

R2V

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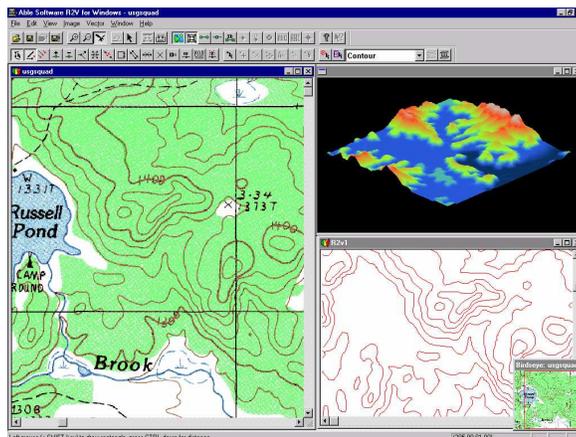
R2V: ADVANCED RASTER TO VECTOR CONVERSION SOFTWARE

Able Software R2V combines the power of intelligent automatic vectorizing technology with an easy-to-use, menu-driven, graphical user interface in the Microsoft Windows (9X, NT, 2000, ME, XP) environment. The software converts scanned maps or images to vector formats for mapping, geographic information systems (GIS), CAD and scientific computing applications. The system is easy to use and can be learned quickly by users with any level of technical background.

R2V provides an easy and complete solution to digitize vector data from image sources, such as scanned maps and drawings, aerial photos and satellite imagery. The entire raster to vector conversion process is fully automatic and needs no human intervention. You display the scanned image on screen and you select the vectorization command. That is all it takes! All the lines are extracted in seconds and displayed right on top of the image for you to verify and edit. Powerful editing and processing functions are provided to edit, geo-reference and label your data. **R2V** has all the tools to get a perfect set of vector data faster and easier than any other methods.

With **R2V**, you can forget about slow and inaccurate hand tracing on a digitizing tablet, simply scan your map or drawing and let **R2V** vectorize it automatically, at a high accuracy level. A typical contour or parcel map scanned at 300 DPI (dots/inch) as black/white or grayscale can be vectorized in seconds or minutes on a Pentium PC.

We know editing for both raster image and vector data is extremely important to you, so we have made the effort to build easy to use and intelligent editors for you to handle all data types in one display window, including lines, points, polygons, text labels, image pixels and control points. With **R2V**, you can automatically vectorize maps or drawings, perform quick heads-up digitizing and georeferencing aerial photos



"R2V is the fastest and finest automatic map vectorization software ever.", Mr. P. Hastings, Director, Environment Information Center, Thailand Environment Institute.

"R2V is incredibly easy to work with, it vectorizes extremely quickly at extremely high quality", Prof. L. Poos, The Catholic University of America

"R2V is the most advanced raster to vector conversion program.", C. J. Liu, Laboratory of Geometronics, University of Kentucky

"The most GIS-friendly product. Direct export of geo-referenced vector files in GIS formats. Little work needed on vectors brought into ARC/INFO. It has more image processing functionality than any other package.", Dr. L.A. Graham, "Modern Day Magic", GIS World, July 1997

"R2V does what it claims and more. Many users will find the package to be a useful addition to their mapping or GIS scheme", B. Gorham (Univ. of Arkansas), GIS World, August, 1995

"Able Software's customer support is excellent.", Mr. J. MacKay, Office of Surface Mining Management, US Government

or satellite imagery, update your existing vector data sets using latest aerial photos or other images.

You have some color maps? No problem. Scan them in color, **R2V** will classify the colors and vectorize each color separately; Then label the lines using the semi-automatic vector labeling tools.

Whether the maps are contours, parcels, transportation and CAD drawings, or you have hundreds or thousands of them, **R2V** is the right tool for you because it is being used all over the world for all types of large and small digitizing projects. Our users have been impressed by how easy and how fast the digitizing job has become and the prompt technical support we have provided.

