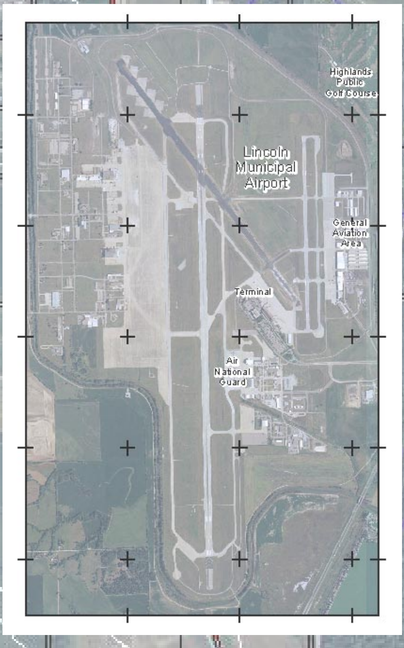
IMAGE MAPS

Applications

Making Image Maps



with

TNTmipsÆ

Before Getting Started

TNTmips provides a variety of tools for working with imagery and related vector data toward a variety of ends including making maps that can be printed and/or distributed as an electronic atlas or 3D simulation. This booklet is intended as a general guide to making image maps in TNTmips. Using a sample image city map layout, it discusses how the different data layers were prepared and assembled, and illustrates the type of results you can achieve with your own data using TNTmips.

Prerequisite Skills This booklet assumes that you have completed the exercises in the *Displaying Geospatial Data* and *Navigating* tutorial booklets. The exercise in those booklets introduce essential skills and basic techniques that are not covered again here. Please consult those booklets and the TNTmips reference manual for any review you need.

Sample Data The data used to prepare the map shown in this booklet is available for download from MicroImages web site from the same page used to download the booklet. Although this booklet does not include exercises with step-by-step instructions on how to use this data, you may wish to view the different data layers and experiment with them before you begin working with your own image map data.

More Documentation This booklet is intended only as an overview of useful strategies for preparing and assembling geospatial data layers to make image maps. As different tasks and procedures are discussed in the text, references are provided to the reference manual and appropriate tutorial booklets with exercises that introduce the tools for performing those tasks in TNTmips.

TNTmips and TNTliteÆ TNTmips comes in two versions: the professional version and the free TNTlite version. This booklet refers to both versions as ìTNTmips.î If you did not purchase the professional version (which requires a software license key), TNTmips operates in TNTlite mode, which limits the size of your project materials.

Merri P. Skrdla, Ph.D., 10 November 2002

It may be difficult to identify the important points in some illustrations without a color copy of this booklet. You can print or read this booklet in color from MicroImagesí web site. The web site is also your source for the newest tutorial booklets on other topics. You can download an installation guide, sample data, and the latest version of TNTlite.

http://www.microimages.com

Welcome to Making Image Maps

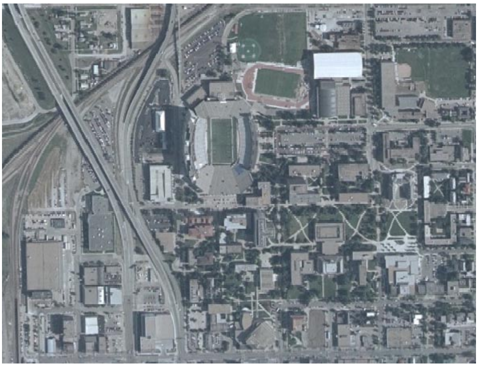
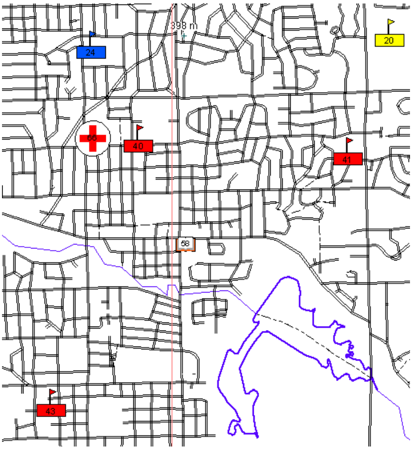
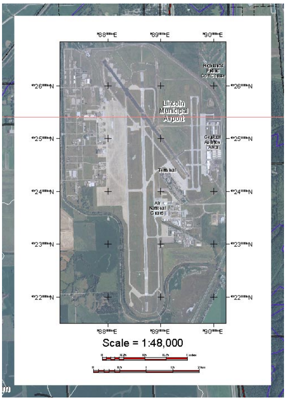


Image maps have an orthophoto or satellite image as the main map base. This image can be grayscale, natural color, color-infrared, or some other band combination. Many types of imagery are now available for free Internet download. In addition to the 2-meter resolution color imagery used in this booklet, the Nebraska Department of Natural Resources provides 1-meter panchromatic digital ortho quarter quads for 1993 and 1999 in compressed or uncompressed form. The data available freely varies from state to state. For example, Arkansas provides multiband satellite data from Landsat 7 processed for same day public access through its RAPID (Real-time Acquisition and Processing of Imagery Data) program.



An image map generally also has a number of other layers, such as roads, hydrology, contours, and other features. You can include as many of these layers as are needed for your application. Standard map components, such as scale bars, legends, and map grids, are also part of an image map. An image map may also include image chips for a classic keys and signatures approach to interpretation of the image in the map.

