

*Introduction to*

# Designing Electronic Atlases



with

# TNTmips®

# TNTserver™ and TNTatlas®

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## Before Getting Started

TNTmips® provides all the tools needed to create hierarchical or single layout atlases. TNTedit and TNTview can create single layout atlases. You can publish and distribute the atlases you create for use on any computer with a CD-ROM drive using TNTatlas. Or you can provide access to them over an intranet or the Internet using TNTserver.

**Prerequisite Skills** This booklet assumes you have completed the exercises in the *Displaying Geospatial Data* and *Navigating* tutorial booklets. Those exercises introduce essential skills and basic techniques that are not covered again here. Please consult these booklets for any review you need. There are also five additional booklets specifically related to making and using atlases: *Constructing an Electronic Atlas*, *Using TNT Atlas for Windows*, *Using TNT Atlas for X Windows*, *TNTserver and Clients*, and *A Case Study: MERLIN: Enterprise-wide Geospatial Analysis*. The mechanics of building a hierarchical atlas using the HyperIndex Linker tool are described in the first booklet. The second and the third booklets provide an introduction to using TNTatlas. The fourth booklet describes specifics for TNTserver managers and the features of the available clients for use over the intranet or Internet. The last booklet describes how the data covering the entire state of Maryland is provided for internal and Internet use.

**Sample Data** This booklet does not use exercises with specific sample data to develop the topics presented. You can, however, visit the MicroImages' test atlas web site (<http://atlas.microimages.com>) to explore how these concepts have been implemented. Just choose from the list of public atlases. Some of the atlases listed are hosted at MicroImages' web site and other listings are links to additional web sites with TNTserver.

**TNTmips and TNTlite®** TNTmips comes in two versions: the professional version and the free TNTlite version. This booklet refers to both versions as "TNTmips." 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. Most atlases incorporate data sets that far exceed the TNTlite size limits. This restriction can be circumvented by viewing atlases with TNTatlas, TNTatlas for Windows, or one of the other free products from MicroImages for use with TNTserver.

*Merri P. Skrdla, Ph.D., 2 May 2005*

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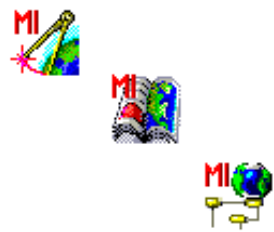
It may be difficult to identify the important points in some illustrations without a color copy of this booklet. You can print or read this booklet in color from MicroImages' web site. The web site is also your source of the newest tutorial booklets on other topics. You can download an installation guide,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

**<http://www.microimages.com>**

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# Introducing Atlas Design

There are two basic atlas organizational strategies: hierarchical and single layout. (These strategies are discussed on the following pages.) TNTmips provides all the tools to assemble both hierarchical and single layout atlases. You can also create single layout atlases with TNTedit and TNTview. Although the tools are powerful and simple to use, careful consideration of how best to present your data is required. This consideration needs to include not only the scope of the data you have, but who will be using the atlas, and the method(s) of delivery.



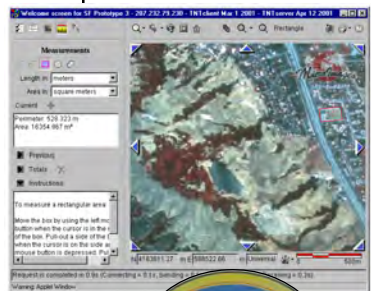
An atlas in the context of the TNT products is a collection of related objects used to present information on a particular topic. The viewer interacts with the atlas to determine the path taken through the available information. This information can be entirely graphical, all georeferenced, or a mixture of the two. The word *stack* is used interchangeably with *atlas* because neither word is entirely adequate to describe all possible applications. The connotation of *atlas* is geographic, which omits such applications as electronic museums or parts catalogs. The term *stack* is inadequate because it implies linearity, and stacks are not limited to simple linear or treelike structures and can even be a single, complex layout.

**Note:** Be sure to also read the *Constructing an Electronic Atlas* tutorial booklet, which discusses the mechanics of building an atlas, or stack. That booklet describes the practical application of many of the topics discussed theoretically here.

Once you have used the tools to build your atlas, you can use the atlas

- on your machine with any TNT product
- over your intranet (single user access)
- on CD-ROM distributed with TNTAtlas
- over your intranet with multiple user access provided by TNTserver and a Java or HTML client
- over the Internet with multiple user access provided by TNTserver and one of the clients.

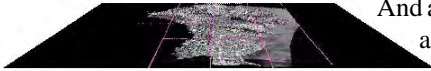
Your choice for use and distribution of your atlas is not limited to one of the above, in fact all of the methods listed can be used for a single atlas.



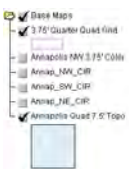
# Give It Some Thought

Additional planning considerations are discussed in the *Constructing an Electronic Atlas* tutorial booklet.

This atlas does not provide a choice of base layers when going from the county level to the map quadrangle level, however, all the layers shown in the options below are available for viewing (see layer controls comparison below).



If you compare the layer controls for these two Base Maps groups, you will see that they contain the same layers, but different layers are selected for viewing. The layer controls with the topographic map visible (top) appear exactly the same for either atlas construction.



Spending some time considering the scope of materials you want to include in your atlas and planning its organization is time well spent. It will likely save you time when you assemble the atlas. It may seem like you start with the Welcome screen, but actually it's a finishing detail. You start by getting all the imagery and overlays in the form you want. When the individual layers are in appropriate form, you assemble them into layouts if needed for your desired presentation.

Once the individual components are assembled, you can start atlas construction. You can, of course, make changes in your plan after the atlas is started.

And atlas components not yet prepared when atlas construction is started can always be added later. However, if you haven't initially planned well, you may find it necessary to redo layouts or artwork or you may run into various other complications that increase the time and cost required for what could have been a simple project.

Consider not only your data but the intended audience. Will you need layouts with annotations to assist users? Is the concept of hidden layers waiting to be exposed by those interested in their content too sophisticated? Should you consider omitting some of your data and creating a simplified atlas for some users but a more complete atlas for others? Do you want a single defined path through your atlas, or should users be given a choice at some points?

Two different atlas designs that provide access to the same information are illustrated here. In the atlas shown above, the user has no choice which base layer is initially shown.



Topographic Map

Color-infrared Airphoto

Natural Color Airphoto

# Naming and Templates

One aspect of planning that may seem overly simple is consideration of layer and group naming. Believe it or not, having standard layer and group naming conventions can save you a tremendous amount of time during atlas construction, particularly when combined with the use of layout templates.

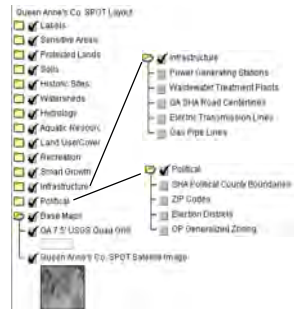
Let's use MERLIN as an example of how use of naming conventions and templates can save you time when assembling a large scale atlas. These techniques can of course be applied to smaller scale atlases and from one atlas to another.

At the county level of the MERLIN atlas, there are 24 layouts, one for each county, with identically named groups. Although the group names and layer names at the county level are the same from one county to the next, the objects for each of these layers varies between counties. At the topographic quad level (of which there are 260), the group names are the same as at the county level with the addition of the Real Property group. The objects used for the layers in these groups are the same as those used at the county level except in the Base Maps group.

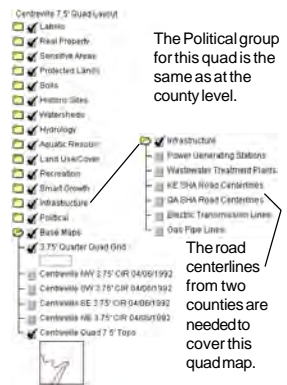
To start building the atlas, you would create and save a layout for any one of the counties. Then do a *Layout / Save As* for each quad in the county, add the Real Property group for the quad, and replace the layers in the Base Maps group. You would also do a *Layout / Save As Template* from the original county layout. This template is used for each of the other counties. When the template is opened, you are prompted to replace the layers in each group. Since for this example you would have your layers organized by county and group name, it is a simple matter to change the layers from county to county, particularly if all layers for a group are in a single project file. Then save the layout and do a *Layout / Save As* for the new county and make the few modifications required to create the quad layouts for this county.

**MERLIN** is Maryland's Environmental Resources and Land Information Network developed and maintained by the Maryland Department of Natural Resources (MDNR). MERLIN is used over an intranet by MDNR and other state agencies and provided online to the public over the Internet at <http://www.mdmerlin.net>. The atlas (versions 1 and 2) is hierarchical with a statewide level, a county level, and a topographic quad level.

