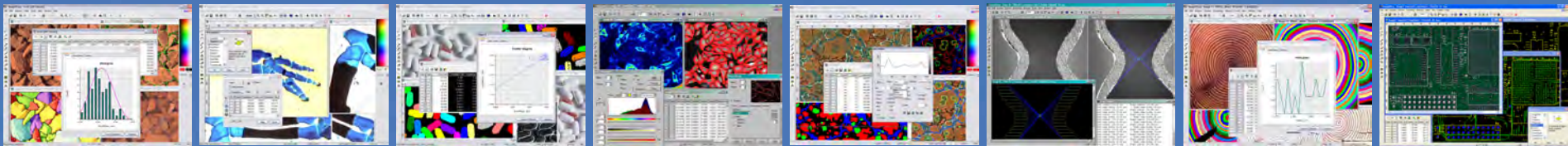


# imageWarp

## Industrial & Scientific Imaging Software



A&B Software's ImageWarp software offers today's industrial and scientific imaging professional a high-performance image analysis and editing application that combines the power of an easy-to-use graphical environment with a comprehensive image processing toolset and includes built-in acquisition and control support for analog, digital and Camera Link® frame grabbers as well as TWAIN devices and FireWire, USB and GigE Vision™ cameras. Both the full version (ImageWarp) and the Lite version (ImageWarp LE) offer unparalleled performance and features at a fraction of the price of other products on the market today. This powerful combination of imaging products allows End-Users, System Integrators and OEMs to streamline their application development down to a few simple steps without sacrificing performance.

## GEOMETRIC, ARITHMETIC and LOGIC

Image stitching and tiling.

Interactive or automatic resizing with selectable bilinear smoothing.

Geometric operations: Translate, Rotate, Flip, Reflect and Warp.

Affine and projective image transformation.

Arithmetic operations: Invert, Offset, Factor, Average, Add, Subtract, Multiply and Divide.

Logic Operations: Not, And, Or, Xor, Mask, Nand, Xnor, Swap, L-shift and R-shift.

## INTERACTIVE ADJUSTMENT and SEGMENTATION

Real-time full screen preview during adjustments.

Brightness/Contrast/Gamma adjustment in RGB and HLS space.

Hue/Saturation, Levels, Color Balance Correction.

Interactive binary and multiphase thresholding with sampling feature.

Color multiphase thresholding in RGB and HLS space.

Several methods of automatic thresholding based on histogram analysis.

## FILTERS

Sharpen and unsharpen masks, uniform, logarithmic, exponent and bell equalization.

Dark and white field background correction.

Several methods of background elimination.

Noise suppression and edge detection operators.

Customized convolution with user-defined kernel images.

Perform discrete and fast transform in both directions.

FFT-based convolution and de-convolution using graphical editing.

## MORPHOLOGY

Basic set operators: Erosion, Dilation, Opening, Closing, Tophat and Contours.

Iteration-independent high-speed algorithms for binary morphology.

Proprietary high-speed thinning, thickening and pruning.

Grayscale morphology with full support of 16-bit, 32-bit and floating-point images.

Extensive set of geodesy functions.

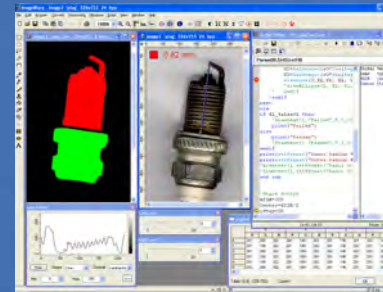
Accurate separation of touching convex objects.

Link operator for connecting broken lines.

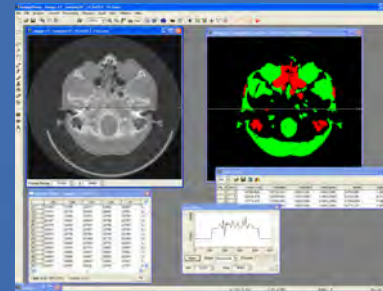
## SIGNAL/PATTERN GENERATION

Built-in set of standard signal and pattern generators for prototyping and testing:

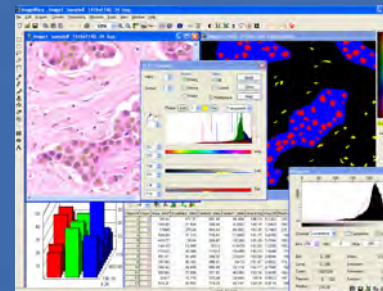
Random noise with user-defined amplitude, Non-uniform light from point and line sources, gray and color wedges, sine wave of arbitrary amplitude, frequency, phase and orientation.



