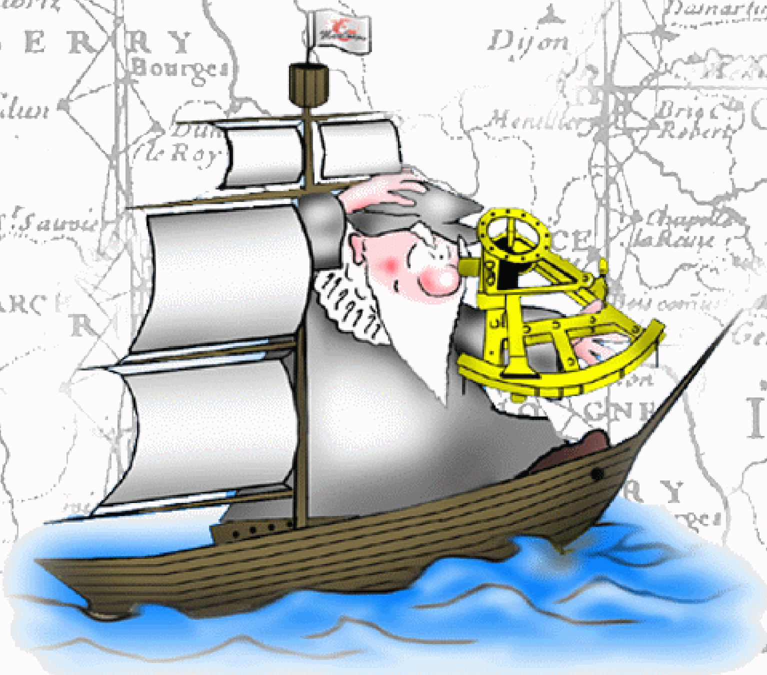
Tutorial

Navigating



in

TNTmips®

TNTedit™

TNTview®

Before Getting Started

This booklet supplies the information you need to navigate the integrated system provided in all TNT products. Consult these pages for an introductory survery of basic system operations. The TNT products appear with the familiar graphical user interface of your computer platform (Windows, Mac OS X, and Linux/UNIX) while at the same time they present an interface that is identical in the essentials across all computer platforms. The TNT products have identical features and interface elements on every computer platform.

Prerequisite Skills This booklet assumes that you have completed the exercises in the tutorial *Displaying Geospatial Data*. The exercises in that booklet show you how to select and view spatial objects stored in Project Files. You should know how to zoom, pan, and enhance display objects, and how to use the Reference Manual. This booklet does not present these basic skills again. Please consult *Displaying Geospatial Data* for any review you need.

Sample Data The exercises presented in this booklet use sample data that is distributed with the TNT products. If you do not have access to a TNT products CD, you can download the data from MicroImages' web site. In particular, this booklet uses objects in the BEREAMSS Project File and the CB_DATA data collection. The installation process makes a read-write copy of these files on your hard drive; you may encounter problems if you work directly with the read-only sample data on the CD-ROM.

More Documentation This booklet is intended only as an introduction to basic system operations. Consult the TNT Reference Manual, which includes over 240 pages on basic system operations, for more information.

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 object size, and enables data sharing only with other copies of TNTlite.

Basic system operations are common to TNTmips, TNTedit, TNTview, and TNTatlas. All exercises can be completed in TNTlite with the sample geodata provided.

Keith Ghormley, 11 September 2003

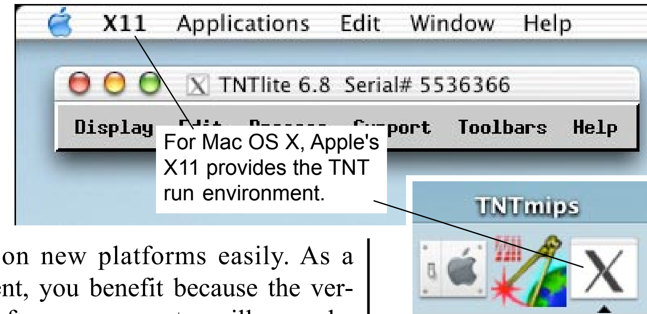
It may be difficult to identify the important points in some illustrations without a color copy of this booklet. You can print or read this booklet in color from MicroImages' web site. The web site is also your source for the newest tutorials on other topics. You can download an installation guide, sample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