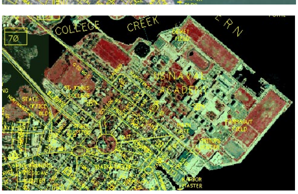


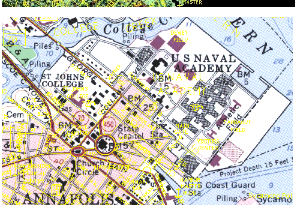
Insets that include areas not on the map or enlargements of areas on the map can also be included as part of an image map. TNTmips provides all the tools to import or create the objects you want and assemble them in a layout to be used for printing and/or distribution as an electronic atlas and/or simulation.

The Image

The imagery used in the map developed for this booklet is a mosaic of color digital imagery derived from JulyñAugust 2001 aerial photography rectified by the Farm Service Agency (FSA). These images have 2-meter resolution and were rectified using existing Digital Orthophoto Quadrangles (DOQ) as a control source. The DOQs used to rectify these images have 1-meter resolution and were developed through a joint effort between USGS and the Nebraska Department of Natural Resources (DNR). The images used for this map are equivalent to those obtained by free download from the Nebraska DNR (http://www.dnr.state.ne.us/databank/fsa.html). The higher resolution DOQs can be used for the image base and are also available for download, but DOQs are often panchromatic. If you think you want the higher resolution and are willing to forgo the color, make sure your printer is of sufficient resolution to support your decision. In a layout for distribution as an atlas, you can include both of these imagery types and more with the viewer choosing which to display.

A good example of layouts with multiple image bases can be viewed at Marylandís Environmental Resources and Land Information Network (MERLIN) web site (http://www.mdmerlin.net). The examples shown at the left include 5-meter natural color, 1.2-meter color infrared, and a scanned topographic map. Each of the image groups is mutually exclusive so that turning on one for viewing turns off the previous selection. The MERLIN web site also demonstrates delivery of an atlas over the Internet using TNTserver and TNTclient.



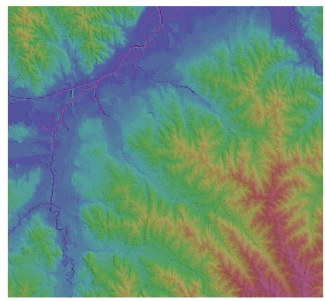


TNTmips supports direct use of rasters in a variety of formats. Using rasters in compressed JPEG2000 format lets you fit high resolution imagery covering a large area on a single CD for atlas distribution. The color imagery used for the sample map in this booklet was acquired on CD in GeoTIFF format. These GeoTIFF files were selected directly for mosaicking without the need to import them first.

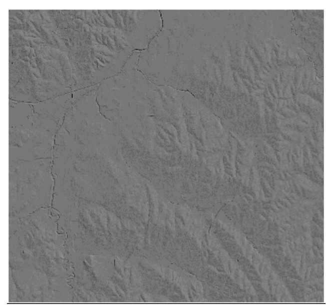
DEMs and Color Shaded Relief

Image maps intended only for hardcopy likely would not contain elevation layers. The map being developed here, however, is intended for hardcopy and atlas distribution with the option to launch a simulation to fly over the area. As a consequence the layout contains a group with the Digital Elevation Model (DEM) both as a surface and as viewable layers in colorized shaded relief. Surface layers are not displayed but are required for 3D perspective visualization and TNTsim3D.

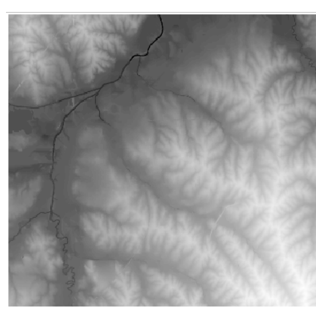
In order to get the color shaded relief effect shown and be useful for 3D applications, the DEM is added to the layout three times: once as a surface layer, once with the Relief Shading toggle on the Options panel of the Raster Layer Controls turned on, and again without relief shading but with a color map selected and 70 entered in the Transparency field, which is also found on the Options panel of the Raster Layer Controls. When a color map is chosen for a shaded relief raster, the color gradient provides shading information rather than the elevation information provided when the color map is associated with the DEM without relief shading, which is why the third, colored, mostly transparent instance of the DEM is required.



Shaded Relief with Colored 70% Transparent Elevation



Shaded Relief



Elevation Values

The DEM layers should be in a group separate from the group that contains the image layer with geographic attachment between the groups so you can take advantage of the mutually exclusive group display feature. When both groups are assigned to the same mutually exclusive group set (Special panel of the Group Settings window), turning one group on turns the other off. If the groups were not mutually exclusive, you would have to hide the image group to see the DEM because the image group draws over it.

One of the DEM layers can also be used to provide the elevation at the cursor location as a DataTip. Be sure this feature is turned on for one raster only.

Mosaicking Images and DEMs

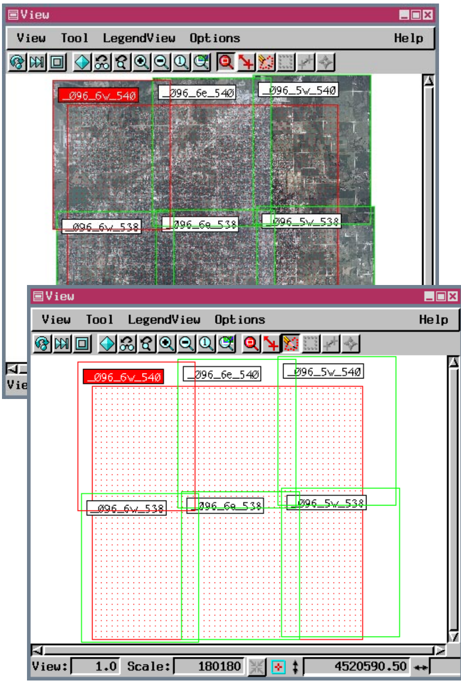


Image maps and atlases often cover a larger area than a single image or DEM. The map created for this booklet uses six orthophotos and two DEMs. Often your area of interest requires multiple pieces but is smaller than the total extents of all the pieces required to cover the area. You can define the exact area you want for output in the Mosaic process by drawing a processing area or using a reference layer or you can accept the total extents for your Mosaic output and use the Raster Extract process later to get the area you want.

