

X-PLUS

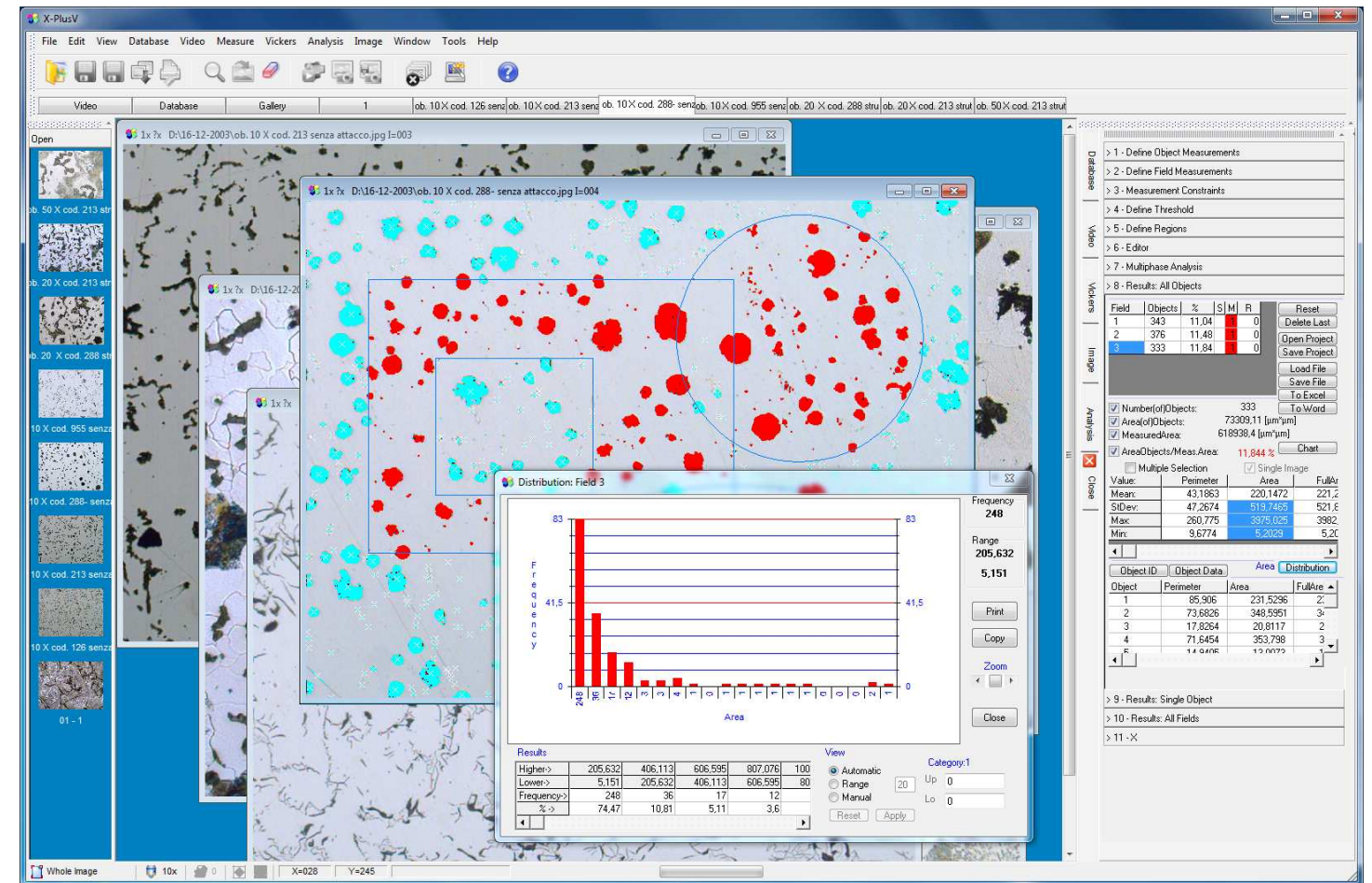
Multiphase image analysis software for dimensional measurements, Vickers and Brinell hardness test measurement and image archiving in multidocument environment.

