CLEMEX

EXPLORING NEW POTENTIAL WITH MACHINE LEARNING

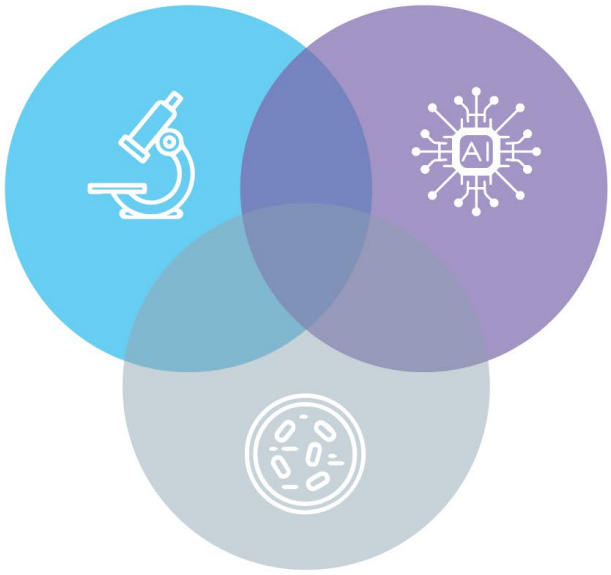
Customer-specific algorithms allow Clemex Vision to leap beyond traditional image analysis techniques.

Clemex Vision

Clemex Vision is a fully integrated image analysis system for labs seeking traceable, repeatable, and accurate results. This powerful microscope control system includes a great range of computer vision functions, catering for various applications in industry and research.

Automated Image Analysis

Take advantage of 30 years experience in developing routines for various applications in our reputed software



Artificial Intelligence

New instructions based on machine-learning algorithms are used seamlessly in Clemex Vision or upgraded software

Customer-developed Algorithms

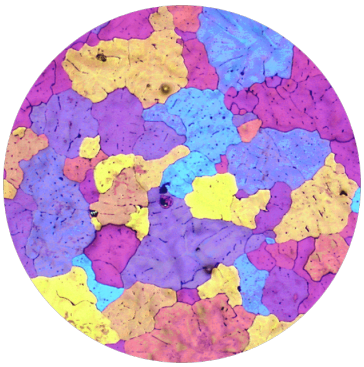
Clemex integrates, develops and optimizes Python code for customers who wish to use their own methodology

APPLICATION EXAMPLES

APPLICATION PACKAGES

These contain a number of pre-built routines for a certain type of application.

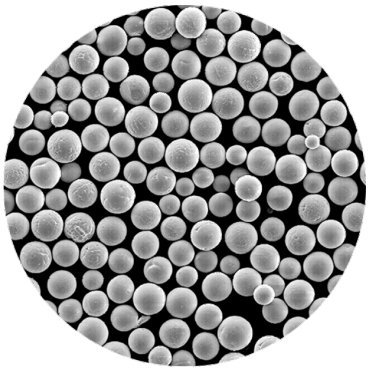
- Grain Size
- Layer Thickness
- Particle Sizing
- Phase Analysis
- Aluminum/Magnesium



CUSTOM APPLICATIONS

Image analysis routines are built using the extensive library of instructions or standard Python code. Previous projects include:

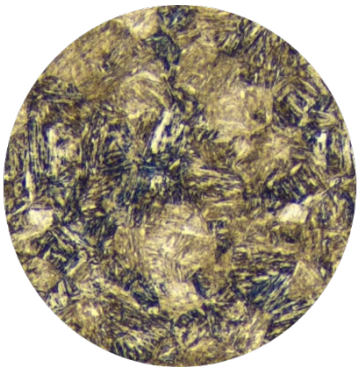
- Mean linear dendrite spacing
- Laser grooves on wafers
- Spherical powder size distribution



Source: Tekna

MACHINE-LEARNING BOOST

Development of analysis routines by our specialists now has the added advantage of machine-learning. Existing routines are reviewed and improved by our staff using the latest tools. Contact our team for more information **ai@clemex.com**.