## County Level



## Topographic Quad Level



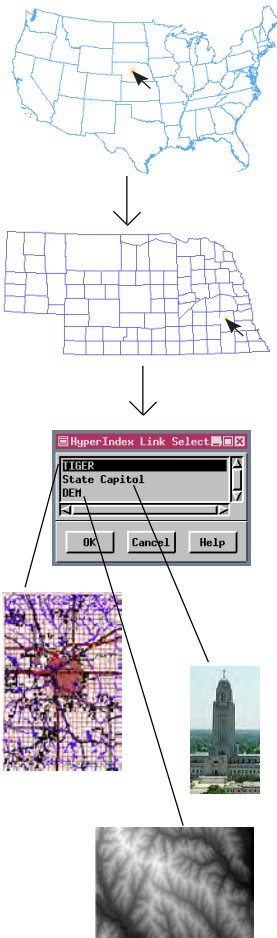
The Political group for this quad is the same as at the county level.

The road centerlines from two counties are needed to cover this quadmap.

You can have a different number of layers when you replace a template's group contents.



# Hierarchical Atlases



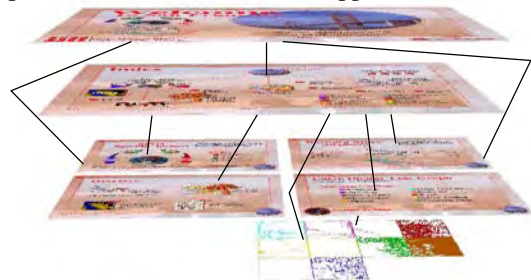
Hierarchical atlases have a logical arrangement in which you move from more general to more detailed information often using branching paths. You can move back up and go down another path or move laterally among the links from a single parent object. A hierarchical atlas has the general, inverted tree structure of a genealogical chart. However, unlike a genealogical chart, you can build in short cuts so you can skip one or more levels.

You click on the element or area of interest to move through the atlas. Once you click, the next level down is displayed. If the location you click has more than one link, a window pops in (TNTAtlas) or a menu pops up (TNTclient) so you can choose which you want to view. You can then get to the other choice(s) using the lateral navigation arrows in either the HyperIndex Navigator (if running TNTmips or TNTAtlas) or at the edge of the viewing area (if running TNTclient or TNTbrowser).

You can mix purely graphical layers with geospatial layers in a hierarchical atlas. The first level generally provides a graphical introduction to the atlas' subject matter. Links to geospatial data can be mixed with links to other graphical elements. You can also have an entirely graphical atlas, such as a pictorial anatomy with annotations.

Links can also be to external files or to URLs in a hierarchical atlas. Such links will automatically open the necessary application as well as the file provided the atlas user has the application installed.

In the San Francisco atlas, you can get from the Welcome screen to the USGS DLG layers for the Hayward map quad in either two or three clicks. The third level has many more graphics than shown here.



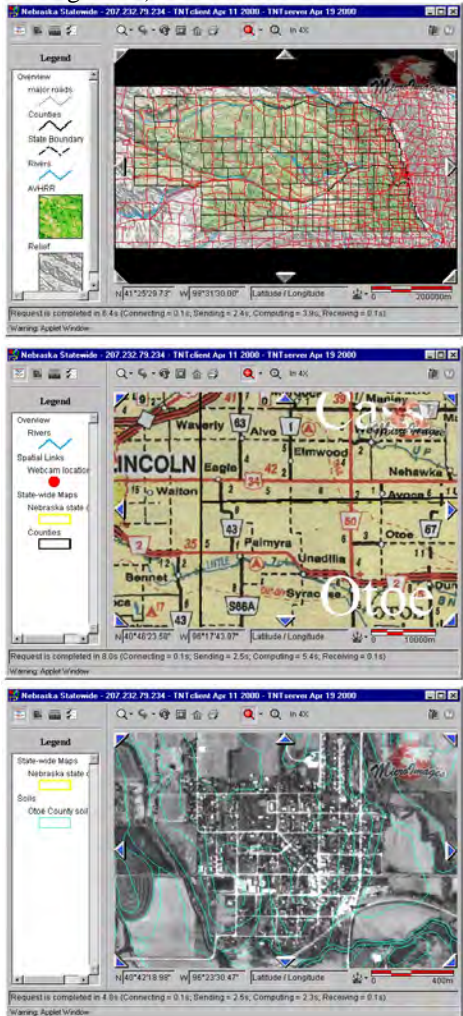
# Single Layout Atlases

Single layout atlases make use of TNTmips' map scale controlled visibility feature, which turns layers on and off as you zoom in and out depending on the current map scale of the displayed layout and the visibility range set. Because visibility is map scale dependent, all layers must be georeferenced—you do not have the option of intermingling simple graphics with geospatial data (without using tricks).

The legend changes to reflect the currently visible layers in TNTclient. The layer controls panel does not change. The Nebraska Statewide atlas (below) has three different base images depending on the map scale.

In a single layout atlas, whenever you zoom to full view, you are back to the “beginning” of the atlas. How far you need to zoom in before the visible layers change is entirely under the control of the atlas designer. The visible map scale range can be shown and altered for an atlas viewed with TNTmips but not with TNTAtlas or TNTclient. As with a hierarchical atlas, a single layout atlas may contain layers that are not turned on for viewing unless the user turns them on. If the layer happens to have a limited scale range of visibility, turning the layer on will not make it visible unless you are in the correct scale range.

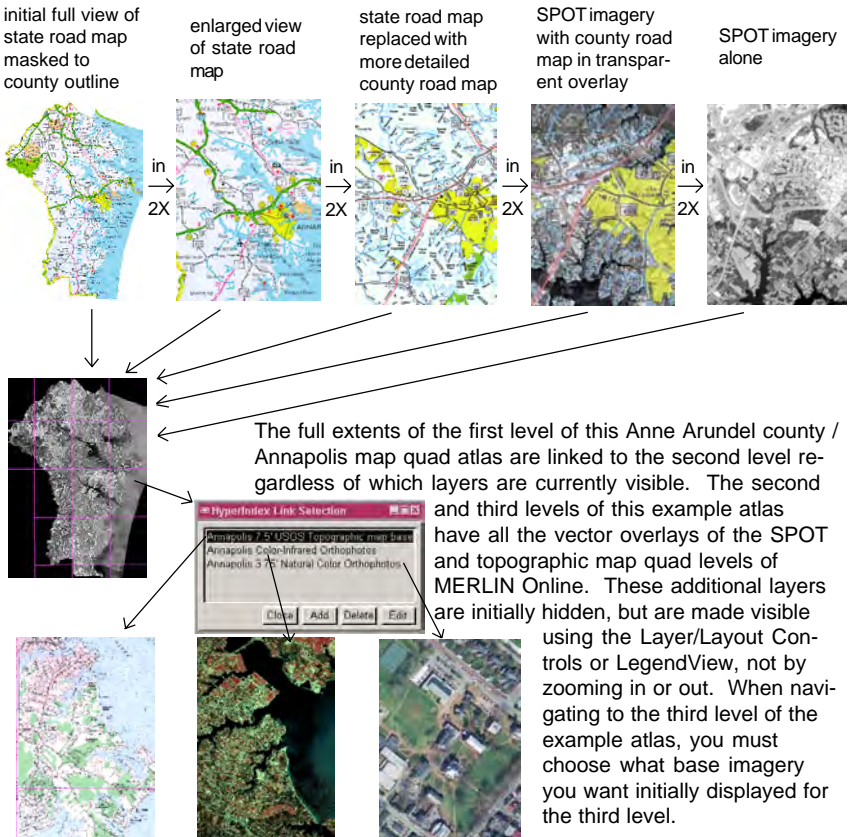
You can create links to URLs and external files in a single layout atlas using URL or File by Attribute links. These links are available when your atlas is run with any TNT product. You can also create links to URLs for atlases run with TNT-server using specially designed Info-Tips and links to files using buttons designed in the HTML that launches the atlas. These features are described later in this booklet.



# Combining Atlas Types

A “single layout atlas” can also be referred to as a map scale controlled visibility atlas. Hierarchical and map scale controlled visibility atlases need not be mutually exclusive. Some or all levels in your hierarchy can also include map scale controlled layers. Such an approach means that you can navigate to different levels but also zoom in or out on a single level and have layers revealed, removed, or changed in appearance as the map scale changes.

The atlas shown as an example below has map scale controlled visibility on the first level—you get a state highway map, a more detailed county road map, a transparent version of the county road map over SPOT imagery, or SPOT imagery alone depending on the map scale of the display. The second and third levels have layers that are initially hidden at all map scales and, when turned on for viewing, are visible at all map scales.