The Mosaic process automatically uses georeference information to position the input objects. If the objects are not georeferenced or are poorly georeferenced such that features do not match up across seams, you can manually adjust the position of adjacent rasters using tie points.

The Mosaic layout shown on this page was used to create the single raster that provides the base image for the map. You can switch between viewing thumbnails of the images and viewing just their wireframes. The processing area is more readily visible in the wireframe version of the layout.

DEMs do not suffer from the optical artifacts often found in aerial photographs, such as vignetting (darkening toward the edges of the image) and differences in contrast, that present a challenge for mosaicking images. The Mosaic process has trend removal and contrast matching features built in to help with these issues. You can choose a model histogram or a reference raster for contrast matching and specify whether to match the entire raster or a designated area.

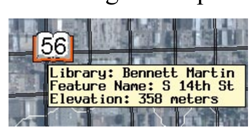
There are also a variety of methods provided for making transitions in the areas of overlap in the mosaic layout. These include feathering, using the last raster, averaging raster values, using the maximum or minimum value, selecting values in a chessboard fashion, and random mixing.

TIGER/Line Data

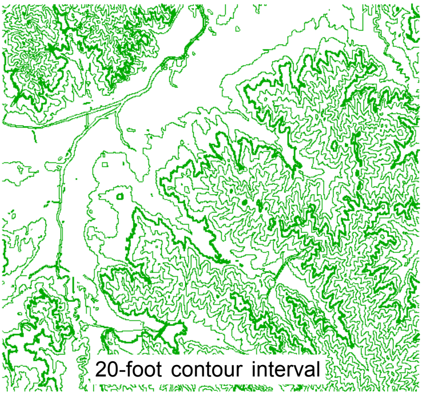
TIGER/Line^{Æ} data, including that from the 2000 census, is available for all states in the United States of America by county. This data is available for download free of charge (http://www.census.gov/geo/www/tiger). You just need the FIPS (Federal Information Processing Standards) code for the desired county, which can be obtained from the same web site (TIGER files are named TGR + 2-digit state FIPS code + 3-digit county FIPS code, for example, TGR31109 for Lancaster County, Nebraska). When you unzip the downloaded file, you have a collection of files all with the same name but different extensions. When you import TIGER data, you select the first of these files and TNTmips creates a single vector object that contains the information from all of these files.

You also get a style subobject that contains styles suitable for all the element types present in a TIGER file.

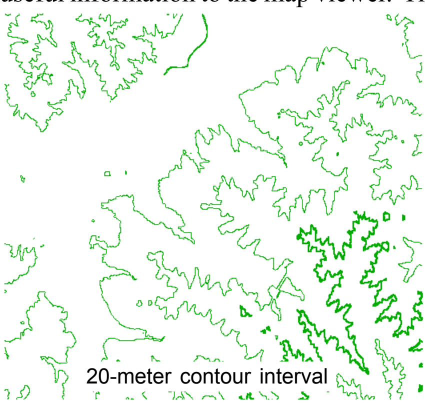
Map scale controlled visibility is desirable for urban areas because TIGER data contains all the streets, which makes a very cluttered full view. You can choose to hide elements according to their associated attributes rather than turning the map off entirely at small scales. TIGER data rarely matches the obvious position of the same features in the image base. For electronic delivery, you can hide the TIGER layer but still use it to provide DataTips.



Contour Lines


20-foot contour interval

Contour lines are lines with constant ground surface elevation and a constant elevation increment between successive lines. You can generate your contours in the Surface Modeling process from the same DEMs you use in your layout. You may be able to find contours for the area of interest in a vector format that can be imported. Contours in TNTmips are generated as 3D-XY vector objects. This more compact 3D format does not maintain Z coordinates for each line vertex because, by definition, the Z value is the same for all vertices of a contour line.

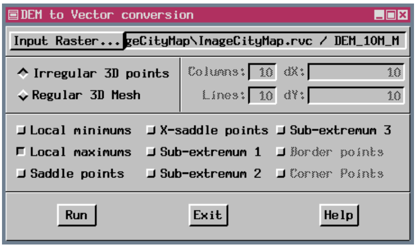

20-meter contour interval

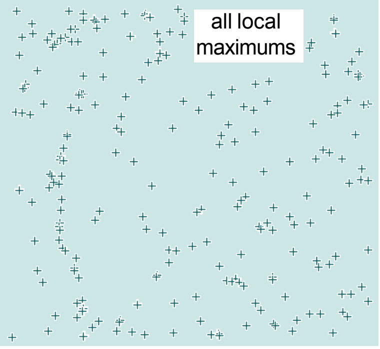
Contour lines are not necessary in an image map, but they do provide additional useful information to the map viewer. The contour interval for contours incorporated in an image map should be greater than if the contours were generated for a topographic map where they are the main map feature. A 20-meter interval was used for the map developed here because the area is fairly flat (total elevation variation of 90 meters). A larger interval would be appropriate for use with an image map of steeper terrain to avoid detracting from the image.

