

# ER Mapper Professional Datasheet

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## Feature

## Feature Description

### Feature Highlights

"End-to-end" image processing to speed enhancement and information extraction from geospatial imagery	Direct read or import images, rectify, reproject, mosaic, enhance, transform, export or compress.
Extensive library of image processing functions	Transformations (formulae), spatial filters, contrast stretching, mosaicking, color balancing, classification, raster-to-vector conversion and more.
Versatility to handle the needs of novice and advanced users	Wizard-based functions to simplify common tasks for novices, with a fast, powerful image processing engine for advanced use and customization.
Unlimited compression of imagery to ECW and JPEG2000 formats	One-time purchase allows unlimited compressions of large images and mosaics with no recurring costs.
Unique "algorithm" approach allows fast "what if" processing of large images with minimal generation of intermediate files	Dramatically reduce time and disk space requirements for processing small or large jobs, see results of complex processing in real time.
Suite of interactive wizards to automate common and complex tasks	Wizards for <ul style="list-style-type: none"> <li>• Mosaicking images</li> <li>• Image enhancements</li> <li>• Color balancing mosaics</li> <li>• Compressing images</li> <li>• Batch conversion</li> <li>• Image tiling and more</li> </ul>
Integrate imagery with vector data	Combine imagery with multiple vector formats into a single view.
Fully bundled software suite	One price includes all functionality, no extra modules to purchase.
Flexible licensing options	Workstation or network floating licensing.

### Advanced Image Processing Technology

True interactive "what if" image processing to quickly apply operations and view processing results in real time	Apply multiple IP operations (contrast, formulae, filters, etc.) as a single step and see results immediately for fast experimentation and adjustments.
Save processed views of imagery to "algorithm" files for later use, compression or printing without creating intermediate image files	Separate data (images) from the processing (algorithms) to gain great savings in disk space while retaining full mathematical precision of results.
Efficiently process today's large image file sizes (multi-terabyte images)	Optimized for very fast display and processing of large images, not limited by scratch files or RAM.

Quickly create mosaics of 100's or 1000's of images

Mosaic all images in a folder or entire directory trees, automatically apply contrast stretching or previously defined clipping polygons.

"Virtual Datasets" to speed and simplify multiple step processing flows and save disk space

Save intermediate processing stages as text instruction files that can be used as input to the next stage as if it were an image file on disk.

True floating point processing, no need to define output file space up front

Full precision of output values is retained throughout the process, no need to truncate or output to lower bit depth files to save disk space.

Easily combine raster images with different data formats, data types and spatial resolutions into a single view

Software handles all resampling internally during processing, no need to resample images to a common type.

Use multiple sequential transforms and filters in a single algorithm

Apply multiple spatial filters and transforms (contrast enhancements) to imagery in a single process flow, no intermediate files needed.

### Image Display

Directly open and work with industry standard geospatial imagery formats

- ER Mapper formats,
- (ALG, ERS)
  - ECW
  - JPEG2000
  - GeoTIFF
  - NITF
  - HDF
  - BIL/HDR
  - ESRI
  - ASCII Grid
  - Imagine
  - USGS
  - DOQQ
  - USGS
  - ASCII
  - DEM
  - DTED
  - SDTS
  - DEM
  - RESTEC/NASDA
  - CEOS
  - Landsat 7
  - Fast Format
  - JPEG, BMP, PNG

Read georeferencing information from World files

Read registration, rotation and pixel size from TIFF, JPEG, BMP and PNG images with World (.tfw, etc.) files.

"Smart open" to quickly display a contrast enhanced image

Auto display any image as color or greyscale with a linear contrast stretch.

Reproject images on-the-fly

Change image datum or projection or combine images with different projections directly on-screen.

Use surfaces to combine or separate multiple images or mosaics within a single view

Surfaces are stand alone images or mosaics of images that can be controlled independently with different types of processing applied.

Set transparency between surfaces to blend or quickly detect changes

Set transparency percent for each surface, no limit to surfaces that can be blended.

Real-time sun angle shading for fast visualization of terrain features or geophysical data trends

Shade or illuminate terrain or geophysical data from any sun azimuth or elevation with real-time display update to find "best" shade angle.

Quickly create and modify color shaded relief images from DEMs, geophysical or other types of data

Control color and intensity (shading) components separately, interactive sun angle controls, many predefined color tables (LUTs) or add custom ones.

Realistic 3-D perspective viewing of imagery

Change view with mouse, use any data for Z-value (elevation), set viewpoint and render resolution, turn lighting on/off, use fly-through mode.