# Methods of Delivery: TNTmips

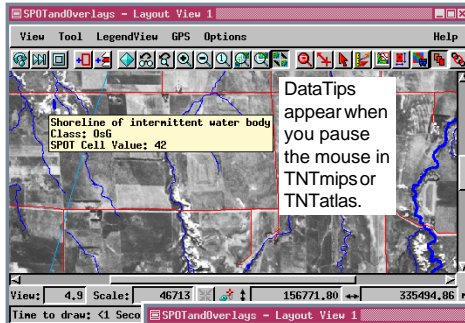
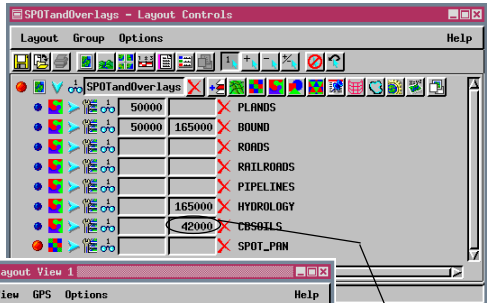
When you create an atlas for use by yourself and others running TNTmips, you (and they) still have all the tools of TNTmips available. You can get to all the display controls so that contrast, color maps, and drawing styles can be altered. The visible map scale range can be changed. Layers can be added or deleted from a layout. Full database viewing and editing capabilities are present. You can also still add and edit HyperIndex links.



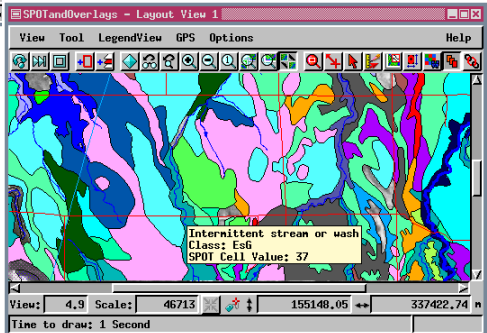
You get the Navigator window so you can move laterally and back up the stack by clicking a button. You point and click on the display to move down through the atlas.

Having all tools available is ideal when you are the only user of the atlas. If, however, others with TNTmips also use the atlas, you cannot be sure the atlas will remain as designed. If file access is set so that only you can write to the files, some features of TNTmips will not be available to others, such as changing vector drawing styles by attribute or viewing the definition for a database table.

To use a hierarchical atlas in TNTmips, you need to be in layout mode (either display or hard-copy), select an object that is part of the atlas, and choose the HyperIndex Navigator tool. You may want to start at a level other than the top. For example, if you have assembled a worldwide atlas but you are interested only in the information linked to Nebraska counties, you may want to start with the Nebraska county map rather than the world map.



You can change the visible scale range to see an overlay outside the originally set scale in TNTmips.



# Methods of Delivery: TNTAtlas



You select a .atl file for this option.

This option lets you select an object in TNTmips' Project File format or any other file format supported for direct use. This object can be the layout for a single layout atlas or it can be the starting screen or some other level in a hierarchical atlas.

The *Save Changes* and *New Record* icons are not active in TNTAtlas if the designer does not choose the *Allow modification of atlases* option in the Assembly Wizard.



You also get the Navigator window with TNTAtlas. The number of active lateral navigation arrows depends on if other links exist in those relative positions on the parent object.

A special file with a .atl extension is created when you run the TNTAtlas Assembly Wizard (see the *Constructing an Electronic Atlas* tutorial booklet). This file is put in the root directory when your atlas is distributed on CD-ROM. The .atl file tells TNT-atlas where to find the starting screen for your atlas. Single layout atlases do not need .atl files; you can simply select the layout involved.

TNTAtlas has a reduced set of display tools when compared to TNTmips. You cannot alter display parameters, such as the contrast, color map, or visible scale range (illustrated on the previous page), or create and save new data. You do, however, get all the measuring, selection, and sketching features of the GeoToolbox including the ability to save sketches with assigned attributes.

You can view database tables in TNTAtlas and use them for selection as in TNTmips. You can also create new forms for viewing tables. However, whether you can add new records, change the information in existing records, or change any table definition parameters depends on permissions set by the TNTAtlas Assembly Wizard. The inability to change database information is a desirable feature when you are distributing an atlas to a large number of people. You can change the master copy in TNTmips, but your published and distributed data cannot be changed by others making it subject to subsequent misinterpretation.

The object displayed when you initially choose the HyperIndex Navigator tool in TNTmips or TNTAtlas is, by definition, the Home level. You can navigate to all levels below this level and back, but if the initial object was not the top level of your atlas, you cannot get to the top with the Navigator tool. An atlas delivered with TNTclient always knows the "home level" intended by the atlas designer, as does an atlas opened from a .atl file in TNTAtlas.

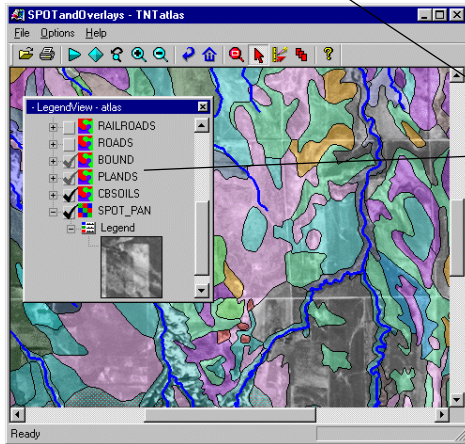
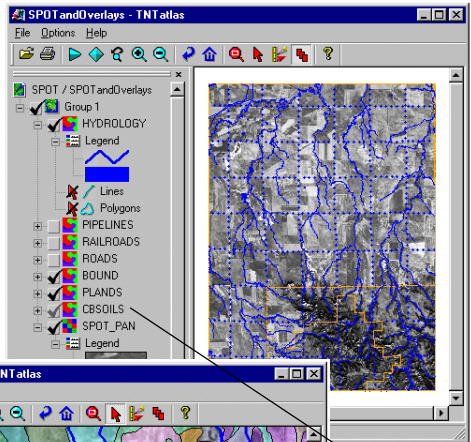
# Methods of Delivery: TNTAtlas for Windows

TNTAtlas for Windows is a native Windows application with the functionality of TNTAtlas (without using an X Server). Like TNTAtlas, this atlas viewing software is a free product. You can navigate through a HyperIndex stack or a single layout atlas and have full use of the GeoToolbox including the ability to display GPS in real time or from a log file and to save sketches and regions. Like all atlas delivery methods, TNTAtlas for Windows supports choice between multiple links and the ability to link to external files and web sites. DataTips appear as they do for atlases running with the X Server (see example on page 9).

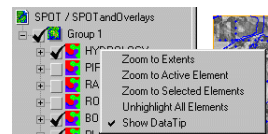
TNTAtlas for Windows has some features not found in other atlas delivery methods simply because it is a native Windows application. For example, it provides a legend and toolbar that can be docked/undocked, and the last atlas displayed is retained as a default and opened when the application is launched. The File menu maintains a list of the last three atlases used. Selection controls have been combined with the legend so there is not a separate Controls window in this version. The right mouse button menu for each layer includes a variety of zooming choices, including zoom one-to-one for raster layers, and the ability to unhighlight all elements and turn DataTips on and off (if set for the layer).



All the atlas viewing products let you select from multiple links for a single location either from a pop-in window or a pop-up menu.



TNTAtlas for Windows shows a dimmed check when the layer is not visible at the current map scale.



right mouse menu for vector

# Methods of Delivery: TNTserver

TNTserver provides the same data to all three clients.

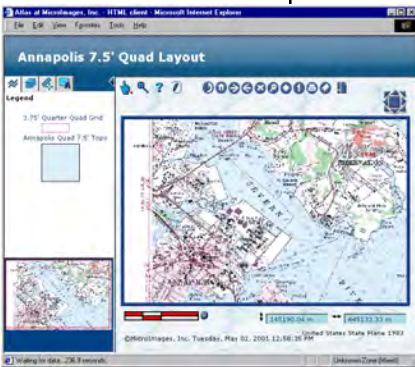
TNTclient (downloaded-at-runtime Java client)



TNTbrowser (user-installed Java client)



HTML client (downloaded-at-runtime HTML client)



Atlases delivered via TNTserver can be viewed using one of the Java clients or the HTML client provided by MicroImages (see *Introduction to TNTserver and Clients* for more information). This method of delivery gives the atlas designer the most

control over what information the atlas viewer sees. The only database information directly accessible is from the fields selected for DataTips. This information appears in the InfoTips panel of the clients and may or may not include entries for all layers in a layout. Associated databases can also be queried to select elements.

Although the tools and information available in the clients are quite robust for an Internet map server, they are limited when compared to TNTmips and TNTatlas. There are tools for measuring but not for sketching and generating regions. The number of different tools used for measuring is also reduced in the clients.

The ability to customize appearance and features of the client from one atlas to the next depends on which client the user selects. If running the user-installed Java client (TNTbrowser), the features are the same for all atlases until the user installs an updated version. Different versions of the downloaded-at-runtime Java client (TNTclient) can be delivered if the web designer modifies the HTML file that launches the atlas. This file sets atlas parameters such as available tools and tabs and what object to start with. Similarly, the available features of the HTML client can be readily altered and many are under control of the user.