And what about remote sensing? Many satellite image format can be imported and processed. Natural source images, such as aerial photos and color satellite images, can be automatically classified or segmented to generate region or boundary maps, all in **R2V**.

If you need to update your existing vector data set using the latest satellite image or other source, simply load the image into R2V and import your vector data set. With R2V's powerful editing functions, you can easily update your data, label them, geo-reference and your data is ready for use.

If you provide digitizing or data conversion service to your clients, R2V will help you to get the job done quicker and better than manual tracing or other poor quality conversion programs. Not only R2V has the best fully automatic and semi-automatic tracing functions, but also all the tools you can use to edit both raster and vector data, assign labels, geo-reference, create 3D display of your data.

Have too many maps or drawings to convert? R2V's batch processing function is the solution for you. First write your image and vector processing script using R2V's script editor, and then list all your images, whether you have 50 or 500 of them, one command will process them all, with all pre-processing and post-processing steps applied and vector data saved.

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Image Formats: Images in TIFF, GeoTIFF, JPEG, GIF, RLC, PNG and BMP formats, supports most image types, including 1-bit bi-level, 8-bit gray scale and color images (4-bit, 8-bit and 24-bit). Most TIFF image compressions are supported and import raw image files with R2V's universal image reader. No software limit for image sizes. Geo-reference your raster image in R2V and save to GeoTIFF format.

Vector Export/Import: ArcView (Shape file), Arc/Info Generate, DXF, MapInfo (MIF/MID), SVG (Scalable Vector Graphics), MapGuide SDL, IGES, 3D Grid, 3D USGS DEM, VRML and 3D XYZ vector file formats. More vector file formats are being added.

Advanced Vectorization: R2V supports three types of vectorization:

1. **Fully automatic vectorization.** One command will vectorize your scanned map in seconds or minutes at high quality. Batch function allows vectorizing a number of maps without any user intervention. Write your own batch script to customize the processing steps for the images before vectorization and vector line processing after the vectorization.
2. **Interactive line tracing.** You select two points on the image and let R2V trace the line for you. Easy, accurate and intelligent! For complex maps or drawings, use the interactive tracing to vectorize lines selectively. Or use the multiple line tracing function to vectorize a group of lines with only two clicks.
3. **Manual on-screen heads-up digitizing.** With **R2V's** easy to use vector editor, you simply draw the lines with your image as the backdrop, zoom in and out, quickly create the data set for your specific applications.

Complete Vector Editing: A complete on-screen vector editor is provided using the image as a backdrop. Lines can be created, moved, joined, split, removed, colored and labeled. Interactive polygon editing tool for easy polygon creation.

Vector Labeling and Contour Map Digitizing: Lines can be labeled with different ID values which are saved

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as attributes when exporting to a mapping or GIS package. Semi-automatic contour line labeling is supported for quick elevation assignments of contour lines.

Multiple Layers: Use R2V's layer manager to define as many layers as needed to organize vectorized data into layers. Layers created in R2V is fully compatible with the export vector file formats that support multi-layer structure. With multiple layers, vector data can be processed, edited and displayed by layer and moved between layers.

Point Feature Digitizing: Complete support for digitizing of point features. Points can be created, moved and labeled. Point data can be exported to all the vector file formats supported.

Automatic Polygon Layer

Creation: Create polygon layer automatically from vectorized lines with just one command. The closed polygons can then be edited, labeled using R2V's line editor.

Powerful Raster Image Editing: R2V provides a powerful raster drawing tool for easy image pixel editing and repairing. All image types, including 1-bit monochrome, grayscale, 8-bit color and 24-bit color are supported by the Image Pixel Tool. Pixel mapping function can easily map one pixel value to another for the entire image to remove noise pixels, clean up image background, or merge color layers.