If your contours are generated from a scanned topographic map that has been converted to vector form (see the Digitizing Soil Maps booklet), TNTmipsí Spatial Data Editor has an interactive tool (Set Contour Z Values) for assigning Z values to the contour lines. The Editor also provides a wizard for contour labeling that sets up major and minor contour intervals with different styles if desired. As with all labels, contour labels can be placed above, below, or centered on the line and you can choose to clip the portion of the line where the label is positioned. The clipping distance can be adjusted at any time. The label baseline can be straight, splined, match the line, or be orthogonal to the line.

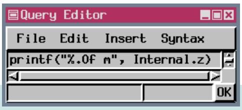
Local High Points

Local high points are another elevation feature that you may wish to include in your map. These can be derived from a DEM using the Extract Important Points process choosing the Irregular 3D Points method. You can turn off all the options except the Local Maximums for this application. You will likely get more local maximums than you want for an image map (below, left). Use the Spatial Data Editor to examine the values of clustered points in the output. Keep the one point in a cluster with the highest value or, if all points have the same value, keep the point that most improves point spacing. This method was used to reduce the number of points from the 242 output by the process to the 19 used in the final map.

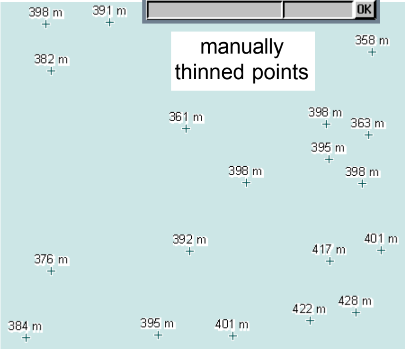




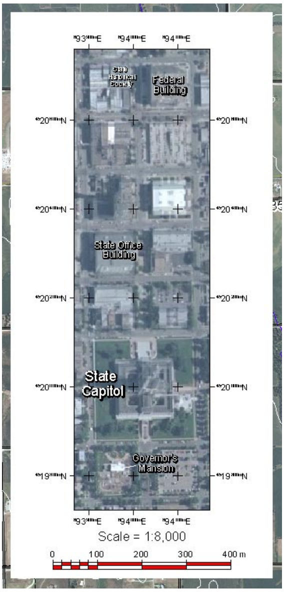
You can use the on-the-fly labeling provided by the Display process for these points. You can choose from nine different label positions with the choices expressed as the position of the label relative to the point. Right Center, for example, places the label to the right of the point and vertically centered. Upper Center was used for labeling the thinned points (below, right). You can label by attribute or by script. Choosing to label by script lets you add the units to the label, which is often useful to the viewer. The script to produce the labels illustrated is shown at the right. It uses the Z values or the points and appends an *m* to indicate the elevations are in meters.



You may also want to include points that indicate high structures, such as radio towers, with this layer or as a separate vector object. You may want to use a special symbol for these points rather than the enhanced crosshair that is available as a standard symbol choice. Using the enhanced crosshair with contrasting colors makes the points easy to see over any background.

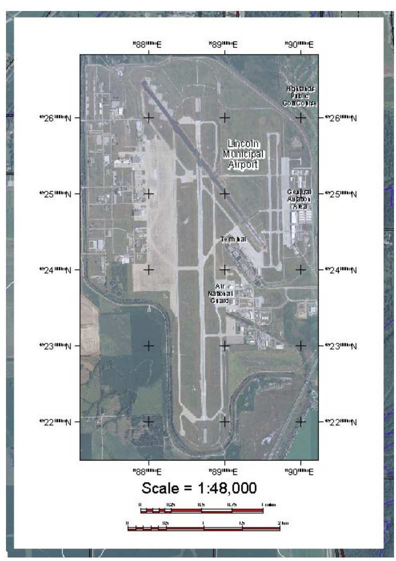


Map Insets



You may want to enlarge an area of the map for reference or even include an area that is not on the map but is related. The map developed for this booklet contains two insets: one that shows an area on the map at a larger scale and another that shows an area not on the map at a smaller scale. You change the map scale of individual groups by changing the groupís relative zoom in the Group Settings window. Do not change the map scale shown in the Group Settings window because that pertains to the layout as a whole, not to individual groups. You need to also change the relative zoom of any scale bars associated with the inset or the scale provided will be incorrect. The layout scale for this map is 1:24,000. The inset at 1:8,000 scale has a relative zoom of 3.0, and the inset at 1:48,000 has a relative zoom of 0.5.

You will likely want to label features in the inset image for which you have no corresponding vector points. Such labels can be easily created in the Spatial Data Editor using the image as a reference for a new vector or CAD object. You do not have to add points and label them; you can directly position text elements in the object you create. Style these elements as desired when you add them, then choose Label / Style: By Element for their display in your map layout. You can also change the style used for all labels and maintain their different heights using the All Same style specification with the Use Element Height toggle on. If you turn this toggle off in Display, all labels will be the same size.



To complete the inset, you need to add a matte to the group that contains the inset image. There is a Matte panel in the Group Settings window that provides the controls for your matte. You could make a matte with two colors and a gradient fill between them, but solid white is probably best for this application.

Image Chips

The keys and signatures approach to image interpretation uses a collection of annotated images to identify features in other imagery. These annotated images provide selection keys to identify similar spatial signatures in other images. You can apply this approach to features in your image map that are not identified by unique vector symbols.