Geoposition controls to set image display extents, center coordinate and zoom factor	Define exact display extents using Easting/Northing, Lat/Long or pixel coordinates, and set any arbitrary pixel zoom factor (including fractional).
Geographically link multiple image windows to aid analysis of different types of data covering the same area	Link windows to zoom/pan to common extents, create viewports on a master window, or quickly zoom/roam using overview windows.
Work with RGB imagery directly in HSI (Hue Saturation Intensity) color space without RGB<->HSI file conversions	Rotate hue, stretch saturation, modify intensity independent of color, replace intensity for pan sharpening or image fusion.
Copy images to the Windows® clipboard	Capture screen resolution views of any image for pasting into documents.

### Image Compression

Compress images or large mosaics of images to reduce file sizes, increase display speed and maximize value of geospatial imagery	Compress color imagery up to 50:1 and greyscale imagery up to 30:1 while maintaining reliable image quality for visual image interpretation.
Compress images to industry standard ECW (Enhanced Compressed Wavelet) format optimized for typical aerial and satellite imagery	ECW provides the fastest compression and decompression (display) speeds, and is supported by 100's of GIS and imaging software products.
Compress images to ISO standard JPEG 2000 format for lossless compression and multiple bit depth support	Lossless compression allows 2-4 times compression rate while retaining original values, encode images with up to 28-bit data ranges.
Use JPEG2000 alpha channel to generate background "no data" masks for images with irregular shapes	Encodes null image areas in a separate binary mask channel (band) to define a clean background even on images with very high lossy compression.
Compress images or mosaics containing several terabytes of data	Most robust wavelet image compression engine in the industry.
Support for compression of multiple band images	Compress multi- or hyperspectral images with more than three bands to ECW or JPEG2000 formats.
Support for resampling during compression	Optionally resample images to different spatial resolutions during the compression process.
Batch compress images	Convert images to ECW or JPEG2000 formats as unattended batch processes.

### Image Processing Functions

Adjust image contrast and brightness to improve presentation and enhance details )	Interactive histogram adjustments, linear and piecewise linear stretches, Gaussian and Histogram Equalization, single-click "quick stretch" wizards.
Library of formulae to apply common spectral enhancements to images, or add custom formulae	Band ratios, Principal Components, Tasseled Cap, Decorrelation Stretch, Spectral Angle Mapper, autoscale, RGB to IHS, derivatives, and more.
Library of convolution filters to apply common spatial enhancements to images, or add custom filters	High pass (sharpen), low pass (smooth) edge enhancement, morphological, adaptive median, standard deviation, majority, and more.
Export images to standard geospatial image formats (with or without World files	ER Mapper Algorithm, ER Mapper Raster, ER Mapper Virtual Dataset, GeoTIFF, ECW, JPEG2000, NITF, BIL/HDR, JPEG, BMP.

Crop or subset areas from large images	Define export bounds by screen view, geographic coordinates or pixel coordinates, export some or all bands.
Automatically color balance mosaics of 100's of aerial photos in minutes to create seamless mosaics	Correct photos for vignetting or tonal mismatches, match colors to a mosaic or single image, auto-define clip polygons to remove fiducials marks or black edges.
Use histogram matching to create uniform color or tonal range across image mosaics	Interactively match histograms of 100's images to a master image or group of images.
Detect changes between images of different dates or types	Use image transparency (blending) for quick toggle, or use formulae to create difference or ratio change images.
Classification layer type for highlighting special interest areas in solid colors over images	Use for spatial modeling to show thematic data extracted from multiple raster images or meeting specific criteria (target areas, change areas, etc.).
Use vector polygons to clip or mask images	Clip images to political or other boundaries, draw clip polygons or import from standard vector formats.
Functions to process Digital Elevation Model (DEM) data	Generate color shaded reliefs, density slice, slope degrees, slope percent, aspect, rescale Z values, 3-D views.
Surface Gridding Wizard to convert point measurements and line data (contours, etc.) into raster images	Interpolate line or point data into a continuous raster file, combine multiple data sources, use Triangulation or Minimum Curvature methods.
Create virtual dataset mosaics containing 1000's of separate image files and treat them a single entity	Process a mosaic of images as if it were a single image (globally adjust contrast, apply filters or formulas, apply polygon clipping, and more).
Specialized functions for processing SAR (radar) imagery	Remove speckle noise, texture analysis, shadow map generation, adjustable Frost, Lee and Weighting filters.
Specialized functions for processing gridded aeromagnetics data	Vertical derivatives, vertical continuations, reduction to pole, filtering and noise reduction, integrate with other raster data.
Fourier Transformations for frequency domain processing	Forward and reverse Fourier transformations, apply vertical derivatives, high pass filters, notch filters, reduce to pole, fill voids, more.
Library of standard math functions for formulae	<ul style="list-style-type: none"> <li style="width: 50%;">• ABS</li> <li style="width: 50%;">• POW</li> <li style="width: 50%;">• SIN</li> <li style="width: 50%;">• SQRT</li> <li style="width: 50%;">• COS</li> <li style="width: 50%;">• MIN</li> <li style="width: 50%;">• TAN</li> <li style="width: 50%;">• MAX</li> <li style="width: 50%;">• EXP</li> <li style="width: 50%;">• FLOOR</li> <li style="width: 50%;">• LOG</li> <li style="width: 50%;">• CEIL, etc.</li> </ul>
Add custom formulae functions or filters using C code	Compile and call custom functions directly within the ER Mapper environment.