Image acquisition in multidocument environment with resolution up to 32.000x32.000 pixels, 32-bit color, with digital or analog videocameras. Wide range of digital videocameras with control interfaces dedicated to the acquisition of single or sequential images. Image acquisition with WDM-compatible (Windows Driver Model) videocameras with all the features offered by DirectX10 and 9 technology: measurements on live image (overlay) and/or transparency effects between live image and previously acquired images for quantitative and qualitative visual comparing. Static and dynamic visual comparing on full or split screen (vertically or horizontally) with transparency control from the mouse. Interval display in transparency between live image and acquired images. Acquisition with TWAIN videocameras. Automatic measurement functions: Perimeter, Area, Full Area, Area Ratio, Equivalent Diameter, Circularity, Length, Width, Maximum and Minimum Feret, Center of Mass Coordinates, Orientation and Elongation. Results for each single object and statistics (maximum, minimum, mean and standard deviation) for all the objects in the analyzed areas. Constraints: maximum - minimum, inside - outside, selectable for each chosen measurement function. Classifying: "MultiRange" function for the superimposition of several independent binarization planes. This function allows you to perform top high-fidelity binarizations. Nine binarization phases with as many user-defined colors. Adjustable binary image transparency. Areas of multiple analysis: Rectangular, Circular, Elliptic, Circular Sector, Polygonal, freehand or in segments. The areas can be combined to include or exclude portions inside the areas. Methods of excluding objects on the border: center of mass or cropping. Binary editor: Delete Binary Image, Restore Binary Image, With and Without Original Image, Negative Binary Image, View Binary Image Only, Select All Objects, Deselect All Objects, Select Single Object, Deselect Single Object, Open, Close, Erode, Dilate, Delete Least Objects, Fill Holes, De-agglomerate, Delete, Analyzed Image Color, Marker and Brush. Results for all the objects with result-object graphic display. Single object query. Statistical results. Numeric or graphic display of results and export to Excel spreadsheets or Word templates for automatic generation of reports. Interactive measurement functions: linear distance, distance from a line, distances from a line, distances on a line, angle and its complementary, angle on a vertex, angles from a vertex, radius and area of circle by 3 points, from the center and by N points, length of a curve, perimeter and area of a figure, Feret diameters, section profile. Automatic edge detection: objective measurements. Editor on measurement functions for text color, format, background color, line thickness and style with 8 stored customizations. Measurement subdivisions by object classes. Single and multiple counters. Image histogram of color components. Insertion of marker, text, scale bar and graticules. Up to 20 calibration memories for as many objectives. Autocalibration when the zoom factor changes. Manual and automatic export of measurements to Excel also for classes of objects. Relational databases developed on MS Access 2000 - 7.0. 10 distinct databases each with a maximum of 13 search fields which can be defined and edited by the user. Unlimited field for annotations. Association of images and documents of any type with each database information record. Record and database gallery with record search from selected image. Automatic association of all saved images with the active database record. Automatic export to Word of field and image contents selected for the generation of custom reports. Complete filter set for image processing. Set of convolution filters with 3x3 to 9x9 kernels with very powerful filters for image enhancement. Single or multiple filter use mode. The settings for multiple filter use can be saved and retrieved. FFT filter for optimization of images from SEM. Composition of panoramic images with automatic and manual reconstruction from a set of single images. Multifocus for creating a perfectly in-focus image from a series of only partially in-focus images. Automatic alignment of images acquired with stereo microscopes. Interactive correction of image alignment. Three-dimensional reconstruction (surface 3D) from a set of partially in-focus images. Display of a surface 3D model from: multifocus image, color and vectorial scale. Controls for rotation, autorotation, translation and zoom from mouse and keyboard. Saving and loading of 3D models in standard DirectX and saving of the image in graphic formats. Interactive micro Vickers test measurement (optional VICK module for automatic Vickers measurement). Interactive Brinell test measurement. Macro generator and editor. Reports customizable with MS Word (not included). English and Italian guide online.