Memorial Stadium/
Tom Osborne Field

Tractor Test Track

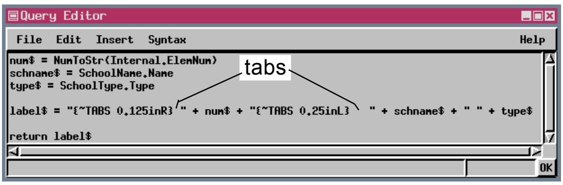
Haymarket Park
and Parking

You may want to identify features on the map that are not represented by vector symbols. There are a number of means to accomplish this end. You could add your base image to a separate group and use group clipping to show just the desired portion of the image. You could use the Print Screen function of your operating system (command-shift-3 on a Mac) then use a graphics package to trim out the portion you want and save it in a format that TNTmips can import or link to directly. A third method is to use the XWDTIFF utility provided by MicroImages, which lets you draw a box on the screen and capture the contents in TIFF format. You need to run TNTmips in the X Desktop mode for this method to be available. The Basic System Operations volume of the Online Reference Manual explains how to introduce this capability in the section entitled *Customizing the TWM Program Menu*. The utility is not on your TNT products CD but can be downloaded from MicroImages web site. The third method was used for the image chips on this map.

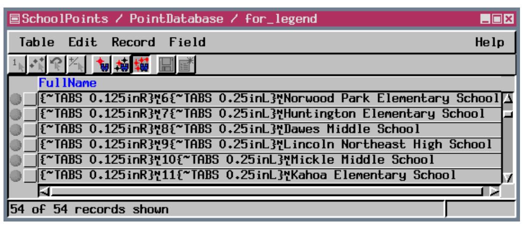
For aesthetic purposes, image chips in the same column in your layout should be the same size. This is accomplished in the first method by making sure your clipping extents have the same range for each of the chips. The means of achieving size consistency will vary with the software used in the second method. In the third method, you can use the rectangle tool in the GeoToolbox to achieve size consistency. You simply find the largest feature you want to present as an image chip and draw a rectangle that encompasses it. Use the rectangle as your guide when drawing the elastic box to define the image capture area. Then move the rectangle to the next location and center it on the feature there before image capture.

Text Legends from Database Attributes

Some maps contain numbered features that should be identified individually, such as the schools, libraries, and hospitals on the map developed for this booklet. Typically, the identifying information is available in a database associated with the object although it may be in multiple tables. This information can be assembled into a single string expression field complete with formatting codes and output to a text file that provides a suitable legend.



The schools, libraries and hospitals have on-the-fly labels provided by the internal element number or the internal element number plus a constant to avoid duplicate numbers. This label information can come from any field. The legend entry for the schools should include both the name and the school type, which are in two separate fields. All three fields will be included in the string expression. You can include as many fields as needed to get the information you want in the legend.



TNTmips provides a number of formatting codes for text including left, right, and center tabs with leader lines if desired. Placing these formatting codes in the string expression provides all the information needed to make your legend appear as desired when added as a text group in your layout. The codes shown in the string expression and resulting database table, which has an implied one-to-one attachment, place a right aligned tab at 0.125 inches and a left aligned tab at 0.25 inches. The formatting codes are described in the *Display* volume of the Online Reference Manual in the section entitled *Embedded Text Style Codes*. What appears to be spaces in the string expression between the closed curly bracket (}) of the tab formatting codes and the closing quote (") is actually a tab. Once your table is set up, choose Table / Save As in tabular view and select Tab Delimited for the format. Next add a text group and select the output file for your text layer (File / Open in the text layer controls). The only modification made to the output file was to add a heading.

Lincoln Public Schools

1	Goodrich Middle School
2	Belmont Elementary School
3	Campbell Elementary School
4	West Lincoln Elementary School
5	Lakeview Elementary School
6	Norwood Park Elementary School
7	Huntington Elementary School
8	Dawes Middle School
9	Lincoln Northeast High School
10	Mickle Middle School
11	Kahoa Elementary School
12	Pershing Elementary School

Map Scale Controlled Visibility

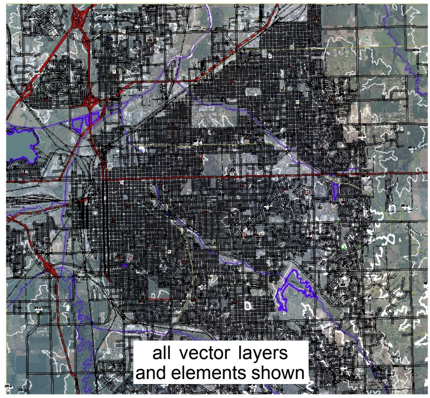
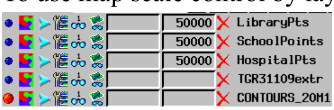
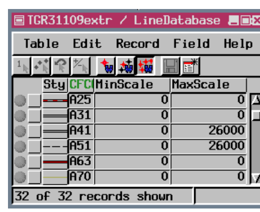
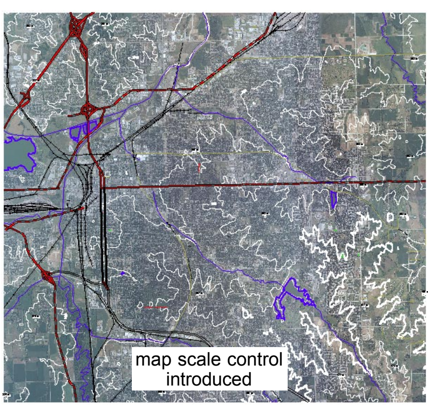


Image maps displayed at full view with all layers on often appear quite cluttered. This may not matter to you if the map is intended for hardcopy only. However, if the map will also be used in TNTatlas and TNTsim3D, its appearance on the screen is important. One approach is to simply have some layers hidden and the viewer can turn them on if desired. Another approach is to control what is visible by map scale. Atlases with a large number of overlays may require that both approaches be applied. All of the TNT products have the ability to control what layers and elements are visible by map scale.