### Image Analysis Tools

View image pixel values	View pixel values in all bands as text and as "signatures" (line graph of values in all bands).
View image pixel coordinate locations	View pixel locations in Easting/Northings Lat Long and pixel row/column simultaneously.

Draw profile lines across images to view change in image pixel values along the line (traverse extraction)

Show change in values (elevation in a DEM, etc.) as a line graph, show some or all bands as different color lines, export to text file. An excellent tool for comparing clay, chemical variations along topographic features.

Automatically calculate length of lines or areas of polygons

Vector tools show length of polylines in Km, meters, miles and feet, and areas of polygons in Sq Km, Sq meters, acres and hectares.

Interactive scattergram (XY plot) tools to analyze images in spectral space

Link scattergrams to images, highlight scattergram value ranges on images, draw polygons on image and show mean and standard deviation ellipses on the scattergram.

Calculate, view and print multivariate statistics for raster images, and within defined vector region polygons

Mean, minimum, maximum, std. dev., non-null cells, area in hectares and acres, correlation eigenvalue, covariance eigenvalue, correlation matrix, covariance matrix, correlation eigenvectors, covariance eigenvectors.

Compare variations along

### Image Registration and Georeferencing

Georeference (rectify) raw images to known coordinate systems and standard map projections using ground control points (GCPs)

Pick GCPs from other images, maps or vector files, import GCPs, use Polynomial or Delaunay Triangulation, use Nearest Neighbor, Bilinear or Cubic Convolution resampling.

Orthorectify aerial photos to remove terrain and camera distortions and create precision geocoded images

Pick GCPs from existing georeferenced data, or use exterior orientation parameters (phi, omega, kappa, etc.).

Reproject images from one datum and/or map projection to another (single images or in batch)

Support for most map projections and datums, output to ERS, ECW or GeoTIFF, resample pixel size.

Reproject images on-the-fly in the user interface

Combine or mosaic images with different datums or projections on-screen without creating intermediate files.

Rotate images to point north, or resample image to different resolutions (single images or in batch)

Rotate any number of degrees, use Nearest Neighbor, Bilinear or Cubic Convolution resampling.

Extensive datum and projection support, add custom ones

Library of standard datums and projections from around the world, support for EPSG database.

Digitizer tablet support

Pick control points from maps or other data set up on digitizer tables.

### Image Classification

Supervised Classification to group multispectral images into feature classes based on user-defined training sites (draw or import polygons)

Maximum Likelihood, Mahalanobis, Parallelepiped, Minimum Distance classifiers, generate typicality index, neighbor filters, prior probabilities.

ISOCCLASS Unsupervised Classification to automatically group multispectral images into statistical clusters for user's correlation with feature classes

Autogenerate classes or use existing classes as seeds, statistical parameters to control splitting/merging of classes, autogenerate class color scheme similar to input image.

View and analyze class statistics before and after classification

Multivariate class statistics, means, standard deviation, distance from means summary reports.

Interactive scattergram (XY plot) tools to help evaluate spectral characteristics of classes	Link scattergrams to images, highlight scattergram value ranges on images, highlight training sample polygon statistics on scattergrams.
Edit class colors and names	Modify color or name assigned to any or all classes, automatically generate classification legends for maps.
Auto-generate class colors for ISOCLASS classifications	Automatically generate class color schemes similar to input image RGB band combinations using image stats.
Confusion matrices to help evaluate classification accuracy against ground truth or other classified images	Row Counts, User's Accuracy, Producer's Accuracy, Overall Accuracy, Kappa statistics.
Automatically vectorize raster classes for export to vector GIS applications	Use raster-to-vector conversion to trace vectors around class pixel boundaries, create polylines or polygons, apply vector smoothing.