SW/HW Requirements
Operating System: Windows 7, Vista, XP
Report Generator: Microsoft Office 2000 or later
VGA: 512 MByte RAM - DirectX9 compatible
Minimum Resolution: 1280x900 pixels, 32-bit color
CPU: Pentium IV 3.0 GHz
System RAM memory: 1 Gbyte DVD R/RW Reader
Hard Disk Space: 500MByte

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MULTI-PHASE IMAGE ANALYSIS SOFTWARE FOR ARCHIVING AND PROCESSING IMAGES WITH AUTOMATIC AND INTERACTIVE MEASUREMENTS



- MULTI-PHASE IMAGE ANALYSIS
- UP TO NINE BINARIZATION PHASES
- MULTI-RANGE FUNCTION
- BINARY EDITOR
- REGION EDITOR
- AUTOMATIC AND INTERACTIVE MEASUREMENTS FUNCTIONS
- MEASUREMENTS ON STILL AND LIVE IMAGES
- RESULTS FOR ALL OBJECTS
- SINGLE OBJECT QUERY
- STATISTICAL RESULTS
- MACRO GENERATOR
- DIRECTX CAMERA INTERFACE
- RELATIONAL DATABASE
- DYNAMIC VIEWER
- EXPORTS RESULTS TO MS EXCEL
- EXPORTS REPORTS TO MS WORD

- MULTIFOCUS
- THREE-DIMENSIONAL SURFACE RECONSTRUCTION
- MULTIPLE IMAGE FILTERS
- MULTIPLE COUNTERS
- ANNOTATIONS AND MARKERS
- METRIC SCALE
- TIME-LAPSE CAPTURING
- MANUAL VICKERS-KNOOP HARDNESS TEST
- AUTOMATIC VICKERS-KNOOP HARDNESS TEST (OPTIONAL)

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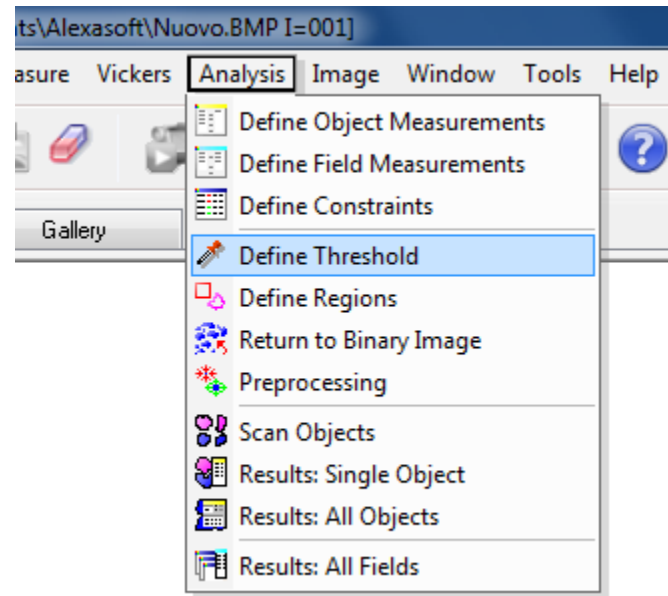
X-PLUS

MULTI-PHASE IMAGE ANALYSIS SOFTWARE FOR ARCHIVING AND PROCESSING IMAGES WITH AUTOMATIC AND INTERACTIVE MEASUREMENTS.

Image acquisition in multidocument environment with resolution up to 32.000x32.000 pixels, 32-bit color, with digital or analog videocameras.