There are two methods to control visibility by map scale: by layer and by element. To use map scale control by layer, turn on the Show Scale Ranges toggle on the Options menu in the Layout Controls window. Two text boxes appear in each layer row in the Layout Controls window. The left column indicates the scale value at which you want the layer to disappear when zooming in. This feature is useful when you want to replace low resolution imagery or a scanned map with high resolution imagery as the viewer zooms in. The right column tells you what scale value the layer becomes visible at as you zoom in. The illustration (above, left) shows that schools, libraries, and hospitals do not appear until zoomed in to 1:50,000 or closer. Map Scale control by element is a selection option in the vector and CAD Layer Controls windows. When you click on specify, a scale control table is created after you select an attribute for scale control assignment. After the table is created, you can edit it like any other database table to change the scale at which elements are visible.

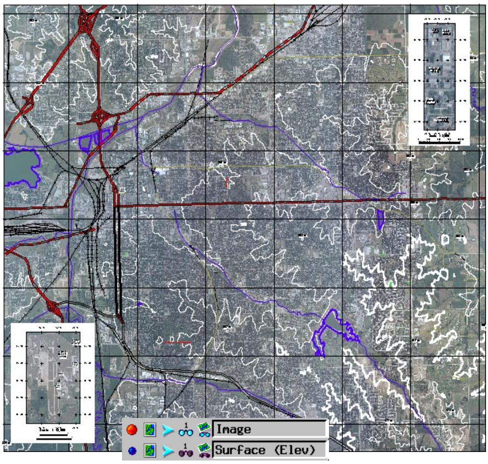






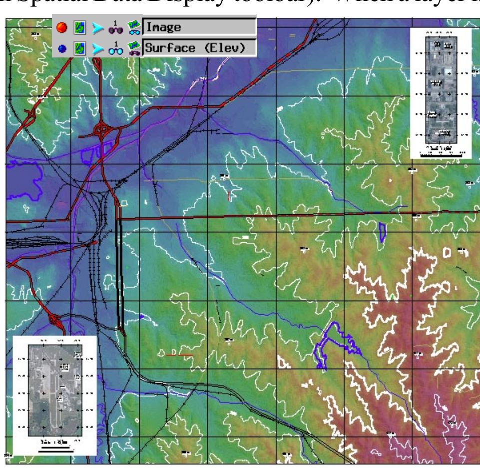
Mutually Exclusive and Hidden

The strategy for creating a map to print is simple: put the image and all its overlays in a single group and add legends, scale bars, a north arrow, and so on. The strategy for a map distributed as an atlas is not so simple. As already mentioned, the image and the DEMs are in separate, mutually exclusive groups so that the viewer does not have to both unhide the surface group and hide the image group to view the surface data. Because these two groups are mutually exclusive, the vectors would not be available for viewing over the DEMs if they were in the same group with the image. So the vectors are in a separate group that is geographically attached to the image.



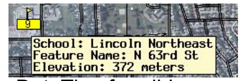
When you build a comprehensive atlas, such as MERLIN, there can be so many layers that it just is not practical to display them all, but you may want to display some of them together so they should not be mutually exclusive. These layers can just be hidden and the viewer can turn them on if desired.

The display will not change when a group in a mutually exclusive set is unhidden, unless you redraw or have the *Redraw after any change* View option turned on (Setup/View Options from the main Spatial Data Display toolbar). When a layer is unhidden, whether mutually exclusive or not, it is redrawn on top of the other layers present regardless of how the *Redraw after any change* option is set.



Hiding a group or layer for printing is separate from hiding them for viewing. For this map the DEMs should be hidden for printingóthey will not show in the final print either way but the time required to render them is eliminated when Hide on Hardcopy is set.

DataTips

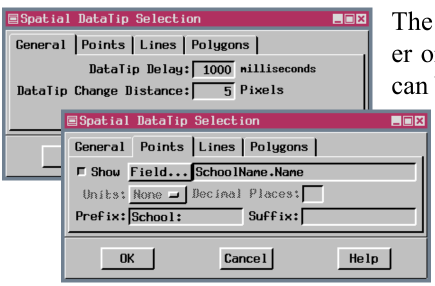


DataTips for all layers

DataTips for active/top layer

Creating a top of the line atlas requires attention to details, such as DataTips and LegendView appearance (see the Designing Electronic Atlases booklet). DataTips are not relevant in a printed map but they are quite important and often overlooked in atlas design. Most atlas viewers are looking to gain information. There is a good deal of information that can be provided if they simply pause the mouse over the View window if DataTips are properly set up.

Just because you can provide information about all layers doesnít mean you should. An atlas viewer will not likely care about the RGB values of the image, so the DataTips for the image layer should be off. For streets you want the field that provides the street name rather than the line length as the DataTip, which is the default choice. In some cases the choice of which field to use will not be as clear.



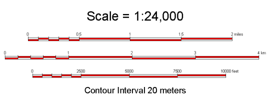
The field to use for the DataTip and whether or not to show a DataTip for that layer can be set in the Layer Controls window or using the Setup DataTips choice on the Tools menu for the layer. The window that opens from the Tools menu also has a General panel that lets you set the delay before a DataTip appears and the distance the mouse has to move before a new DataTip is generated. These settings apply to the DataTips for all layers in the layout.

Do not just accept the default prefix for your DataTip unless it is the best one you can think of. When you select a different field for the DataTip, the default prefix is the field name, which means there are no spaces or special characters. Spaces and special characters are allowed in DataTip prefixes and suffixes. In those cases where you want length or area for the DataTip, you probably want a suffix that identifies the units of the DataTip. The DataTip units can be set whenever you pick a field that has assigned units. These are separate from the units you pick for viewing the same field in the database table. It is recommended that you match your field viewing units and DataTip units to avoid viewer confusion.