Source: Universal Stainless

LATEST RELEASE

The advanced Grain Size Package now includes Martensitic and Austenitic Grain Size.

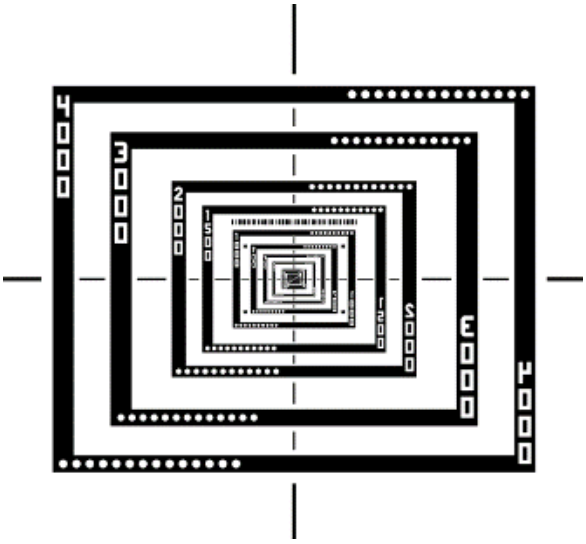
clemex.com/news

ACCURATE RESULTS

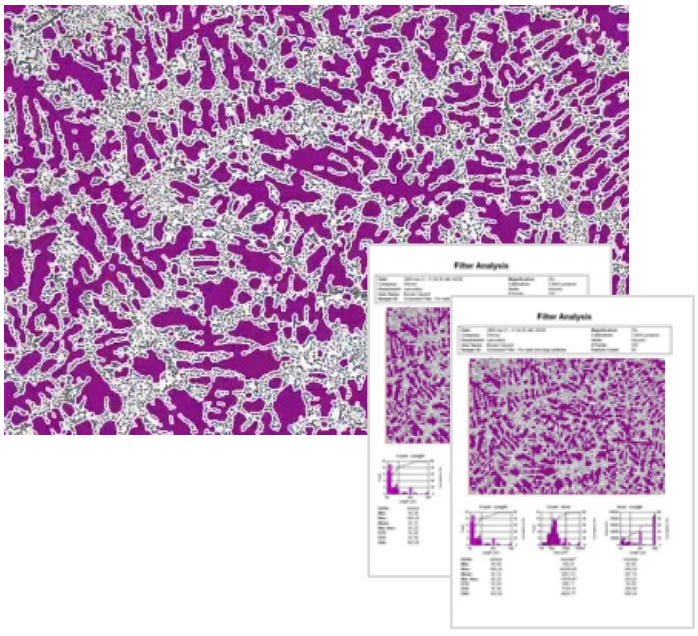
COMPLIANCE WITH STANDARDS

Regular system calibration is performed automatically using our NIST traceable stage micrometer to ensure accuracy and compliance with regulations and standards.

Refer to the specifications sheet for a list of metallographic standards and FDA requirements as per CFR 21 Part 11.



> “Clemex offers high quality products and professional services to industries and laboratories.”
>
> *Lorraine Blais, P.Eng.. – Solutions Novika*