## Viewing Sample Atlases on the Web

Viewing atlases others have created is a good means to get ideas for approaches to use and perhaps elements to avoid when you design your own atlas. MicroImages' web site offers a variety of sample atlases for public viewing. To view one of these sample atlases go to MicroImages' Online Atlases page (<http://www.microimages.com/tntserver> or choose Online Atlases from MicroImages' home page) and click on one of the atlases listed. For most atlases, an introductory page that provides background and copyright information will appear. Click on *Open Atlas with TNTclient* or other linked items, if available, to launch the client and the atlas.

The speed at which TNTclient downloads and brings up the selected atlas is, of course, dependent on your connection speed and whether the Java-based or HTML version of the client is downloaded. Using a 56 KB modem with a good connection rate, it takes approximately two and a half minutes for the Java-based client interface to appear and another 30 seconds for the data to be served up. The HTML-based client takes about 1/5 the time to download at 56 KB. You can eliminate the client download time from one session to the next by installing and using TNTbrowser. To launch an atlas from TNTbrowser, you start TNTbrowser and select or type in the web address of the desired TNTserver, and click on the Connect to TNTserver icon. Then select an atlas from those listed in the Atlas List panel.

The majority of the atlases listed are hosted on MicroImages' web site, but some selections, such as Maryland Statewide and South Africa: Safari2000, will take you to other web sites. You then have to navigate to the atlas.

The screenshot shows the MicroImages website interface. At the top right, there are tabs for "Products" and "News". Below them is the MicroImages logo and the URL "microimages.com". A list of atlases is organized by state:

- Maryland**
  - Statewide
  - Anne Arundel County
  - Maryland Selected
- Nebraska**
  - Statewide
  - Precision Farming
  - Spotts Bluff County
  - DRG Test Project
  - Lincoln Property Finder
- New Mexico**
  - Los Alamos
- Arizona**
  - Appleton-Whittell Ranch
- California**
  - Fresno
  - San Diego
  - San Francisco
  - San Francisco CCAP
  - Statewide Topographic
  - Monterey Bay
- Texas**
  - Pease Pipe Ranch
  - Dallas/Fort Worth
- Missouri**
  - DOQs
- U. S. A.**

Below the list are several thumbnail images of atlases. One prominent thumbnail is labeled "Broken Bow" and shows a satellite-style map with a green dot. Other thumbnails show various maps with different overlays, such as roads, terrain, and colored regions. The thumbnails are arranged in a grid-like fashion, with some overlapping.



## Turning to the Details

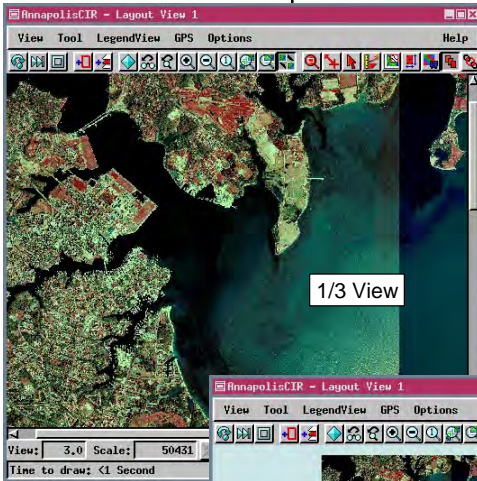
**Note:** one often overlooked detail for speed of atlas operation from CD-ROM is the order the files are written to the CD. There is faster access to files on the outside of the CD. You should place your largest or your most frequently accessed files on the outside for best performance. Some CD Creation software has explicit file ordering functions while in other software you simply put the files requiring faster access first.

The previous pages present general information to help you with initial choices about atlas design. There are no absolute rules about when to choose a single layout atlas rather than a hierarchical atlas for presentation of your materials. Many atlases could be designed either way. However, there are some circumstances in which a hierarchical atlas is the clear choice. If your data is such that branching paths are logical in the organization, you will want to use a hierarchical atlas. If you want to mix simple graphics with georeferenced data or have graphics only, you need to make a hierarchical atlas (unless you want to create a pseudo-georeference that will

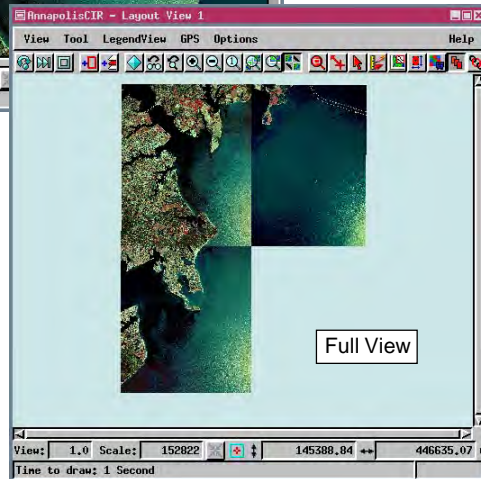
give your graphics the desired location and map scale). A simple graphic presents no problems in a hierarchical atlas as long as it is on a different level than georeferenced materials.

Once the general design is selected, you need to be concerned about a number of details. Some of these details are what portion of the image to show as you move

from one level to the next in a hierarchical atlas, how the legend looks, whether overlays should be visible or hidden, and how to present different base images.



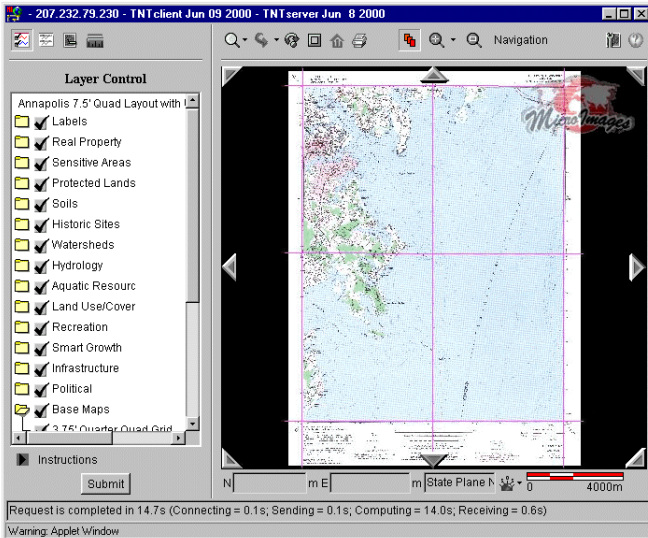
You should consider the overall visual impact of the initial view and the information you want the viewer to understand. Here, the 1/3 View option (above) has more impact and better conveys the idea of high resolution imagery for viewing.



## How Large Is the Imagery?

HyperIndex Linker provides a variety of choices for how a level in an atlas appears when initially viewed. These choices are 1X, Full View, predefined or user entered fractional views from 1 down to 1/256 (.0039), a designated map scale, or as stored with the layout. Any one of these choices can be positioned around the image center, the location of the mouse click that initiated the new level display, or as saved with the layout. The decision is intimately related to the data itself. The scanned road map (right) should be initially presented in full view to convey that data for the full county outlined is included. Showing the full topographic map quad (below) is not a good choice. No additional information is conveyed by seeing the map in its entirety, and the user will likely require more zooming steps to make the desired portion of the map legible.

When an image is masked so the shape of the whole has some significance, such as a county outline, the full view is generally the most meaningful choice for initial display.



There is nothing gained by showing a full view of the map at the left. A 1/3 or 1/4 view so that the map is more legible is a better choice (see previous page).

# How Many Layers in the Layout?

The default Layer Controls panel for MERLIN at the County level has 14 groups, only one of which has its layers listed. Simply click on a closed folder (TNT-client) to see the list of layers in that group. Then turn on the layers you want, and click on the Submit button.

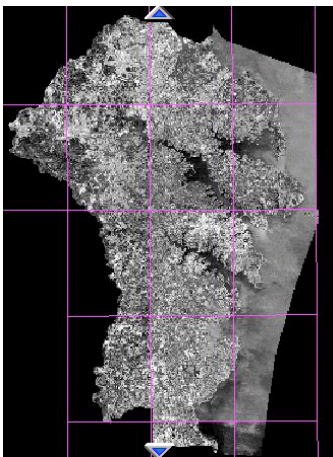


Legend samples are only shown for layers that are turned on for viewing.

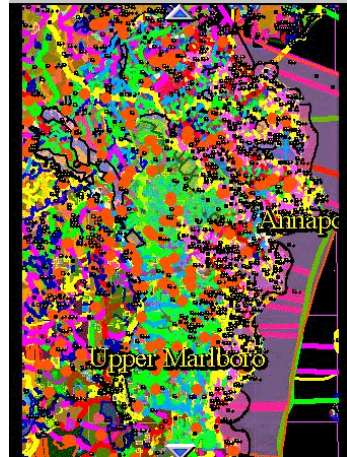
When you are attempting to present a comprehensive package of all data for a given geographic area, you may have dozens of data sets to include. Deciding how to make such data readily accessible can be a daunting organizational task.