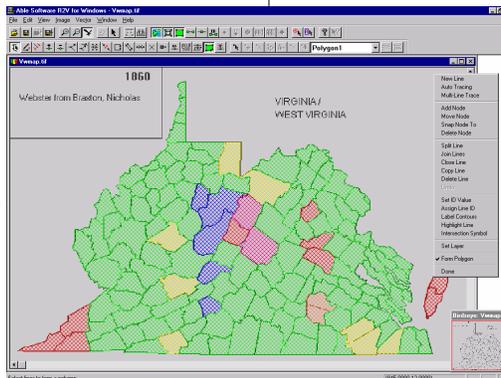
Geo-Referencing and GeoTIFF compatible: Vector data can be geo-coded or geo-referenced to a real world coordinate system (e.g., UTM, State Plane, Latitude/Longitude) using user selected control points or a World file (TFW). R2V supports both **bi-linear** and **Delaunay triangulation** methods for geometric transformation.

Raster images can be geo-referenced as well with a generated World file supported by ESRI's Arc/Info, ArcView, or TAB file by MapInfo. **Image rubber sheeting** function allows geometric correction or

registration of an image to a new coordinate system. Geo-referenced raster image can be saved as GeoTIFF format. Fully compatible with other packages that support GeoTIFF.

Automatic Text Detection and Recognition: Detect and recognize text of any font, any size and any language automatically. Flexible editor for easy removal and manipulation. Other irregular intersection symbols can be detected and corrected as well.

Merge Multiple Maps/Images: Use R2V to vectorize the maps separately and then merge them into one set by specifying proper control points. The merged vector data set can then be edited within R2V and treated as a single map. Multiple images are merged using the Image Merge command.



Advanced Image Processing: Vertical and horizontal flip, transpose, rotate, mosaic, remove dark background, edge detection, image resample, crop a region, image cropping by ROI, smoothing,

segmentation, warping and negate. Both supervised and unsupervised classification are built in to help process aerial photos or satellite imagery that are in color. Color separation, grayscale image enhancement and image type conversions can all be done using R2V.

3D Display With Image Draping: Create 3D data set automatically from your labeled line data and display them using R2V's advanced 3D display and animation function. View your data with image draping in 3D at any angle and distance. Supports 3D DEM (compatible USGS DEM format) and grid formats for both input and