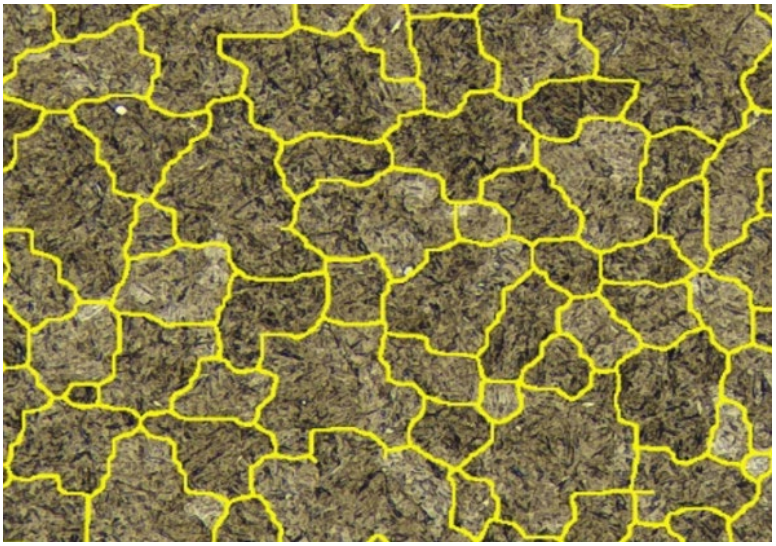


AUTOMATED ROUTINES

Clemex systems analyze samples without user input and are robust enough to operate autonomously. Depending on the needs, analysis routines are developed for specific applications or taken from a library of existing applications.

Once the system is calibrated, a routine is run on any number of samples and produces accurate, reproducible, and reliable results.

ADVANCED TECHNIQUES



FASTER AND SIMPLER

Machine Learning has started to play a key role in enhancing image analysis routines. Seamless integration of these algorithms into our systems have allowed new applications such as Martensitic and Austenitic grain size.

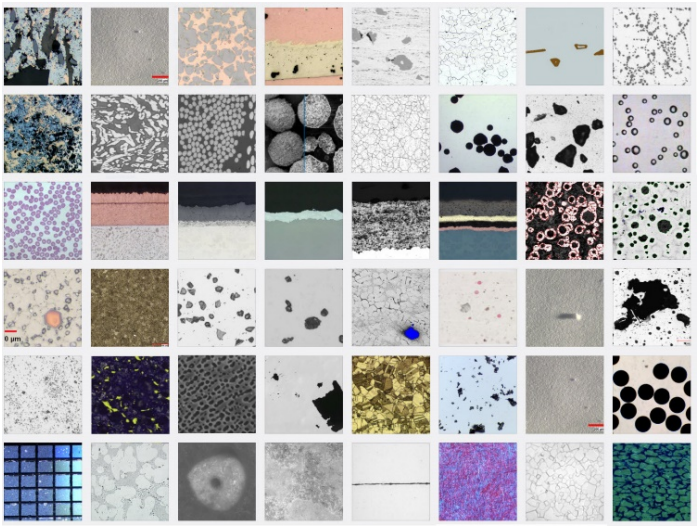
These new techniques substantially improve the throughput of complex image analysis. Automating manual techniques mitigates operator repeatability errors.

> “A well-designed testing software that is user friendly and reliable.”
>
> *Al Mabee – Triumph Group*

