7, SZX9, SZX10, SZX12, SZX16, BX3M-CB, BX3M-CBFM, BXFM DSX1000.
3 Supports the LC30, LC35, DP22, DP23, DP23M, DP27, DP28, DP73, DP73 WDR, DP74, DP75, SC30, SC50, SC100, SC180, and UC90 microscope cameras.
4 Supports Chuoseiki: QT-ADM3, MSS-50C-OB, MSS-50WC-OB, MSS-150C, MSS-399C, MSSS-FM1; Ludl: MAC6000, 96S100, 96S109-LE, 96S103-6-LE, 96S106-O3-LE, 96A404;
  Märzhäuser: TANGO, SCAN 75x50, SCAN130x85, SCAN 225x76, SCAN 200x200, SCAN 300x300, MFD-2; Prior: ProScan 3, ES111, H101F, H105, H112, H117, PS3H122R;
  Objective Imaging: OASIS (Operation is not guaranteed, although the connection has been verified.)

PC Requirements for PRECiV Capture/Core/Pro/Desktop v. 2.1.1	
CPU	Intel® Core i5, Intel® Core i7, Intel® Xeon
HDD	10 GB hard disk space for installation Min. 50 GB for saving images and data
RAM	16 GB RAM (2 x 8 GB RAM) Special requirements to the memory for certain functionality: Training of neural networks: 32 GB RAM 3D Analysis Application: 32 GB RAM
Operating System	Windows 10 (64-bit), Windows 11 (64-bit); Editions: Pro, Pro for Workstations, Enterprise
.Net Framework	Version 4.6.2 or higher
Optimized resolution	1920 × 1080
License activation	Using an Internet connection or code-based
One-time migration from OLYMPUS Stream	Migration from former OLYMPUS Stream original licenses to selected PRECiV license
Graphics card	64 bit Graphics board with 2GB RAM Special requirements to the graphics board for certain functionality

PC Requirements for PRECiV DSX v. 2.1.1	
CPU	Intel® Core i5, Intel® Core i7, Intel® Xeon
HDD	10 GB hard disk space for installation Min. 50 GB for saving images and data
RAM	32 GB RAM (2 x 16 GB RAM) Special requirements to the memory for certain functionality: Training of neural networks: 32 GB RAM 3D Analysis Application: 32 GB RAM
Operating System (OS)	Windows 10 (64-bit), Windows 11 (64-bit); Editions: Pro, Pro for Workstations, Enterprise
.Net Framework	Version 4.6.2 or higher
Optimized resolution	1920 × 1080
License activation	Using an Internet connection or code-based
One-time migration from existing DSX1000 system	Migration from DSX-BSW-V1 and DSX-BSW-V2 to PRECiV DSX
Graphics card	64 bit Graphics board equivalent to NVIDIA Quadro P620 / T600 / T400 with 4GB RAM Special requirements to the graphics board for certain functionality: Training of neural networks: NVIDIA graphics board compatible with CUDA 11, 6GB RAM

PRECiV™ Advantages

Simple

> Simple-to-use imaging and measurement software

> Precise, repeatable 3D measurements

> Modern interface with the most used functions always visible

> Hide advanced functions to stay on task

Modular and Versatile

> Works with a wide range of imaging conditions using Evident and third-party products

> Control all Evident conventional manual microscopes

> Control all Evident digital microscope cameras

> Many software solutions updated to the latest standards

> 3D profile measurements and 3D analysis like surface roughness

Safe

> Meets the latest standards in cyber security

> Share data over your local network or Office 365 cloud

> Digital solutions for sharing methods

Efficient AI

> Optional Materials Solutions with dedicated workflows

> Includes advanced neural network training and programming

> Simple macro recorder for repetitive inspections

> Neural networks supported in selected Materials Solutions

Semiautomatic Inspection

> User-friendly functions and interface improve efficiency

> Integration of DSX1000 Digital Microscopes

> Supports third-party motorized hardware (motorized stages and focus drives)

> Motorization support for Materials Solutions workflows

EvidentScientific.com