http://www.microimages.com

X and the TNT products

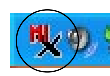
TNTmips is like no other software product in its class; it has exactly the same features and interface on every type of computer: Windows, Mac OS X, and Linux/UNIX. The software engineers at MicroImages maintain exactly one version of their programming code, and that code is prepared for each type of computer without modification. Keeping one set of code is the only way to ensure that the version of TNTmips on each type of computer is exactly like the versions on every other type of computer. It lets MicroImages prepare TNT products for release on new platforms easily. As a MicroImages client, you benefit because the version of TNTmips for your computer will never be orphaned or lag behind when updates and new versions are released.

The **X Window System** supports multitasking, remote execution, and display of graphics generated in one computer system on another computer in a network. X has strong traditional ties to UNIX, but can run under any operating system.



For Mac OS X, Apple's X11 provides the TNT run environment.

MicroImages accomplishes this seamless cross-platform development by using the X Window System as the system environment for the TNT products. UNIX computers have X in their basic configuration. Mac OS X uses Apple's X11 implementation. For Windows computers, MicroImages supplies MI/X, our own X Server. On every platform, X runs as an environment layer in the background, so you as the user can concentrate completely on your work in the TNT processes.



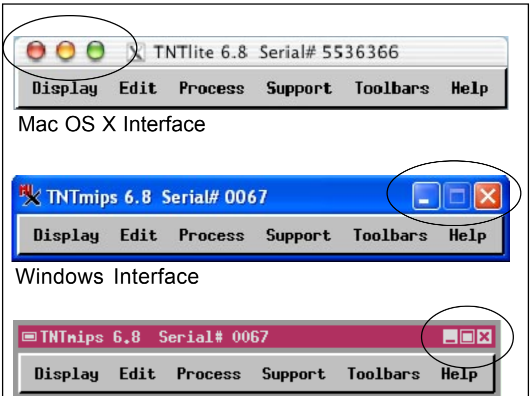
For Windows, MicroImages automatically launches MI/X. Set MI/X peferences from the icon in the Windows system tray.

You can select a Windows or X desktop interface.

The first exercises (pages 4-6) introduce some basic X concepts. Project Files, object types, naming and maintenance procedures are covered on pages 7-15. Other system basics are covered on pages 16-23.

Host System Differences

This booklet illustrates its exercises with the Windows interface. You will notice only slight differences if you are using Mac OS X or Linux/UNIX. Some interface elements are determined by the host operating system. For example, Windows and Linux / UNIX computers put the Minimize, Maximize, and Close buttons for each window at the right end of the title bar, while Mac OS X puts those buttons on the left end of the title bar. These are differences in the host operating system, not in the TNT products.