MERLIN Online, which was created and is maintained by the Maryland Department of Natural Resources (MDNR), may have more than a hundred overlays on the base map in a topographic quad layout. The SPOT level, shown below, does not have as many overlays, but if all are turned on, the image is psychedelic and indecipherable (bottom, right). MDNR devised a good solution for presentation without scrolling through a seemingly endless list of layers. Logically related layers are placed in the same group, all groups except the base maps are hidden for initial viewing, and the layer lists for hidden groups are collapsed. With the group folders closed, all of these groups are visible in the Layer Controls panel at the default size for TNTclient.

With layers arranged in this manner, you expand the groups of interest and turn on the layers you want to view. You don't have to scroll through a long list hunting for the layers you want.



Default view  
← (MERLIN,  
3rd level)



All layers on  
(MERLIN,  
3rd level) →

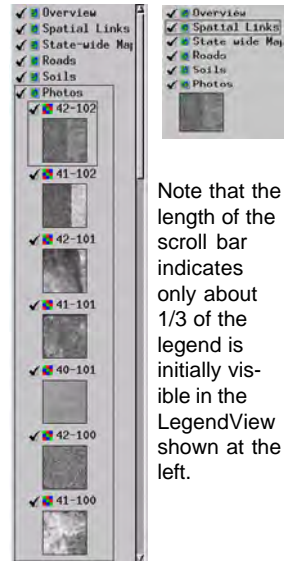
# Choices for LegendView

In addition to deciding the best raster sample to show in LegendView, which is discussed in the Dos and Don'ts section at the end of the booklet, you need to decide whether each layer in a group should be represented in the legend or whether all layers should be represented by a single sample.

Because TNTmips provides on-the-fly mosaicking, you may have a group with numerous similar layers. For example, the Nebraska Statewide atlas provides Digital Ortho Quarter Quad (DOQQ) coverage of the entire state. The DOQQs have been mosaicked into 1° blocks for inclusion in the atlas. More than 20 of these blocks are required to cover the state. There is no point in listing all of these layers and providing an area sample for each when a single sample serves well to represent them all. The active layer is the layer used for the representative sample. Consider turning off the Update view as each layer is drawn preference if you have a combined group legend; it will make the group seem more like a single layer.

You also need to decide whether you want some or all groups expanded in the LegendView. As mentioned on the previous page, collapsing the layer list for groups with no displayed layers is a good idea. Which groups are expanded in the LegendView (TNTAtlas) or Layer Controls panel (TNTclient) is determined by which groups were expanded when the displayed layout was saved.

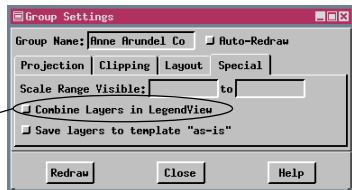
The 1° blocks are the only layers in the Photos group. Choosing to combine the layers for LegendView produces a much more compact legend (below, right).



Note that the length of the scroll bar indicates only about 1/3 of the legend is initially visible in the LegendView shown at the left.



The active layer is the only layer represented in LegendView when this option is toggled on.



You can combine layers in LegendView even if all layers are not the same object type. It is always the active layer that appears for the legend sample. Combining layers is not recommended for groups like that shown at the right. The user has no way of knowing that there are other layer types that are initially hidden from viewing without also consulting the Layout Controls (TNTmips) or Layer Manager (TNTAtlas). **You cannot expose hidden layers or hide individual layers in a group with a combined legend when used with any of the clients and TNTserver.**



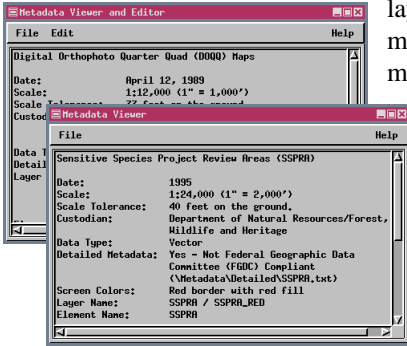
# Metadata

In TNTmips and TNTAtlas, you get to the metadata from the Tool menu.



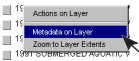
Metadata is text that describes a layer. It may include such information as the date the data was acquired, how the data was acquired, the data's accuracy, and so on. A metadata file can be unique for each layer or can be shared by many

layers. The MERLIN system has generic metadata for a number of similar layers (Submerged Aquatic Vegetation layers for 11 years). This metadata also provides the locations of more detailed text files that describe each layer separately.



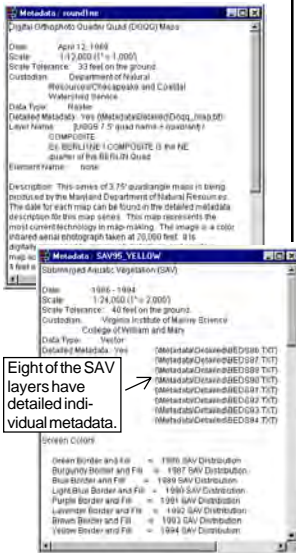
In TNTmips, you select all the objects you want to associate with a particular metadata file in a single step (Support / Maintenance / Attach Metadata). This metadata can then be viewed whenever

You have access to metadata by clicking the right mouse button on a layer name in the Layer Controls panel in TNTclient or TNTbrowser.



any of these objects are displayed in any of the TNT products (see instructions in the column at the right).

You can also view an object's metadata during the selection process by clicking on the Metadata icon in the Select Object window.



Eight of the SAV layers have detailed individual metadata.

Metadata appears in a separate window for you to read. You can keep this window open and refer to it while you do other operations. You can open multiple metadata windows and compare the information for different layers. Within TNTmips, you can edit the metadata while viewing it. If a single metadata file is attached to a number of different objects, changes made and saved will be reflected when metadata is accessed for any of the associated objects. TNTAtlas and the Internet products allow viewing only.

It is a good idea to include information pertaining to copyright and how to obtain copies of the data if available to the public. Including such information may reduce the number of unnecessary inquiries about your data.



## Web Links from HyperIndex Linker

Making a web link for use in TNTmips or TNTAtlas is just like making any other HyperIndex link. You can draw an index area that corresponds to the entire extents of the group (or layout), you can select an individual vector element to link to, or you can choose something in between. After the index area or element is designated, you set the link type to URL, click on the Object button and enter the URL you want to link to.

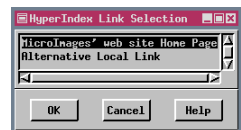
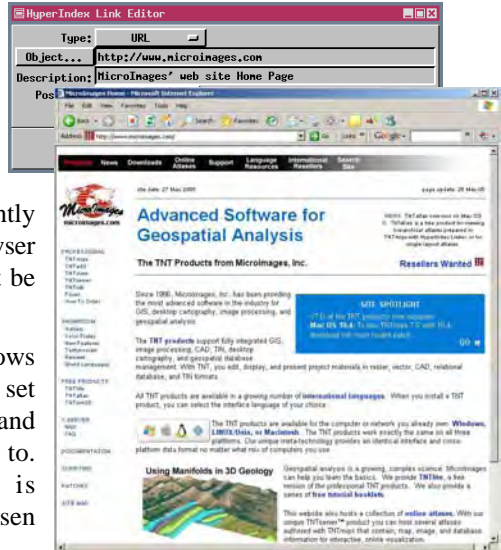
When you navigate to this link, your Internet browser is launched and you connect to the web site indicated. If the user is not currently connected to the Internet, the browser will report that the page cannot be displayed.

Linking to an external file follows the same procedure except you set the link type to External File and select the file you want to link to. The associated application is launched when this link is chosen provided it is available.

One way to avoid launching the browser and attempting to find a linked web site when not connected to the Internet is to have multiple links from the same index area so a list of link choices is presented instead of automatically trying to take the user to the web site. If the description for a URL link makes it clear the link is to a web site, the user can cancel the selection or choose an alternative instead of trying to link when not connected to the Internet.

This type of web link can be accessed from TNTmips, TNTedit, TNTview, TNTAtlas, or TNTclient. The other types of web and file links are described on the following two pages.

There are three methods of linking to web sites or external files from an atlas: from individual index areas or elements, from vector elements by attribute, and from InfoTips (TNTclient and TNTbrowser only).

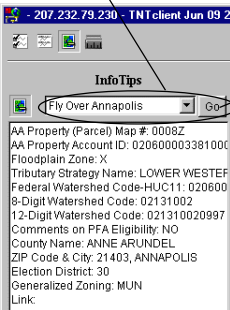


If more than one object, file, or URL is linked to, the user must choose which to view. If the description provided clearly identifies a link as to a web site, the user is alerted not to select that link when not connected to the Internet.