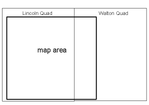
Showing DataTips for all layers, not just the visible or active/top layer is recommended for an atlas. This cues the viewer that there is additional information present if you have many hidden layers. DataTips do not show for any elements or layers that are not shown because of map scale controls.

Other Map Features

Spatial Data Display has many built-in features to make map making easy. Scale bars, text, and multi-object legends are managed as part of the layout rather than as separate files to keep track of. Because these object types do not have georeference, they are positioned as separate groups with their size designated in their respective layer control windows as relative to the layout design scale or a specified fixed map scale. See the *Making Map Layouts* booklet for more information on these object types.

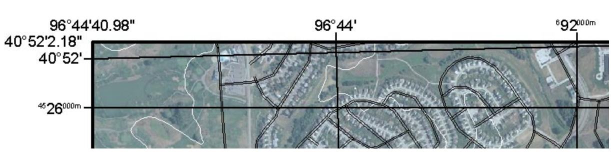


An index map is frequently included to assist the viewer in determining the location of the area mapped. The area represented by the map developed for this booklet is indicated by a rectangle that covers a portion of two adjacent map sheets, which are identified. Maps that cover larger areas are often represented as a small rectangle on a state or country outline map. A sample of this type of index map is shown in the *Making Geologic Maps* booklet. The object used for an index map is generally georeferenced, which means it must have a reduced scale assigned to its group in the Group Settings window. The Relative Zoom for this index map (relative to the 1:24,000 scale of the map) is 0.1.



The declination graphic used in the layout is a Spatial Manipulation Language (SML) layer. This script works for multiple maps with the requirement that you change the value for degrees to magnetic north in the script itself to be correct for the map location that uses the script. This group may also require adjustments to the relative scale. The specific text that is generated for the declination graphic can be altered in the script. Consult the *Writing Scripts with SML booklet* for more information on this layer type.

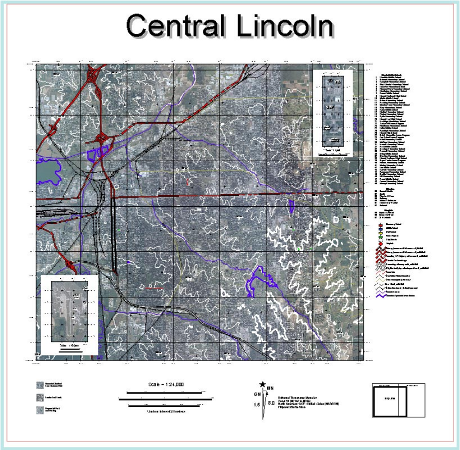
Two map grids are included in the layers group: one a Universal Transverse Mercator (UTM) grid and the other in Latitude / Longitude. The Latitude / Longitude map grid uses only interior and border ticks (no grid lines), and also provides corner coordinates. The UTM grid uses all the graphic components except interior ticks. Map grid labels do not collideóone label simply is not drawn if the display process thinks they will collide. There is, therefore, no point in selecting corner coordinates for two different grids. Some label styles drop leading numbers. You need to be sure that your map grid interval and extents are large enough to make sense with these choices; otherwise the map will appear to have duplicate labels.



Using a Hardcopy Layout in an Atlas

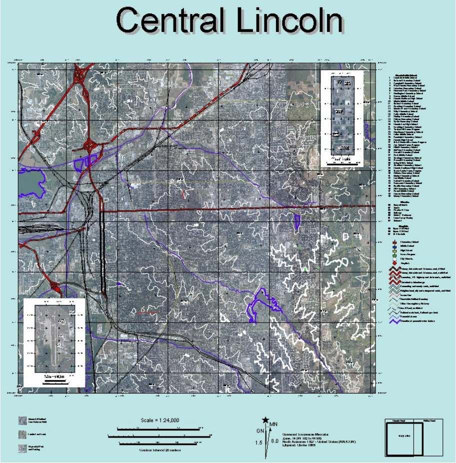
Some considerations that arise for an atlas that are not of concern for hardcopy layouts have already been discussed. It is recommended that you read the *Designing Electronic Atlases* booklet for other considerations, such as choosing appropriate samples for LegendView. That booklet is largely directed at creation of hierarchical atlases, but many of the principles apply to single layout atlases as well. You could add some HyperIndex links to your single layout atlas if desired, such as a link to a web cam in the area or the web site for a feature on the map, such as the Nebraska State Capitol inset.

One consideration is whether you want to use your hardcopy layout as is in the atlas, which means with a page background, or you want to use a display layout, which means you can have any color background (including white) and not have the red page outline (the page outline only shows in TNTatlas for X). If you assemble your hardcopy layout with conversion to a display layout in mind, the transition can be trivial. You may have previously switched from hardcopy layout to display layout mode and seen a number of the groups in the layout stack up on top of each other. These groups were attached to the page or margin, which does not exist in Display mode. If you attach just one group to the page or margin and make all other attachments and spacings relative to that group or another group attached to it, the positioning of groups in Display layout mode will be exactly as it was in Hardcopy layout mode. If a white background is fine, then you can directly use your hardcopy layoutóthe concept of a page is maintained whether or not the outline is shown.