Mac OS X Interface

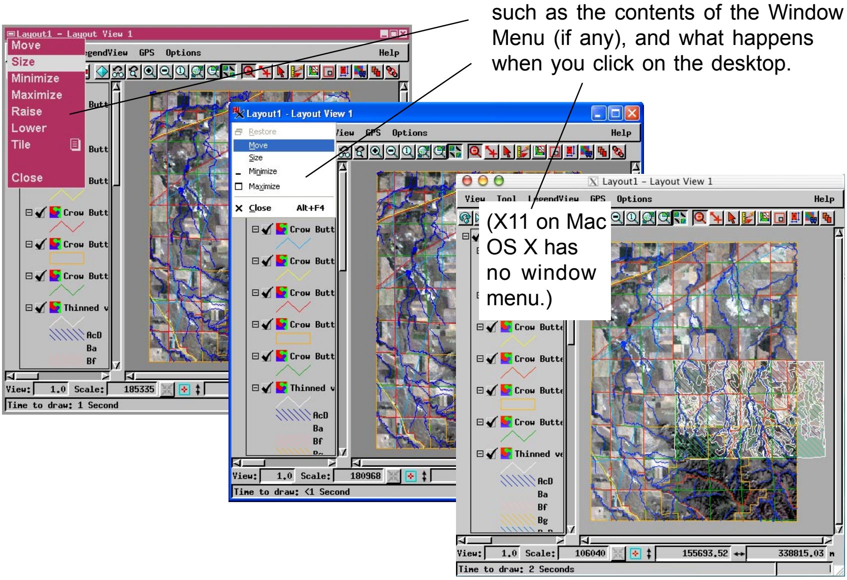
Windows Interface

X Windows / OSF-Motif Interface

Minimize, Maximize, and Close buttons differ according to the conventions of the host operating system.

Other difference include the contents of the Window Menu (if there is one), and what the operating system does with a mouse click on the desktop.

You may notice slight differences, such as the contents of the Window Menu (if any), and what happens when you click on the desktop.



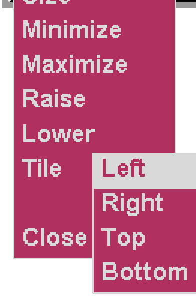
TWM with X Windows

If you use the X Windows desktop under Microsoft Windows (or if you use Linux / UNIX), you will encounter the TWM window manager. The TWM window menus and the TWM pop-up operations menus offer several features for managing your work in the X Window environment.

The TWM window menu opens when you click the menu icon.

Click the left mouse button on the title bar of any window to RAISE it.

Click the right mouse button on the title bar of any window to LOWER it. RAISE and LOWER operations are apparent only when there are overlapping windows.

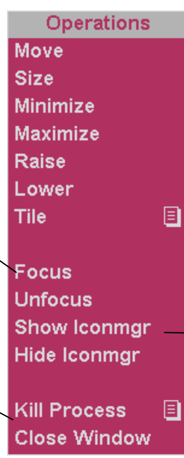


Click on an iconified window to restore it.

Use the TWM window menu and its cascades to manipulate window size, order, and position.

Click on any unused part of the desktop to open the TWM pop-up operations menus.

Left-click pop-up:



Right-click pop-up:

The right-click menu can be expanded and customized by editing the TNTSERV.TWM file in the TNT products home directory.

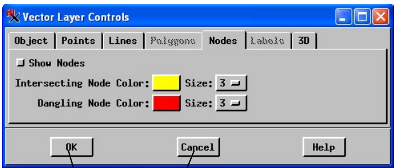
Keyboard focus follows the mouse in TWM. But you can anchor keyboard focus to a selected window so that even if you move the mouse somewhere else, the keyboard input is still directed to the same window.

If for some reason a process stops responding, you can force it to close with the TWM Close Window or Kill Process operations.

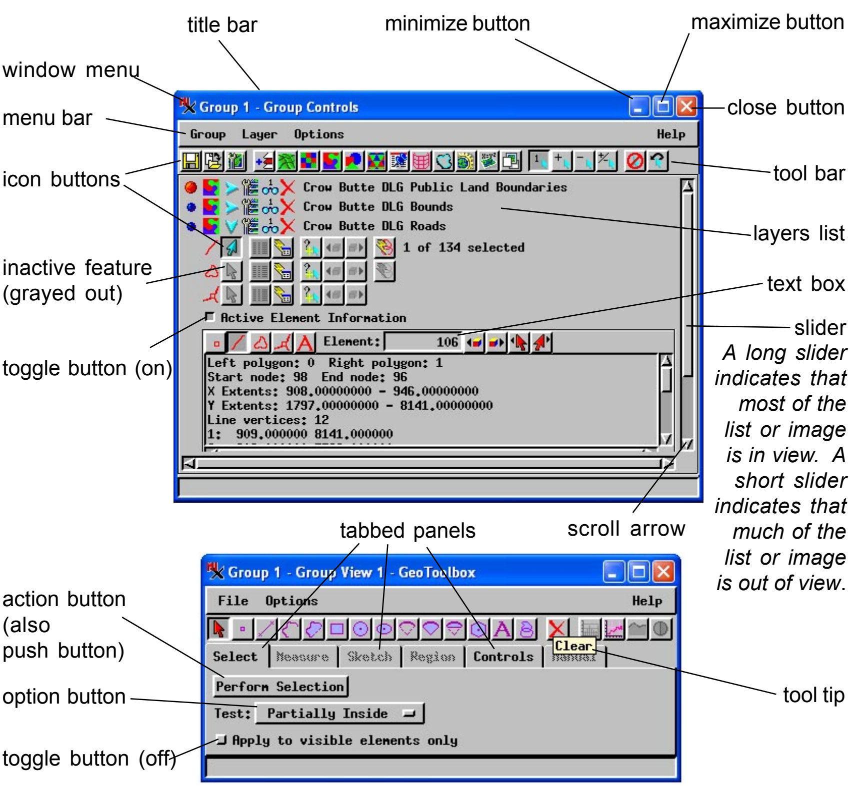
You can show or hide an Icon Manager bar that offers a control icon for each active process.