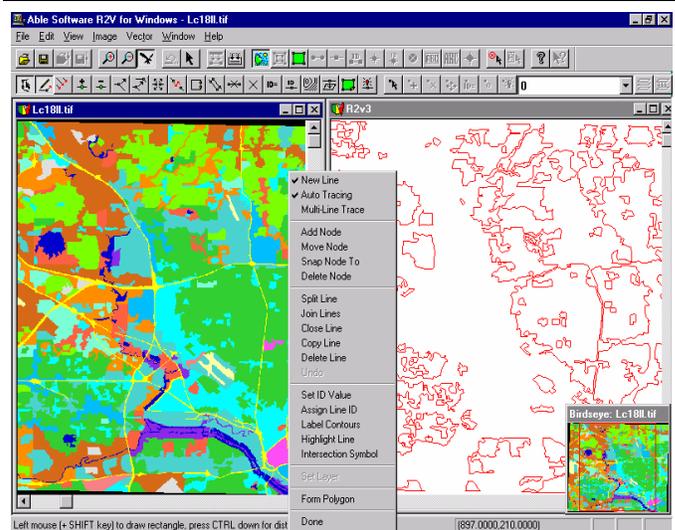
A Partial R2V User List

·A.A.N. (Spain) ·AD Design Inc. (Kawasaki, Japan) ·Agricultural Land Reform Office (Thailand) ·Agricultural Univ. of Norway ·Alabama State Univ. (AL, USA) ·ArrayComm (CA, USA) ·AMOCO (TX, USA) ·ArcGeo Information Systems (Slovakia Republic) ·Aristotle Univ. of Thessaloniki (Greece) ·Arex (Mexico) ·Army Corps of Engineers (USA) ·ASEAN Institute of Forest Management (Malaysia) ·Australian Army (Australia) ·Beijing Normal University (Beijing, China) ·Boston University, Center for Remote Sensing (USA) ·Bucknell Univ. (PA, USA) ·CAADG Architects and Planning s.r.c (Slovakia Republic) ·Centro de Analises e Sistemas Navais (BRAZIL) ·China Forestry Institute (Beijing, China) ·Chiang Mai University (Thailand) ·City of Cookeville (TN, USA) ·Civil Engineering, Univ. of Florida (USA) ·Clyde Consultants (Malaysia) ·Center for Development of Advanced Computing (Pune, India) ·Cornell University (NY, USA)

·ComputerLand of Wichita ·Current Software AS (Norway) ·Cybersoft Inc. (CA, USA) ·Daimler-Benz Aerospace (GERMANY) ·Dept. of Agriculture & Biosys., McGill Univ. (CANADA) ·Dept. of Environment Protection, Commonwealth of Pennsylvania (PA, USA) ·Dept. Fish and Game, State of Alaska (USA) ·Department of Marine Resources, State of Maine (Maine, USA) ·The Department of Geography of Cambodia (Cambodia) ·Duke Power Company (NC, USA) ·Earth Information Systems Corp. (TX, USA) ·Ecology Center (MT, USA) ·Ecomapa (Ecudor) ·ESRI India, ·ESRI Thailand, ·ESRI Slovakia, ·Forest Management Institute (Malaysia) ·GAT Bangkudulis Petroleum Co. (Indonesia) ·GEOIMAGE Pty Ltd. (Australia) ·Geomatics (Argentina) ·Geocadsys (Venezuela) ·Geoanalysis (Chile) ·GEOCONSEIL (Burkina Faso, West Africa) ·Geographic Solutions Inc. (VA, USA) ·Geografx (AZ, USA) ·GEOID OEG (Austria) ·GeoIntelligence (Taiwan) ·Geological Survey of Sweden (Sweden) ·Geomax Information (CO, USA) ·GEOMED (Venezuela) ·Geotech Exploration Services, Inc (Calgary, Canada) ·GeoVista (Sweden) ·Gippsland Forest Management Services(VIC, Australia) ·GIS Center, Feng Chia University (Taiwan) ·Government of Canada, Parks Canada ·Hampton Data Services (United Kingdom) ·Honngi Internatioal Ltd. (TAIWAN) ·Hunter College, City University of New York (NYC, USA) ·IDDI (CA, USA) ·Image Etc. (France) ·IMA/GEO (France) ·IMAGEM SENS. REMOTO (BRAZIL) ·Information OSG Inc (Quebec, CANADA) ·Instituto de Engenharia, de Sistemas e Computadores (Portugal) ·International Paper Corp. (OR, USA) ·Iscor Head Office (South Africa) ·Iscor, Geology Dept (South Africa) ·ISLEM GIS Ltd. (TURKEY) ·Istituto Per Lo Studio Delle, Metodologie Geofisiche Ambientali (Italy) ·Jackson County, Mississippi (USA) ·JS Knight (Singapore) ·Kuwait University (Kuwait) ·Kozo Keikaku Enginerring Inc. (Japan) ·LandVest (NH, USA) ·Landsoft (Malaysia) ·Lattice Research Corp. (Malaysia) ·Lonely Planet Publications Pty Ltd (Australia) ·Lee County (Fort Myers, FL, USA) ·MapInfo UK ·Map Net Inc. (Tokyo, JAPAN) ·Metria (Sweden) ·Midacomp Corp. (FL, USA) ·Mineral Management Services, US Government ·Monmouth Press (Main, USA) ·MIT (MA, USA) ·Mount St. Mary's College (CA, USA) ·Mr. H. SUZUKI (NAGOYA, JAPAN) ·National Caving Assoc. (UK) ·National Park Service (US Government) ·Nuclear Mendoza S.E. (Argentina) ·Natural Resources (Ottawa, CANADA) ·New Mexico University (NM, USA) ·New York Univ., Medical Center (NY, USA) ·NITT GIS Ltd. (India) ·Office of Surface Mining (US Government, KY, PA, OH, IL) ·Oklahoma State University (OK, USA) ·PASCO Automated Mapping Technology (Tokyo, Japan) ·PASCO International (Tokyo, JAPAN) ·Petroscan A.B. (Sweden) ·Pioneer Valley Planning Commission (MA, USA) ·PT. ENDAPROSINDO (Indonesia) ·Pollution Control Department (Thailand) ·Realworld Data, LLC (VA, USA) ·San Francisco State Univ. (CA, USA) ·San Juan, Puerto Rico ·Seton Company (PA, USA) ·SITA (Societe Internationale De Telecommunications Aeronautiques, United Kingdom) ·Slovenian Forestry Institute (Slovenia) ·Software Factory International (Troy, NY, USA) ·Southwest Texas State Univ. (Texas, USA) ·Spatial Information Services Pty Ltd. (Australia) ·SPOT Image Corp. (VA, USA) ·Stetson Engineers Inc. (CA, USA) ·Stevenson Engineering Ltd. (Canada) ·Stockholm University (Stockholm, Sweden) ·Studio d'ingegneria (Switzerland) ·SUNY-ESF (State University of New York, USA) ·Super Full Tech. Co. Ltd. (Beijing/Hongkong, China) ·Synergist Technology Group Inc. (PA, USA) ·Synmap International Chile, S.A. (CHILE) ·Telinstrument Co. (Hong Kong) ·TerraNOVA International (CA, USA) ·Texas Parks and Wildlife (Austin, Texas, USA) ·Texas Tech Univ. (TX, USA) ·Thailand Department of Mineral Resources (Thailand) ·Thailand Environment Institute (Thailand) ·The Cadmus Group, Inc. (MA, USA) ·The Catholic University of America (Washington DC, USA) ·The Institute di Chimica Agraria (Bologna, Italy) ·The Norwegian Univ. of Science & Technology (Norway) ·The University of Auckland (New Zealand) ·Tim Tyler Surveying Inc. (AR, USA) ·Total Information Solutions, Ltd (Cairo, Egypt) ·Trans Pacific Network Co. Ltd (Japan) ·Traverse Land Info Systems (USA) ·Tu Yuan Spatial Data Technology (Beijing, China) ·Turkey Prime Ministry (Ankara, Turkey) ·Volcanex International Pty Ltd (Australia) ·United States Geological Survey (Denver, US Government) ·United States Geological Survey (Purto Rico, US) ·United Nation, Cambodia Mine Action Center (Cambodia, South East Asia) ·Univ. of Aarhus, Denmark (DENMARK) ·Univ. of Chihuahua (Mexico) ·Univ. DEGLI STUDI UDINE (ITALY) ·Univ. of Georgia (GA, USA) ·University of Kentucky, Forestry (Lexington, KY, USA) ·Univ. of Kansas, Center for Research (KY, USA) ·Univ. of

For maps of contours, parcels, transportation or drawings, or hundreds or thousands of them, R2V is the right tool for you because it is being used in more than 60 countries for all types of large and small digitizing projects.

Our users have been impressed by how easy and how fast the digitizing job has become and the prompt technical support we have provided.



Minimum System Requirements: Windows 9X/ME, Windows NT/2000/XP. Pentium CPU or better, 32 MB RAM or more highly recommended, 5 MB hard disk space for the software. and extra space to store your 3D images. 16-bit color or better display.

FREE FULLY FUNCTIONAL DEMO is available at <http://www.ablesw.com/r2v>. Try the demo with your own images to see how much time you can save and how easy the digitizing work can be.

Note: Able Software, Able Software R2V, R2V for Windows & NT, 3D-Doctor are trademarks of Able Software Corp., all other trademarks are the property of their respective holders.

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