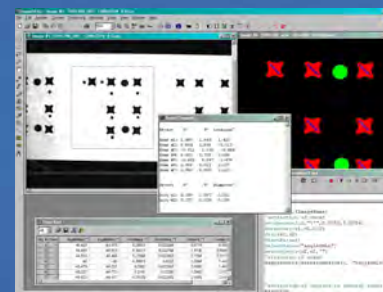
MACHINE VISION



MEDICAL IMAGING



MICROSCOPY



AUTOMATION

## KEY FEATURES

### ACQUISITION

- Capture from analog, 1394, USB, GigE, LVDS, Camera Link cameras and TWAIN and WDM devices.
- Perform frame averaging and integration while capturing.
- Acquire, create and playback image sequences with user-specified time lapse.
- Real-time Bayer demosaicing for raw color devices.
- Acquire images from multiple cameras and boards.
- Trigger and encoder synchronization, exposure, clock and line rate adjustments.
- Simulation video driver for prototyping real-time algorithms.
- Read/Store numerous image types: BMP, GIG, TIFF, JPEG, PCX, TGA, FITS, STK, AVI, IWD.

### USER INTERFACE

- Multiple document environment for images, data tables and charts.
- Real-time video window for live acquisition display.
- Comprehensive functional dialogs with real-time sliding previews.
- Interactive multi-channel histogram and line profile associated with a live image.
- Digital Editor for viewing and editing the numeric content of an active image.
- Script Editor for automatic and manual scripting, debugging, storing and testing.
- Context-sensitive help: position the cursor over any interface element and press F1.

### GRAPHICAL EDITING

- Rectangle, elliptical, freehand and magic wand selections (ROI).
- Add negative selections to set up an ROI with holes.
- Move images/selections to and from another program using drag-and-drop operation.
- Extensive set of drawing tools for direct application to all supported types of images.
- Adjustable size, transparency, hardness and spacing for brush family tools.
- RGB/HLS interactive color editor with a built-in set of pseudo-color palettes.

### PROCESSING

- Intel MMX/SSE technology utilized for performance boost.
- Multi-threading engine allows for performing up to 16 parallel operations.
- Automatic parallelization distributes imaging functions among several CPUs.
- Selectable coordinate system for processing color images.
- High-depth image support in all processing functions.

### CALIBRATION

- Interactive and automatic spatial calibration.
- Interactive choice of the coordinate system origin and Y-axis direction.
- View image dimensions in calibrated units on superimposed rulers.
- Optical calibration with Lagrange and polynomial approximation.
- Store calibration data along with images for IWD, JPEG and TIFF image types.

### MEASUREMENT

- Select from 100+ parameters using comprehensive graphic representation.
- Parameter arrays of variable size.
- Manual count and classification.
- Point, line, angle and area morphometry.
- Densitometry and position analysis.
- Automatic and interactive blob measurements.
- Selection or removal of objects by using specified parameter limits.
- Classification of objects by a specified parameter.

### ANALYSIS

- Load, view and edit measurement data in multi-level tables and spreadsheets.
- High-performance global data grids.
- Analyze and edit the pixel values of an active image in the interactive Digital Editor.
- Plot an intensity profile with the Line Profile tool.
- Display comprehensive Excel-style data charts.

### PROGRAMMING

- Built-in high level scripting language with parallel processing engine.
- Comprehensive Script Editor with command line support.
- Dynamic Data Exchange (DDE).

### AUTOMATION (COM)

- Integrate ImageWarp into your application by using it as a COM server.
- Access hundreds of ImageWarp functions using COM methods and properties.
- Exchange data and images between ImageWarp and your application in real time.
- Synchronize your application and ImageWarp with a set of COM events.
- Run ImageWarp in invisible mode and provide end customers with your own GUI.

## BENCHMARKS\*

Lowpass 7x7	220 msec
Sharpen 3x3	185 msec
Laplace 3x3	270 msec
Sobel 3x3	93 msec
Emboss 3x3	31 msec
User-kernel convolution 7x7	995 msec
User-kernel gray erosion 7x7	475 msec
Binary Erosion 3x3, 10 passes	305 msec
Distance Map	180 msec
Medial Axis Transform	365 msec
Watershed separate (512x512)	195 msec
Blob Measurements	110 msec

\* Performed on a 5000x5000 pixel grayscale image using a 2.7GHz Intel Core Duo processor.

## RECOMMENDED SYSTEM REQUIREMENTS

Intel Pentium 4 or higher class CPU  
Microsoft Windows XP or XP Server  
512MB of RAM  
SVGA graphic adapter with acceleration  
Supported frame grabber (contact us for more information)  
1394 adapter  
GigE adapter

## 21-DAY RISK-FREE DEMO

Try ImageWarp risk-free for 21 days by downloading our demo from [www.imagewarp.com](http://www.imagewarp.com).

## FREE APPLICATION ANALYSIS

Send us your images along with a description of your application and processing requirements. We will perform an analysis with ImageWarp and email you a screen shot of our results along with a quotation. If you purchase ImageWarp, we will send you the complete script to help you get started.

## CUSTOM SOLUTIONS

If you're interested in developing your own application using ImageWarp's highly optimized algorithms, need help creating a COM-based solution to run ImageWarp scripts, require a driver for a new device or want to consider bundling ImageWarp LE with your newest cameras, we would be more than happy to discuss your requirements and recommend the best possible solution. A&B Software can also develop a complete custom imaging solution for you.



ImageWarp  
ActiveDcam  
ActiveGigE

Advanced Imaging Solutions

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