# Web Links from InfoTips

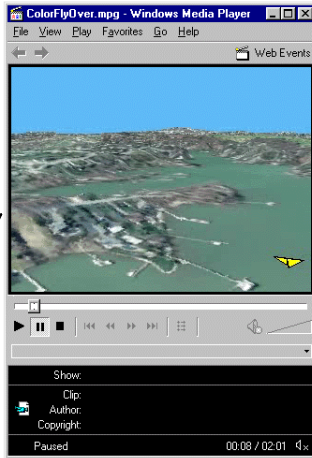
**Vocabulary:** A *DataTip* is the information from a specifically designated database field that is revealed when the mouse is paused in TNTmips or TNTAtlas. An *InfoTip* contains the same information, but requires a mouse click with the InfoTip panel active in TNTclient or TNTbrowser.

This menu and Go button do not appear in the InfoTips panel unless a DataTip in the form below has been designated for at least one of the layers at the location chosen for the InfoTip. Clicking on Go in this example launches your mpeg player with the movie at the designated web address (a frame of which is shown at the right).



One type of web link for TNTclient and TNTbrowser is set up as DataTips in TNTmips and appears at the top of the InfoTips panel. The InfoTips that link you to web sites are associated with vector elements. The ability to link to web sites and files by attribute, which is described on the following page, has since been introduced and may likely be the preferred method now because it works for all atlas delivery methods. However, if your atlas is web-based, this method presents atlas users with a permanent list of sites to visit directly for any location clicked on rather than the pop-up list received with the Navigate tool.

These special fields are rather intimidating if actually viewed as a DataTip (see below) because they are long and contain the HTML that triggers the Java client to add a menu and a Go button at the top of the InfoTips panel. The required information includes a bit of HTML, the web address to link to, and the description you want to appear on the menu. This link can be to any file as long as it has a web address; it could be an HTML file, such as a specific web page,



a pdf file, or an mpeg movie, for example.

The Nebraska State-wide atlas uses a computed field, which has since been made permanent, to combine the required HTML with the zip code for each polygon to produce a link to the Weather Channel's web site by zip code.

```
<A HREF="http://www.microimages.com/simulations/aaflyby.mpg">Fly Over Annapolis</A>
```

web address in quotes

description for menu

## Web and File Links by Attribute

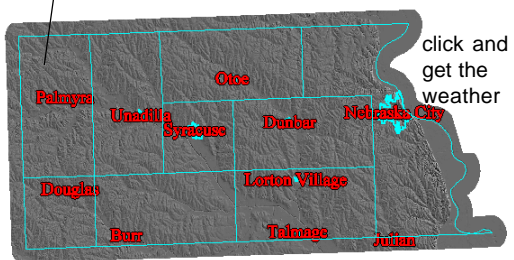
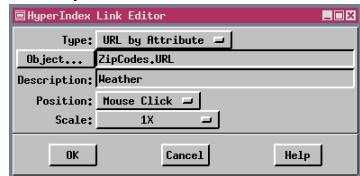
A third method for linking to external files and web sites is to choose URL by Attribute or File by Attribute for the link type. This method is similar to that described on the previous page, but the database field that supplies the URL or file name does not need to be set up as the field that provides the DataTip, there is no HTML involved, and it works for all atlas delivery methods. The layer with the links need not be displayed for the links to be available.

The basic strategy is to create a string expression field, which generates the file name or URL, in a table already linked to the elements. This string expression has a constant component and a value pulled from the database (such as a zip code), which often needs to be concatenated with an additional string that specifies the file extension. Having a constant component in the string expression requires some organization if you are linking to files, particularly if you have files for multiple years associated with the same elements. The constant component should contain all the path or URL information to the left of the information acquired by attribute.

If you are preparing an atlas for use with TNTAtlas on CD-ROM and with TNTserver and that atlas has links to external files, such as PDF files, the links need to be set up differently. Making the change is quite simple. All files accessed by TNTserver must have a web address. This requirement necessitates two changes for links that point to files on the CD-ROM. You need to change the link type and the file reference in the string expression.

The mechanics of creating a link to a file or URL by attribute are described in *the Constructing an Electronic Atlas* tutorial booklet.

Use the object button to select the table and field for URL or File by Attribute links.



# Active Layer Gets HyperIndex Subobject

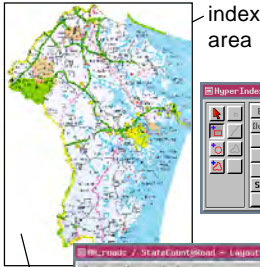
The information that identifies the object(s), files, and URLs linked to an index area is stored in the HyperIndex subobject for the *active layer* in the layout at the time the link was made. The links for all layers in a layout are active when using the Navigation tool.

It is rather obvious when you want links to individual vector elements that the layer with those elements is the one that should have the associated HyperIndex subobject and, therefore, be the active layer. If it is not the active layer, you will not be able to select the desired elements with the

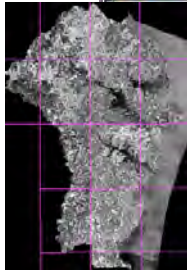
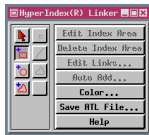
HyperIndex Linker tool. It is not so obvious which raster layer you want to have the HyperIndex subobject when there are multiple layers

in an atlas. You should, however, give it some thought. Since an object has only one HyperIndex subobject and it contains all the index areas and the associated links ever defined for that object, you can create confusion for atlas users if you have not considered this subject.

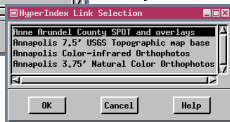
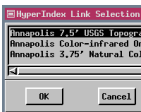
In the example on page 8, the same SPOT raster object is used in both levels one and two. The links shown to the third level are from the topographic map grid. However, because all links from all layers are available, if the SPOT image had been the active layer when the link to the second level was created, that link would also show up on the list. Choosing that link would take you back to the starting view of the second level, which may or may not be exactly what you were viewing when you choose the link. It would appear that you were going back to where you started from when you thought you were going to navigate down.



index area



The first navigation click takes you to this SPOT layout no matter which layer was active when the index area shown above was drawn.



Only the SPOT layer appears again in the next level, so any other layer could be active when the link is created without creating the problem of a fourth choice on the list that takes you back to the layout you thought you were leaving.

# Geographic Attachment

Generally, when creating a layout, you place all layers to be geographically overlaid in a single group and other groups include legends, annotations, or scale bars, for example. These other groups are positioned in a tiled array by default (in display mode) or can be attached and positioned relative to other groups in the layout. There is also a special group attachment mode in TNTmips that positions multiple groups by georeference just as multiple layers within one group are positioned. This type of attachment, referred to as geographic attachment, allows logical grouping *and* positioning by georeference when many layers are present. You should take advantage of this feature if your layout has many layers. There is no absolute rule on the number of layers in a group or when you should switch from all geographically related layers in one group to multiple, logically related groups that are geographically attached.

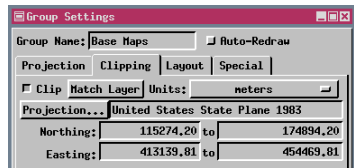
Each Labels group contains the layers shown here. See page 16 for examples of layers in other MERLIN groups.



MERLIN provides an excellent example of the use of geographic attachment. There are 14 groups in each MERLIN layout at the county level and 15 groups at the topographic quad level (the same as at the county level plus a Real Property group). The number of layers within these groups may vary from one layout to another but the group in which they appear remains constant. For example, a layout at the topographic quad level may have from 0–4 DNR wetland layers. When these layers are included, they always appear in the Sensitive Areas group.

All groups at the county and topographic quad levels of MERLIN are geographically linked to the Base Maps group. The Base Maps group is clipped to a rectangle that inscribes the county or quad and all geographically attached groups are automatically clipped to match.

All geographically linked groups can be clipped to designated map extents in one simple step. If the “base” group is clipped to designated geographic extents, all groups geographically attached to it are also clipped to the same extents.



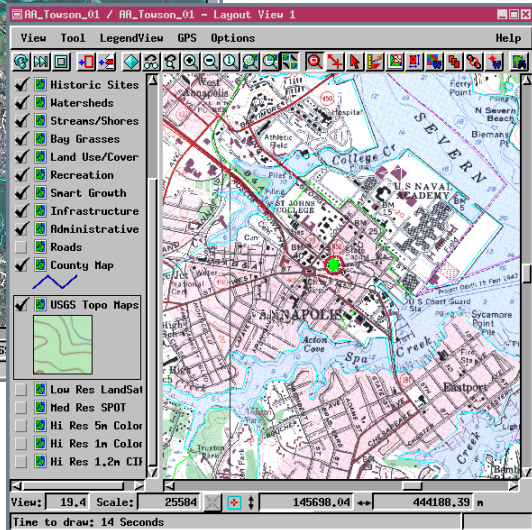
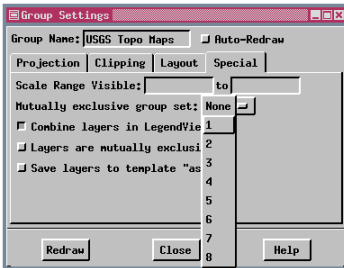


# Mutually Exclusive Layers and Groups

You can have up to 8 mutually exclusive group sets. All groups that belong to the same group set have mutually exclusive display—you turn one on, it turns the others off.