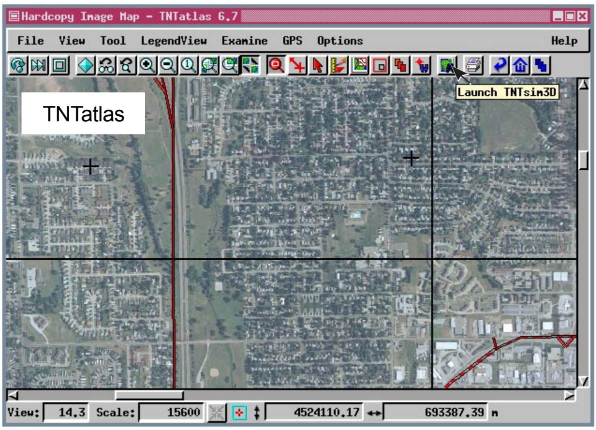
Hardcopy Layout Mode

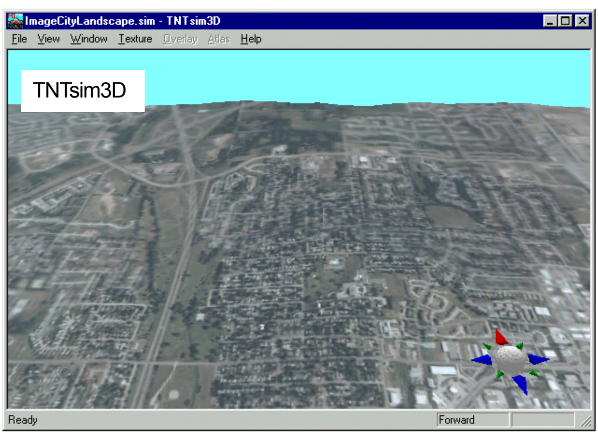
Display Layout Mode



Incorporating TNTsim3D

Many people have a difficult time relating orthophotos to the ground areas they represent. Providing a simulation flyover to run in TNTsim3D may help orient the viewer so they can better interpret what they are seeing in the two-dimensional TNTatlas view. It is also a quick way to locate points of interest in the landscape since you can jump back to the same atlas or even to a different atlas while navigating through the simulation. You can think of the simulation as an overview for the atlas because fewer layers are generally included.



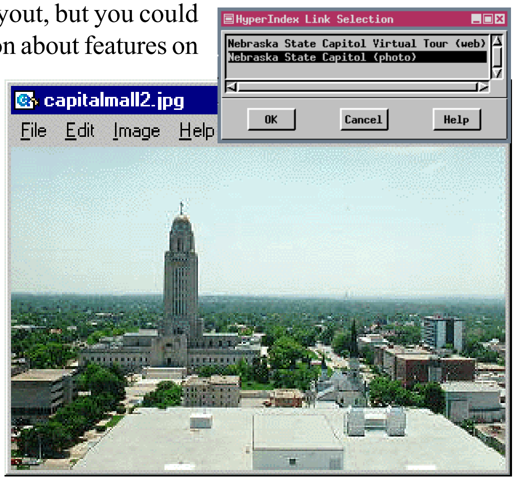


If you want to include a simulation in your map layout / atlas package and media size is an issue, you should think about using the Landscape Builder to create your simulation file before you even start on your map. You can introduce the desired amount of compression into your terrain and texture rasters when the Landscape File is created and use these same rasters in your layout and atlas (the selection process lets you chose rasters from within a *.sim file just as you do from a *.rvc file). You do not have to decide on all your texture layers for the simulation at this point because you can add to a Landscape File at a later date.

The steps required to move between TNTatlas and TNTsim3D are discussed in two color plates entitled *Launching TNTsim3D from TNTatlas* and *Using TNTsim3D to launch TNTatlas*, which are available on MicroImagesí web site.

Remember Your Audience

You may be working under a contract that is very specific about what is included in your printed map that also specifies the data be delivered in atlas form. It is unlikely more than an electronic version of the map is expected for the atlas, but it is easy to provide more features. You probably would not want to create a hierarchical atlas from a map layout, but you could provide links to more information about features on the map. Consult the *Constructing an Electronic Atlas* and *Designing Electronic Atlases* booklets for more information on this topic.



Consider your audience before preparing these add-on features. If the atlas viewer is unlikely to have web access, there is no reason to create HyperIndex Links to URLs. You can, of course, create links to files included with the atlas and to web sites so the viewer can choose both if an Internet connection is available. Consider the format of an attached file; donít attach a Photoshop fileó attach a .gif or .jpeg, which have viewers in most operating systems.

The web sites and other linked files should also be geared toward your intended audience. A general audience might be more interested in local points of interest while conference planners would want to know about local accommodations and conference facilities and agricultural consultants would be more interested in soil type information and extension office location. You can try to appeal to more than one audience with your HyperIndex Links, but remember, simpler is better for most people not already familiar with the software. The map developed for this booklet has both web and image links for the Capitol and airport insets.

Advanced Software for Geospatial Analysis

MicroImages, Inc. publishes a complete line of professional software for advanced geospatial data visualization, analysis, and publishing. Contact us or visit our web site for detailed product information.

TNTmips TNTmips is a professional system for fully integrated GIS, image analysis, CAD, TIN, desktop cartography, and geospatial database management.

TNTedit TNTedit provides interactive tools to create, georeference, and edit vector, image, CAD, TIN, and relational database project materials in a wide variety of formats.

TNTview TNTview has the same powerful display features as TNTmips and is perfect for those who do not need the technical processing and preparation features of TNTmips.

TNTatlas TNTatlas lets you publish and distribute your spatial project materials on CD-ROM at low cost. TNTatlas CDs can be used on any popular computing platform.

TNTserver TNTserver lets you publish TNTatlases on the Internet or on your intranet. Navigate through geodata atlases with your web browser and the TNTclient Java applet.

TNTlite TNTlite is a free version of TNTmips for students and professionals with small projects. You can download TNTlite from MicroImagesí web site, or you can order TNTlite on CD-ROM.

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