Wide range of digital videocameras with control interfaces dedicated to the acquisition of single or sequential images. Image acquisition with WDM-compatible (Windows Driver Model) videocameras with all the features offered by DirectX10 and 9 technology: measurements on live image (overlay) and/or transparency effects between live image and previously acquired images for quantitative and qualitative visual comparing.

Automatic Measurement



The software enables automatic image analysis with the possibility of choosing one or several of the following measurement functions: Perimeter, Area, Full Area, Ratio of Area, Equivalent Diameter, Circularity, Length, Width, Horizontal Coordinate of Object Boundary, Vertical Coordinate of Object Boundary, Maximum and Minimum of Feret, Coordinates of Center of Mass, Orientation and Elongation.

Besides the values for each object, statistical calculations are carried out for maximum, minimum, middle values and standard deviation for all objects included in the area under analysis. The following statistical calculations can be performed on all analyzed image results: Number of Objects, Ratio of Area, Area of Objects and Area of Measurement.

Limits can be set to exclude from the analysis objects which fall either inside or outside a selected range of maximum and minimum values. Each limit setting can be activated or deactivated by the user.

Nine binarization memories are available with as many colors definable by the user.

The "MultiRange" function is available allowing the superimposition of several independent binarization planes. This

function makes it possible to perform top-quality binarizations.

If not differently specified the image analysis concerns the whole of the image. If one wishes to carry out the analysis on one or several zones of the image, the following functions can be used to shape the desired area: Rectangular, Circular, Elliptic, Elliptic Sector, Polygonal in free hand or in segments. The zones can be combined to include or exclude the zones inside the areas.

The binarized image can be modified by means of an editor having the following functions: Erase Binary Image, Recall the Threshold, View Image, View Binary Image, Revert Binary Image, View Binary Image Only, Exclude All Objects, Include All Objects, Exclude Single Object, Include Single Object, Open, Close, Erode Dilate, Erase Small Objects, Fill Inner Holes, Erase, Analysed Image Color, Draw and Draw with Brush.

The analysis results can be combined to obtain any type of statistics. The results can be viewed numerically or graphically and sent to Excel sheets or to Word templates for the writing of final reports.

Image Capture

The live and still image format from the digital camera, the controls for brightness, contrast, saturation, hue, etc. can be defined by the user. A still image previously acquired can be superimposed in overlay onto the live image. The degree of transparency can be defined by the user. As well as on acquired images, all interactive measurement functions can be used on a live image without having to acquire the image first. User-defined square and circular graticules in overlay are also available. The "Multifocus" function blends together into one single focused image a series of images with only limited focus. There is also dynamic zoom function with auto-calibration of measurement functions.

Constraints

You can set constraints to all measurement functions selected in Define Object Measurements to exclude from the analysis those objects which do not fall within the chosen intervals.

You can define the **upper** and **lower** limits of the interval for each function and the **interior or exterior range of the active interval**. Each single constraint can be enabled or disabled by the user.

Define Threshold

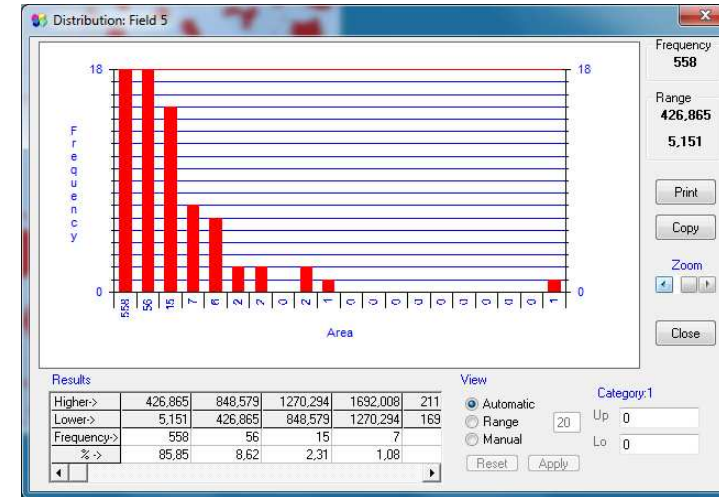
A binarization is necessary to be able to analyze an image. A binarized image is an image with two states: the active state, or the state of the objects of interest displaying the color selected in **Memory**, and the inactive state.