You may find that you have a number of base images that can be used with your vector overlays in your atlas. You can use different base images at different map scales or provide different paths through the atlas to layouts with a single base image as shown on page 8. Another alternative is to use mutually exclusive layers and groups. When you turn on the *Layers are mutually exclusive* toggle (Special panel of the Group Settings window), selecting one layer in a group turns off the other layers. The atlas user does not have to figure out how to hide and unhide layers or change their drawing order to make the desired layer visible.

With groups it is unlikely that you would want selecting one group to turn off all other groups in the layout. In this case, you define mutually exclusive group sets, and selecting one member of a set turns off the other groups in that set. Groups in other sets or groups not assigned to sets are not effected.



In this example, the six base image raster groups are mutually exclusive.

# HTML for Launching TNTclient

When designing an atlas to run with TNTserver, there are a few more details to contend with after the atlas is complete. In order for an atlas to run with TNTbrowser, it must have been added to the Layout List specified by the TNTserver Manager. In order for an atlas to run with TNTclient, an HTML file is needed. You can readily view an example of the required file at <http://www.microimages.com/ron/customize.htm>. You can select any of the atlases listed on the Atlas Customization Form, adjust the various options, then click on the *view html* button. Change the options, then view the HTML again and compare.



## Applet Customization Form

This form allows you to sample some of the customizable features included in the TNT Client Applet. An atlas manager can be used to input parameters, remove (not include) unneeded tools, such as tab panels or hyperindex navigation. You can even render tab panels as desired to suit the emphasis of a particular atlas. You can set the View Area Background Color to properly emphasize the data in the particular atlas being opened.

Select an Atlas:   Hyperlinked Atlas

View Area Background Color (value range 0 to 255):  red

Choose Tab Order:

Choose Tab Order:

Default Units:  metric  U.S. standard

InfoTips:

measuring tools:

The necessary components of the required HTML file are found in the first few lines. The first statement tells the location and which files to use and what to execute. The next few lines shown below identify the server port, file name, and object name for atlas startup. You also need to specify the location of the Help file. The remainder of the parameters are optional and may change certain default settings, such as whether the Navigation tool is present, the order and presence of tabs in the work area of the atlas, the default units for measurements, and the background color.

```

<applet ARCHIVE='atlas1.jar, atlas2.jar' CODE='atlasclient.AtlasClientButton'
CODEBASE='http://testatlas.microimages.com/atlas/' WIDTH='1' HEIGHT='1'>
<param name='ServerPort' value='4750'>
<param name='FileName' value='d:\Nebraska\Layouts.rcv'>
<param name='ObjectName' value='Nebraska'>
<param name='HelpURL' value='http://testatlas.microimages.com/atlas/help.html'>
<param name='ImageUrl' value='http://testatlas.microimages.com/dot.gif'>
<param name='HyperLinked' value='true'>
<param name='DistanceUnits' value='1'>
<param name='AreaUnits' value='4'>
<param name='InfoTips' value='3'>
<param name='Measurements' value='4'>
<param name='Legend' value='2'>
<param name='LayerControls' value='1'>
<param name='ViewBackground' value='255,255,255'>
</applet>
    
```

Annotations for the code block:

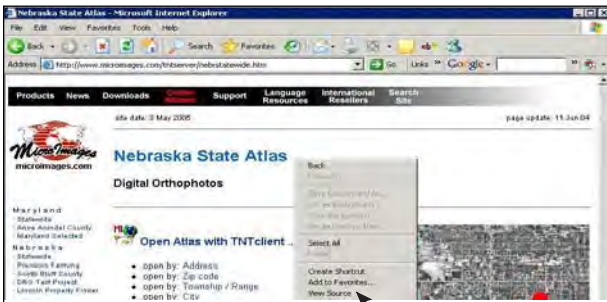
- double slashes needed for some Macintosh users (pointing to 'd:\Nebraska\Layouts.rcv')
- required information (pointing to 'ObjectName' and 'HelpURL')
- include Navigate tool (pointing to 'HyperLinked')
- optional icon for 1x1 button (pointing to 'ImageUrl')
- location of Help file (pointing to 'HelpURL')
- specify initial distance and area units (pointing to 'DistanceUnits' and 'AreaUnits')
- specify order of tabs in work area (pointing to 'LayerControls')
- background color R,G,B (pointing to 'ViewBackground')
- required to end (pointing to the closing </applet> tag)

## More HTML for Launching TNTclient

The TNTclient toolbar (below) has been customized to remove the Layer Controls panel and the Navigation tool. It is a good idea to remove the Navigation mode of mouse operation for single layout atlases because use of the tool produces no results except the message "No Child," which means there are no HyperIndex links at that point.



The material on the preceding page was covered very briefly, and you will likely need more information, such as unit types associated with numeric values, if you are setting up TNTserver at your site. Note that while most of the path references are to web sites, the file location for the starting object is a drive path that can be accessed by the TNTserver machine. Although Navigation is the only mouse mode operation that can be eliminated, you can choose to eliminate some of the work area tabs by including similar statements in the HTML. If, for example, your atlas is a parts catalog, there is no point in providing the measurement panel because actual distances and areas cannot be determined without georeference. If you do not want the atlas user to be able to turn layers on and off for viewing or have access to metadata, you can remove the Layer Controls panel. (The Navigation tool should only be removed for single layout atlases without HyperIndex links.)



You can view the HTML for a page or frame in Explorer, Netscape, or Safari if you right-click over the area of interest, and select View Source.

MicroImages' web site does not launch an atlas as soon as it is selected; an intermediate page opens with some information about the atlas and buttons to launch the atlas. The HTML for these or any other web page can be viewed by right-clicking on the area of interest in your browser and choosing View Source from the menu. Viewing a variety of web pages and their source HTML is a good means of acquiring ideas for your own such page. If MicroImages is hosting your atlas, a page similar to the one shown above will be created for you. You just need to provide the artwork and any text information you want to be included.

## Using Banners with TNTclient

You can add a banner between the toolbar and the atlas viewing area in TNTclient. The banner can be a single image or a number of separate images. You can rotate the image shown in any or all banner positions. The images can be in jpeg or gif format. Each image can be linked to a separate web address, or all images can be linked to a common address. Keep in mind that a number of rotating images can be very distracting and that simpler banner design is generally better.

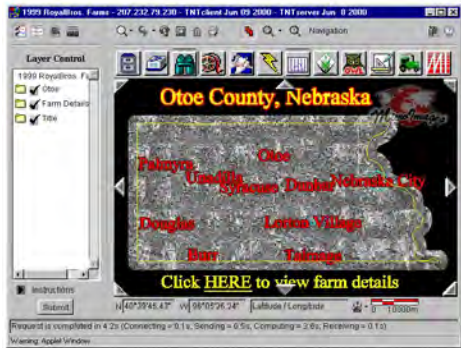
The banner shown below with TNTclient is static, or unchanging. The banner count value is 12. Each image is linked to a different web address, some of which open .pdf files, others connect to web sites, such as the Weather Channel, and one launches TNT-client with another atlas.

The information required for a banner is optional information that you include in the required HTML file for TNTclient (described on page 25). You need to include the banner height (in pixels), the number of images to display at one time (BannerCount), where to find the images, and what the images are linked to. If you are rotating through images in the banner, you also need to specify the time delay between subsequent images (in hundredths of seconds). If no delay is specified, only the first image will be shown.

The lines you need to add to the required HTML file to rotate through the three versions of a single banner, such as shown at the right, are provided below. The time delay specified would display each version of the banner for 3 seconds.

```
<param name='BannerHeight' value='40'>
<param name='BannerCount' value='1'>
<param name='BannerDelay_0' value='300'>
<param name='BannerImages_0' value='http://testatlas.microimages
.com/atlas/banners/adbanner1.jpg, http://
testatlas.microimages.com/atlas/banners/adbanner2.jpg, http://
testatlas.microimages.com/atlas/banners/adbanner3.jpg'>
<param name='BannerCommon_0' value='http://www.microimages.com'>
```

This last entry could be replaced by a BannerLinks\_0 entry that listed different links for each of the images in the same form as the BannerImages\_0 entry. Either single or double quotes around parameter names and values work.