FUTURE ANALYSIS NEEDS

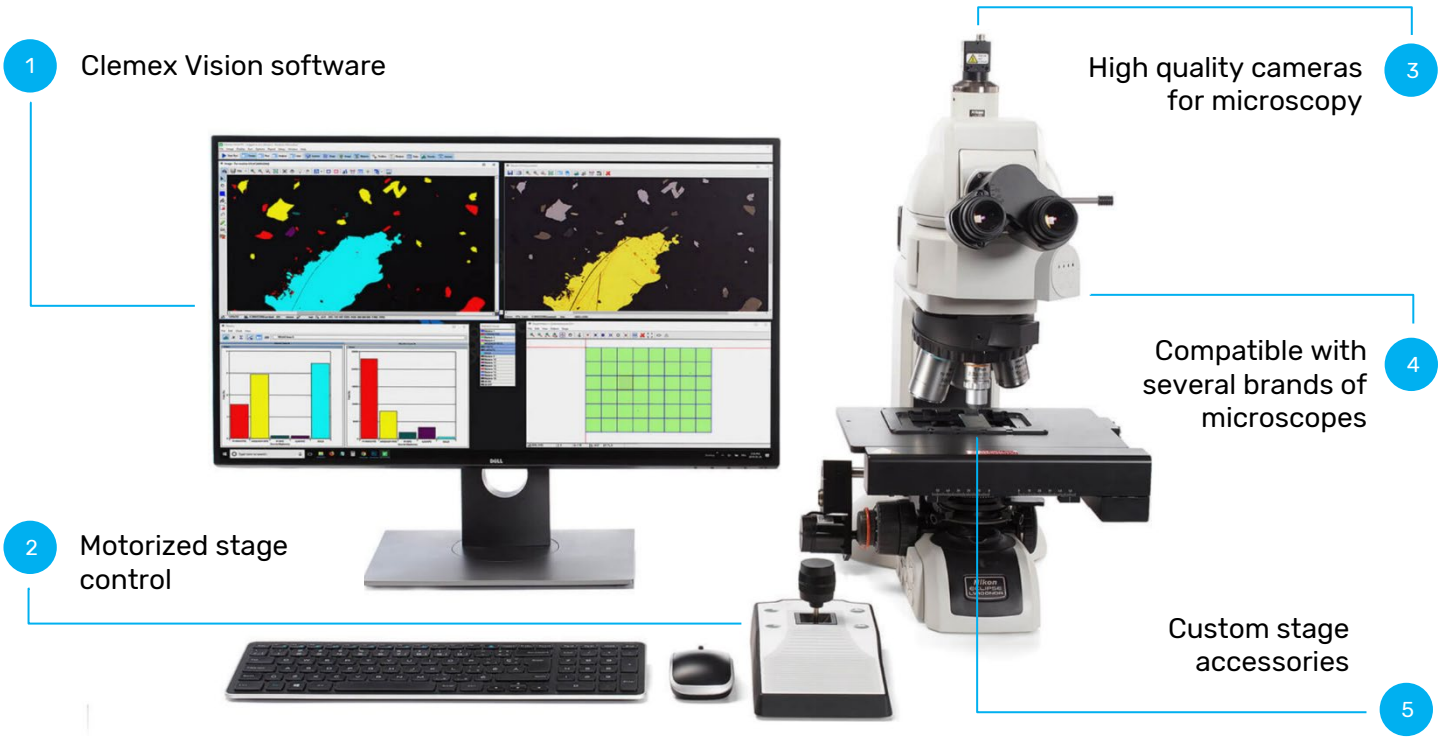
Our software is constantly evolving. New features and algorithms allow you to keep existing equipment for a longer period with regular software releases and a new bridge to machine learning (or ai) capabilities.

Hardware components can be added or replaced to adapt to new specifications. The value of your initial investment is therefore maintained.



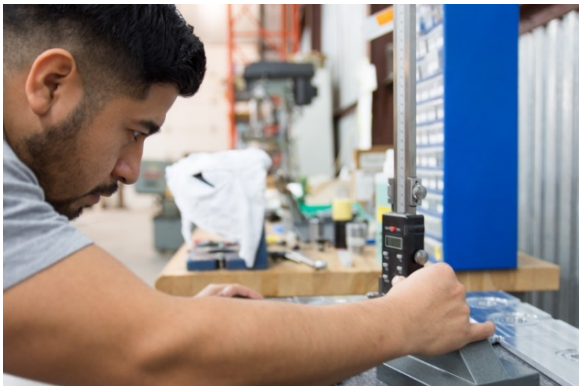
The Clemex advantage

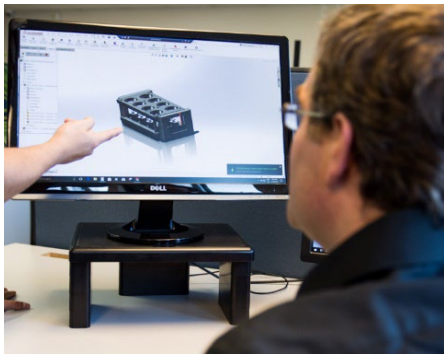
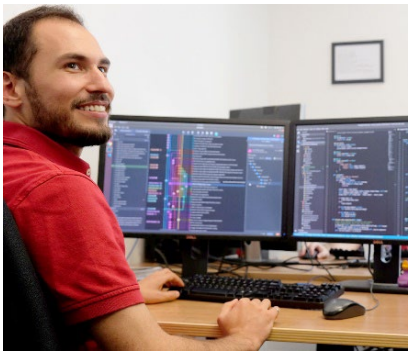
Providing customers with high quality data to improve their processes has been our goal for over 30 years. We offer reliable expert service to accompany your lab at every step from purchase to maintenance.