MultiRange

This powerful function allows you to obtain a binarized image very similar to the one required. It can happen that during the normal binarizing procedure parts of the image that should not be binarized actually fall within the color interval. This function can solve this frequent problem.

Define Regions

To analyze one or more regions within an image you can use the Region Editor:



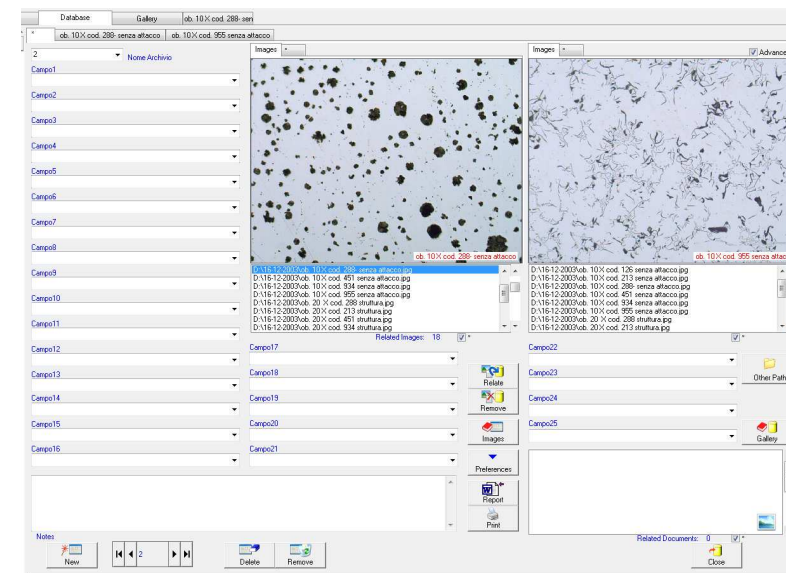
Results: all objects

This dialog displays all the results, including statistical data, obtained from object analysis.

Relational Database

The software has a powerful relational database developed on Access 7.0 that

allows images to be archived with records made up of fields definable by the user so as to create up to 10 distinct archives. The name and the number of the archives are therefore dynamically definable. Each archive can contain an unlimited number of records, documents in any format (Word, Excel, TXT, PDF, etc.), and corresponding associated images. Each record contains data fields, an area for comments, and can associate countless images with local album function.



Filters

The software has a wide set of filters for image processing that control brightness, contrast, color, equalizations, sharpening, noise reduction, binarization, focus improvement; filters which work with image pairs as sum, subtraction, xor, etc.; convolution filters with 3x3 and 9x9 kernels including very powerful filters for image enhancement.

Field	Objects	%	S	M	R
1	343	11,04			0
2	376	11,48			0
3	333	11,84			0
4	1	99,93			0
5	650	11,02			0

Value:	Perimeter	Area	FullAr
Mean:	43,4104	211,6945	212,1
StDev:	50,0182	539,7354	541,4
Max:	414,2498	8355,877	8366,
Min:	9,6774	5,2029	5,2

Object ID	Perimeter	Area	FullArea
1	12,9032	10,4058	1
2	48,0472	91,051	?
3	11,7147	7,8044	?
4	79,2856	330,3849	3-

Each archive can be examined and cross-examined for the search of data. The saved images are

automatically associated with the current database record.

Report

Once the hardness profile chart is completed, select a *Report* from the *Hardness Profile Chart* and select the desired template. Automatically all the data of interest will be transferred to the report.

The resulting report can then be modified like any other Word document and sent to the printer or stored.