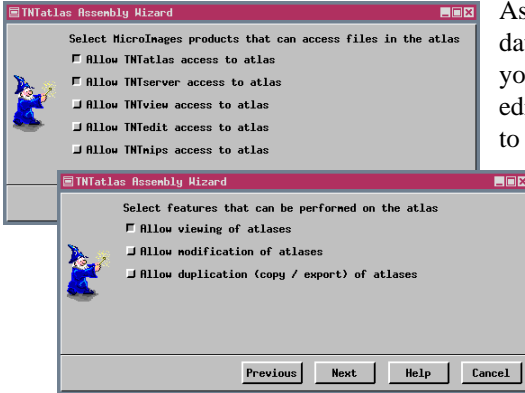
Images will be clipped here at default client width, but area to right is revealed if the user makes the window wider.



Note: Insert this information before the </apple> line in the HTML file.

## Limited Access to Atlas Materials

You may have concerns about including proprietary data in your atlases to be distributed on CD-ROM. A system of file access control has been developed and is implemented in the TNTAtlas



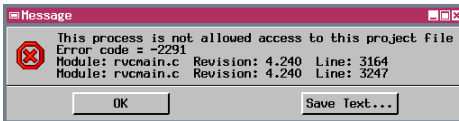
Assembly Wizard to protect such data. Without restricted access, your data could be viewed and edited in TNTmips and exported to some other system.

The default settings allow only TNTAtlas and TNTserver access to the files in your atlas and only for viewing. Any SML tools added to the atlas, such as the Find Streets tool developed for

the atlas of the Var region in southeast France, can also be used in TNTAtlas with the default settings.

An error message similar to that below will appear if someone tries to use the files in a process you did not authorize. This error message was generated when the Spatial Data Editor (TNTmips) tried to access one of the files in an atlas created with the default settings.

The option to additionally provide access to TNTview, TNTedit, and TNTmips is available. If you allow access by TNTview, your objects could be copied but not edited or exported since these latter features are not available in TNTview. The *Allow duplication (copy / export) of atlases* toggle would also need to be turned on to enable copying in TNTview. If the *Allow modification of atlases*



toggle is on, the TNTAtlas user could change the DataTips setup and edit database information. If TNTview, TNTedit, or TNTmips

had access, layers could be added and removed and drawing styles changed as well.

The access control is established when the atlas files are copied to their destination directory by the TNTAtlas Assembly Wizard. The machine with the key that created the atlas will continue to have full access to these files regardless of the access control settings.



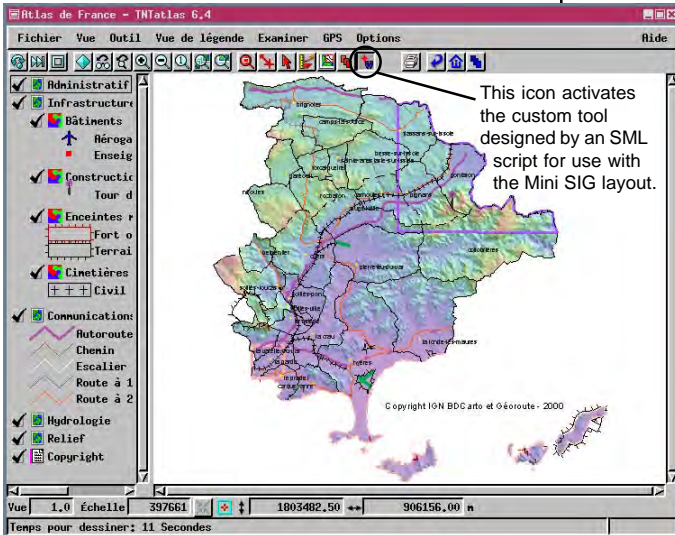
# Override Files for TNTAtlas Installation

Including an Override folder on your TNTAtlas CD lets you customize the default settings for TNTAtlas when installed. One of the most important applications is the ability to install TNTAtlas so it comes up in a language other than US English. Coming up in another language requires that the locale be defined in the configuration settings file for TNTAtlas (tntproc.ini), which also must be included in the Override folder, and that the required resources and messages files be present for the specified language.

You can also specify any tool or macro scripts to be included for use with the atlas. The presence of such tools is also specified in the configuration settings file and the associated SML script must be included in the Override folder.

The installation procedure looks for this Override folder and replaces files from the default installation with those from the Override folder. Because the configuration settings file is involved, you also have control over fonts, background color, tool color and thickness, and many other parameters.

Other parameters you can change by including an appropriate configuration settings file include setup of multilayer DataTips, measurement units preferred by your target audience, redraw preferences, and window positions (so the Layer Manager and HyperIndex Navigator do not come up over the middle of the data).



This atlas when installed with its override files comes up in French and has a custom tool used for finding streets.

## Design Starting Graphic for 1X Display

The starting graphic for the MERLIN atlas was designed to fit in the default-size viewing area of TNTclient at full resolution.



The starting graphic for the San Francisco atlas was designed years before TNTserver was developed. Although no alterations in the atlas were required for it to work with TNTserver, the starting graphic must be resampled to fit in the default viewing area (below, left), which makes small text difficult to read. Changing to full resolution (right) makes the text easily readable, but some of the buttons are no longer in the view.



Full View  
←

Full Resolution  
→



The default size of TNTclient is 800 x 600 pixels with about 525 x 450 devoted to the viewing area. You should design any introductory graphics to fit within the default size window for all delivery methods used (TNTAtlas defaults to full screen).

This caution applies to graphics saved as raster objects because sizing them involves resampling, which degrades the readability of small texts. Thin line elements may also appear broken or disappear altogether.

One way to create more dynamic sizing is to maintain the graphic as a layout with text and line work that is separate from the imagery. The text and lines will then be rescaled (if styles are set appropriately) before being

rendered to keep them crisp in appearance and still in proportion to the rest of the layout. In order for scaling to occur as the layout is resized, text size and line width need to be set relative to the layout scale.

Also remember that while high resolution imagery is great for printing, it really serves little purpose in a starting graphic for an atlas. Users will likely just navigate to the next level rather than zooming to reveal additional resolution that may be present in the initial graphic. When viewing an atlas with TNTclient or TNTbrowser, the image delivered is a jpeg image compressed to retain 75% of the quality. Download time is generally more important than resolution for Internet viewing.

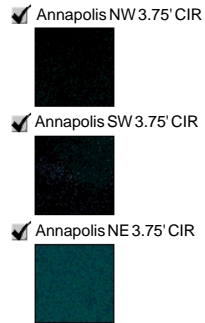
# Make Legends Meaningful

It may be that you routinely work in TNTmips with LegendView off, so how the legend appears does not even cross your mind. Or how the complete legend appears may have escaped your attention because you have to scroll to see it all and you didn't bother to scroll. If the atlas is distributed using TNTserver/TNTclient or TNTatlas, LegendView or its equivalent is on when the atlas is viewed, and you should consider how the legend appears.

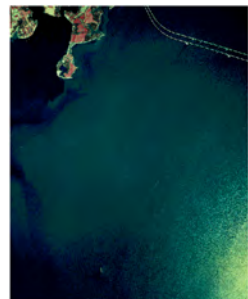
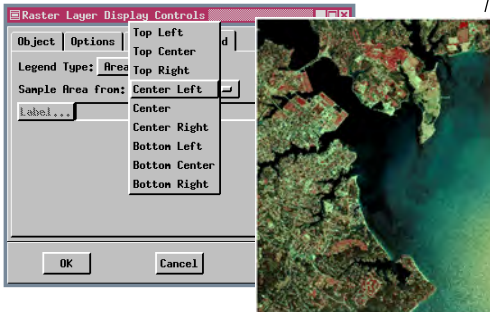
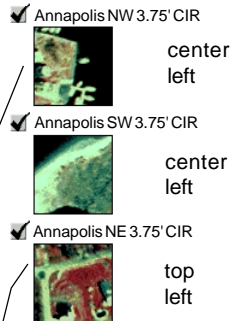
The legend will reflect the current display style for vector elements, but there is a choice of legend types for raster layers: area sample, two types of color scale, color sample, or none. The area sample legend is suited to most imagery that represents the ground optically. Color scale legends are intended for elevation or other intensity rasters with color maps assigned to the range of values. Color sample legends are for feature mapped or other categorical rasters and present the colors and assigned labels.

The default area sample comes from the center of the raster, but there are eight other area choices for the legend sample. In the example shown below (left), five of the nine choices will provide a sample that conveys complex imagery while the other four provide black or nearly uniform green samples. In the sample below (right), only one of the choices provides a good sample. If you cannot find an area that provides a good sample, set the Legend Type to None or have a single group legend.

Default legend settings use the center of the image, which may not be the best choice. In this case the center of the images is over water, so it appears black in the sample.



Legend for the same layers as above with different areas selected.



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