### Vector Support

Import vector (line) data from many standard vector formats	Import from Shapefile, DXF, DGN, ArcInfo coverages, ASCII, DLG-3, others.
Interactively draw and edit vectors over images using simple but powerful drawing tools	Draw text, lines, polygons; set color/font/line thickness, split and join vectors, add/remove polygon nodes, move objects front/back.
Generate vector contour lines	Automatically generate vector contour lines and labels for DEM or geophysical raster data.
Tie object positions to coordinate or page units	Set objects to coordinate (Easting Northing, Lat Long) units to overlay on any image, or to page units to overlay on maps with the same page size.
Convert raster data to vector representations for export to GIS	Automatically trace vectors around pixels with specific value ranges to avoid manual digitizing.
Convert between vector file polygons and raster region polygons	Use vector polygons as clip polygons for raster images (regions), and convert raster regions to external vector files.
Automatically calculate length of lines or areas of polygons	Vector tools show length of polylines in Km, meters, miles and feet, and areas of polygons in Sq Km, Sq meters, acres and hectares.
Reproject vector data on the fly to match imagery projection	Vector data in different datum or projection than raster imagery can be reprojected automatically to match the raster, and can also be exported in the new coordinate system.
Digitizer tablet support	Create or edit vector data using input from digitizer tablets.
Export vectors to standard formats	Export to Shapefile or DXF formats.

### Map Composition and Printing

Compose simple or complex maps using a library of predefined Postscript map objects	<ul style="list-style-type: none"> <li>Titles, legends, coordinate grids, scale bars, north arrows, clip masks, color bars, symbols, set color/font/line style and many other attributes.</li> </ul>
Setup maps to print at exact page sizes or map scales and set plot background color	<ul style="list-style-type: none"> <li>Select standard (A1, A0, etc) or custom page sizes, fit plot to printer's max page size, set map scale (i.e., 1:50,000), set position of image on the page and size of border areas.</li> </ul>

Define template vector map overlays with standard objects and page positions

- Set map objects to page relative units so they automatically overlay on any plot of the same page size.

Add custom map objects for company logos or other uses

- Add custom map objects as TIFF, GIF, PCX, etc. images or as vector Postscript or EPS files.

## Standard Image Enhancement and Processing Wizards

Over 100 supplied wizards for a wide variety of tasks

Designed by experts to greatly speed and simplify common tasks and to automate complex processing flows.

Image Mosaic Wizard to automate creation of large mosaics containing 100's or 1000's of images

Mosaic all images in directory trees, filter or include images with different resolutions, data types, number of bands, or projections, and auto apply predefined clipping polygons.

Image Balancing Wizard to help create seamless, tonally balanced mosaics

Automatically apply functions to compensate for tonal variations, vignetting, and other effects, clip out black/white edges, apply contrast stretches, and match mosaic color to reference images.

Image Compression Wizard to compress single or multiple images to ECW or JPEG2000 formats

Compress single images or mosaics to greyscale, RGB or multi-band formats, batch compress any supported raster format, specify target compression ratio and other settings.

Batch processing wizards to automate time consuming functions

Import, export, reproject, rotate or resample images in batch, edit or create ER Mapper header (.ers) files in batch, create custom color tables, more.

Geocoding Wizard to simplify georeferencing and geocoding workflows for raster imagery

A single, simple interface for rectification, orthorectification of air photos, reprojection, resampling, rotation or known point registration of raster imagery.

Surface Gridding Wizard to simplify workflows for rasterizing point and vector data

A single, simple interface to interpolate line or point data into a continuous raster file.

QuickStretch contrast enhancement wizards

Quickly apply a variety of linear (clip), Gaussian and Histogram Equalization contrast stretches to an image or all images in a mosaic.

ASTER Data Processing Wizard to automate processing of ASTER satellite imagery

Separate or integrate ASTER bands, display as pseudo or RGB, reduce noise, map common surface cover types, decorrelation stretch, more.

Land Application Wizard to simplify information extraction of satellite and aerial imagery

Map regional lithology, flood zones, watersheds, perform change detection, classify images, create vector data.

Desktop Mineral Exploration Wizard to automate common image processes used in the MinEx industry

Process Landsat imagery, radiometrics, magnetics, intergrate different data types, model and display target areas.

Local Council Applications Wizard

Simplify integration of scanned maps with raster images and detect changes between two raster images.