ABOUT CLEMEX

Clemex specializes in the integration of advanced computer vision, building out tailor-made software/hardware solutions that best suit our clients' needs.



PROFESSIONAL SYSTEM START-UP SERVICES

Installation and training are delivered by skilled application experts.

PERFORMANCE

Fully tested high quality components make a difference in image acquisition and processing.

AFTER MARKET SERVICE

Our team treat your complete system as a whole regardless of the hardware configuration.

VERSATILE

Systems evolve with your requirements. New routines or ML instructions can be developed by our team of specialists.

EASE OF USE

More automation has been added for the sake of simplicity.

ROI

Longer system life keeps your initial purchase and operating costs optimized. Ensure your investment is ready when you are.

SOFTWARE OPTIONS

	Vision PE	Vision Lite
Image Capture	●	●
Direct Measures	●	●
Exportable Results	●	●
Instruction Library	●	●
Analysis Packages	●	○
Advanced Instructions	●	○
Report Generation	○	○
User Management	○	○
Custom Measurements	●	✖

● Included ○ Optional ✖ Unavailable

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CLEMEX

CLEMEX VISION

SOFTWARE SPECIFICATIONS

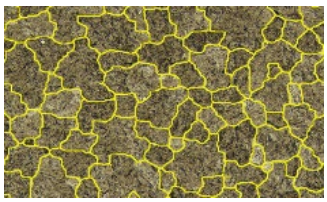
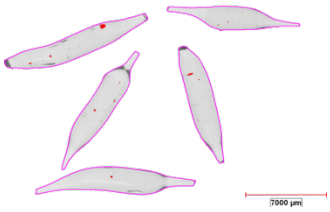
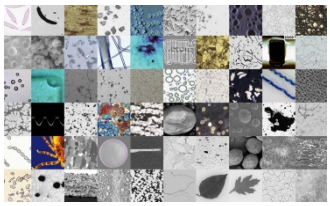
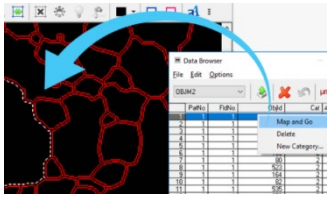
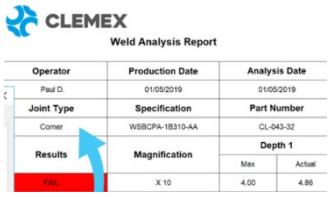
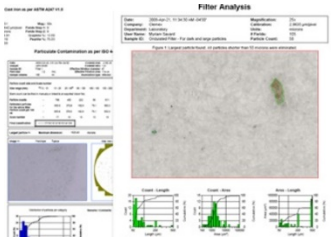
TYPES OF ANALYSIS

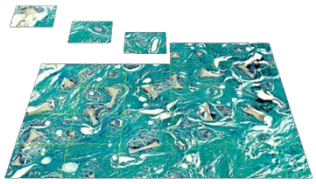
Banding	Flake size	Nodularity
Cell size	Gamma prime	Object orientation
Custom measurements	Grain size	Particle size and shape
Dendritic arm spacing	Layer thickness	Phase analysis
Density	Morphology	Porosity

STANDARDS

ASME B46.1	Surface Texture (Surface Roughness, Waviness, and Lay)
ASTM A247/ ISO 945	Microstructure of Graphite in Iron Castings
ASTM B487	Measurement of Metal and Oxide Coating Thickness
ASTM E1077	Depth of Decarburization of Steel Specimens
ASTM E112/ISO 643	Average Grain Size
ASTM E1245	Inclusion or Second-Phase Constituent Content of Metals
ASTM E1268	Degree of Banding or Orientation of Microstructures
ASTM E562	Volume Fraction by Systematic Manual Point Count
ASTM E45 (A & E)	Inclusion Content of Steel (Semi-autmatic)