Map Collar Wizard to clip collars from standard map sheets	Automatically define vector clip polygons to remove map collar areas from standard size topographic and other types of maps.
Contouring Wizard to automatically generate vector contour lines	Generate vector contour lines and labels for DEM or geophysical raster data, set spacing interval, line width, color, label font.
Export Images in Batch Wizard to automate large image conversions	Export all images in a directory, in a mosaic (with or without neighbor overlap), or defined in a text file, save to algorithm, GeoTIFF, ECW, more.
Create Rotated or Percent Clip Regions Wizard	Automatically define vector clip polygons for a set of images to crop out a percentage of the image area with or without rotation of polygons.
Cut Algorithm into Tiles Wizard to automatically divide large images or mosaics into smaller tiles	Cut by geographic tile sizes, number of pixels, number of tiles, or text file list, use auto naming conventions, export to algorithm, GeoTIFF, ECW, more.
Create Mosaic Index Map Wizard to create a vector file of images extents in a mosaic	Generate vector index maps including filenames, select line width/color, select font, export to ERV, Shapefile, DXF.
Colordrape Wizard to quickly generate color shaded relief images from DEMs or geophysical data	Use different images for color and shading, set shading azimuth and elevation, create special wet, shiny an metallic look images.
Color Enhancements Wizard to quickly perform industry standard color space enhancements to an RGB image to aid analysis and interpretation	Hue Saturation Intensity (HSI), Direct Decorrelation Stretch (DDS), Intensity Conservation DDS, Brovey (Chromaticity) Transform, Hybrid Contrast Stretch.
Resolution Merge Wizard to "pan sharpen" a lower resolution RGB image with a higher resolution panchromatic image	Hue Saturation Intensity (HSI), Direct Decorrelation Stretch (DDS), Brovey (Chromaticity) Transform, Smooth Filter Intensity Modulation (SFIM), High Pass Filter (HPF) Additive and Transparency Merge.
Natural Color Wizard to convert a color infrared image to simulated natural color (with green vegetation)	Simple or color enhanced versions, process subset, set contrast stretch, automatically apply a vegetation mask.

### Batch Scripting Language

Batch scripting language to create your own wizards or simply complex processes	If-then-else processing, query image information, apply most image processing functions, no additional modules or software needed.
Library of script functions for defining point and click interfaces to help novice users	Add radio buttons and menus, prompt for files, get file lists, add images, navigation buttons, more.
Call external ER Mapper programs or other programs from within batch scripts	Run ER Mapper executable programs for import, export, compression, reprojection, or your own or 3rd party utility programs.

### Supported Raster Import Formats

Directly open and work with industry standard geospatial imagery formats without file conversion

ER Mapper formats

- (ALG, ERS)
- ECW, JPEG2000
- GeoTIFF, NITF
- HDF
- BIL/HDR
- ESRI
- ASCII Grid
- Imagine
- USGS DOQQ
- USGS ASCII DEM
- DTED
- SDTS DEM
- RESTEC/NASDA CEOS
- Landsat 7 Fast Format
- JPEG
- BMP
- PNG

Import a wide variety of additional raster formats and convert to ER Mapper Raster Dataset (ERS) format

- ASCII BIP/BIL/BSQ
- Binary BIP/BIL/BSQ
- GIF
- PCX
- TGA
- XYZ
- EROS NLAPS
- ASCII grid
- Geosoft ASCII and binary grid
- Surfer binary grid
- ERDAS LAN
- PCI PIX
- EOSAT Fast Format
- Any BIL/BSQ LTWG CCT and more

### Supported Vector Import Formats

Directly display vector data on top of imagery without file conversion

AutoCAD DXF, Microstation DGN, ARC/INFO coverage, Postscript.

Import vector line formats and convert to ER Mapper Vector (ERV) format

ESRI Shapefile, ARC/INFO coverage, AutoCAD DXF, Microstation DGN, ASCII line, ASCII points with attributes, DLG-3.

### Supported Raster Export Formats

Directly export (Save As or compress) imagery displayed on-screen (all or subset) to industry standard formats

- ER Mapper formats (ALG, ERS, Virtual Dataset)
- ECW
- JPEG2000
- GeoTIFF
- NITF, BIL/HDR
- Universal Data Format (UDF)
- JPEG
- BMP

Export raster files to a variety of additional raster formats

- ARC/INFO BIL image (.hdr)
- ASCII BIL
- ASCII XYZ Grid
- ASCII XYZ Grid with Nulls
- ASCII XYZ Grid as Radians
- Geosoft GXF
- PCX
- Encapsulated Postscript raster (EPS)
- Portable aNyMap (PPM, PGM, PBM)

Write georeferencing information to World files

Write World (.tfw, etc.) metadata files with registration, rotation and pixel size for GeoTIFF, ECW, JPEG2000, JPEG, BMP and PNG exports.

### Supported Vector Export formats

Export ER Mapper Vector (ERV) files to industry standard formats

Export to ESRI Shapefile and AutoCAD DXF vector formats.

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