KEY FEATURES

	**Martensitic Austenitic Ferrite-Pearlite**	These powerful instuctions based on machine-learning are inserted at the beginning of a routine to detect the boundaries of grains. Several parameters allow the user to fine-tune detection.
	**CFR 21 Part 11 compliance**	With the User Management module, administrators can add users, create user groups, and trace events in the audit trail. This optional module allows electronic signature embedding and is secure and reliable
	**Customize your analysis**	Detect, characterize and measure phases or objects of interest using our extensive instruction library. You can easily combine any set of instructions and create your own routine.
	**Powerful process automation**	Quicker analysis time is made possible with this robust software capable of processing thousands of images and generating data all day long without human intervention.
	**Traceable data**	Validate detected features and delete artifacts across multiple fields using the Map and Go function. Object data in the built-in spreadsheet are dynamically linked to the actual position of the objects on the sample.
	**Analysis properties**	Information from property fields can be automatically inserted into reports, file names or folder names. Use standard properties such as Magnification, Date or Sample Name or create custom fields.
	**Automated reporting**	Reports are generated automatically after each analysis and can be adapted to suit your needs. Add a company logo, images captured during analysis, graphs and statistics, and save your results as a csv, xlsx or pdf file

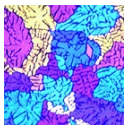
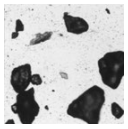
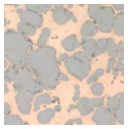
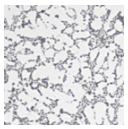
	**Mosaic image stitching**	Clemex Vision software automatically stitches multiple fields to form a seamless composite image of the whole sample which can then be analyzed and saved. This function can be used with a manual or motorized stage

MORE FEATURES

Accurate detection	Detect objects that are difficult to distinguish because of their transparency, low contrast or faint outlines.
Classify objects	Isolate objects using any measurement type (length, width, aspect ratio, roughness, etc.).
Conditional instructions	These are based on measurement criteria and additional variables such as If greater than / less than / equal to etc.
Direct measures & annotations	Annotate your images on-the-fly during your analysis; include results and visuals in reports.
Extended depth of field	Obtain a sharp composite image made up of several image slices, perfect for uneven surfaces.
External device control	Activate external devices such as valves, locking devices, alarms, lights.
Image optimization	Shading correction, auto-exposure, white balance, auto-focus, and parfocality for each magnification.
Motorized stage control	Controlled through the software, scanning regions can be defined using pre-built templates.
NIST-traceable calibration	Eliminate operator subjectivity by automatically calibrating each lens using a NIST-traceable micrometer.

Separate objects	Separate adjacent objects automatically prior to performing measurements.
Scan region automation	Automated stage pattern creation based on detected objects or sample reference points.
Third party images	Import images from various sources, such as SEMs or scanners.

APPLICATION PACKAGES

	**Grain & Cell Size**	Grain intercept, intercept counts, intersection counts, grain boundary length, and grain areas in accordance with ASTM E 112, ASTM E 930, and ASTM E 1382. Includes instructions for martensitic, austenitic and ferritic steel.
	**Layer Thickness**	Thickness of thin surface layers on metals, alloys, carbides, and oxides (ASTM B 487).
	**Particle Sizing**	Size and shape of particles as small as 0.5 micron. Statistical and individual data on a large sample of particles.
	**Phase Analysis**	Count any number of clearly distinguishable phases within a microstructure. Statistical estimation of the volume fraction of different phases.
	**Aluminum/Magnesium**	Dendrite cell spacing (DCS), average percent eutectic and mean linear dendrite spacing (MLDS) for all magnifications and camera resolutions.

Customer-specific algorithms allow **Clemex Vision** to leap beyond traditional image analysis techniques.