Interface Vocabulary

The TNT products provide a consistent and recognizable style for interface elements such as scroll bars, check boxes and menu cascades. This consistentcy makes you instantly familiar with the interface components when you go to a different computer. The Reference Manual, tutorial booklets, and other documentation uses a carefully defined vocabulary to refer to the elements of the graphical interface. Review the basic terms, concepts, and appearance of the interface elements presented on this page.



A **Dialog Box** is a window that offers response push buttons, such as [OK], [Cancel], and [Help]



The Project File

TNT products use a single data structure, the **Project File**, that can hold all of your project materials. Any combination of raster, vector, CAD, TIN, region, text, and database materials can be kept in each Project File, so all of your data that pertains to a project or task can be kept together easily. The Project File was designed with cross-platform users in mind. The TNT processes all use special read and write routines so that any single TNT Project File can be used interchangeably by any kind of computer: Windows, Macintosh, or UNIX. From your point of view, all cross-platform conversion and translation issues are automatic and transparent.

The free TNTlite product differs from the TNT professional products in three ways:

1 **Object Size.** TNTlite is limited in the size of the Project File objects it can use.

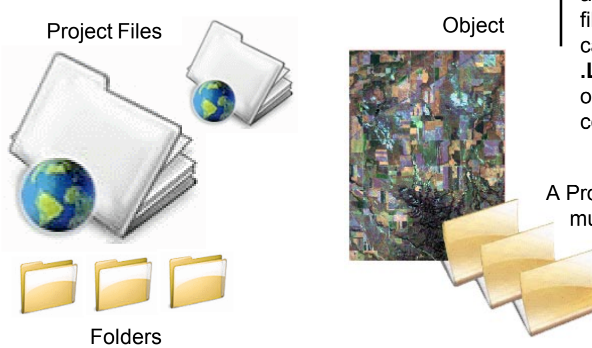
2 **No Export.** Data Export is disabled in TNTlite.

3 **No Return.** TNTlite can use Project File materials prepared by the TNT professional products, but the TNT professional products cannot use any object that has been edited or otherwise modified by TNTlite.

Except for the object size, export, and "no return" limitations, the free TNTlite product and the TNT professional products are identical.

An **object** is one complete data entity in a Project File that all the TNT products handle as a unit, like one airphoto scan (raster), or one imported CAD file. A **subobject** is attached to an object and contains supplemental material, like color display information or georeference data. You may have as many Project Files as the capacity of your storage devices allows.

Locked Files: When TNT opens a Project File, the system LOCKS the file from other users and processes to protect it from simultaneous updates. If your computer gets turned off or otherwise interrupted while a Project File is open, the **.LOK** file that TNT uses for locking will not be erased as it should. As a result, the next time you try to open that Project File, the system will see the **.LOK** file, assume that it is in use, and report to you that the file is locked. In such as case, you can delete the **.LOK** file as you would any other unwanted file on your computer.



A Project File may contain multiple levels of nested folders and virtually any number of objects.

Raster Objects

☑ display and examine the SHEET45_LITE raster object in the LANCSOIL Project File from the EDITRAST collection

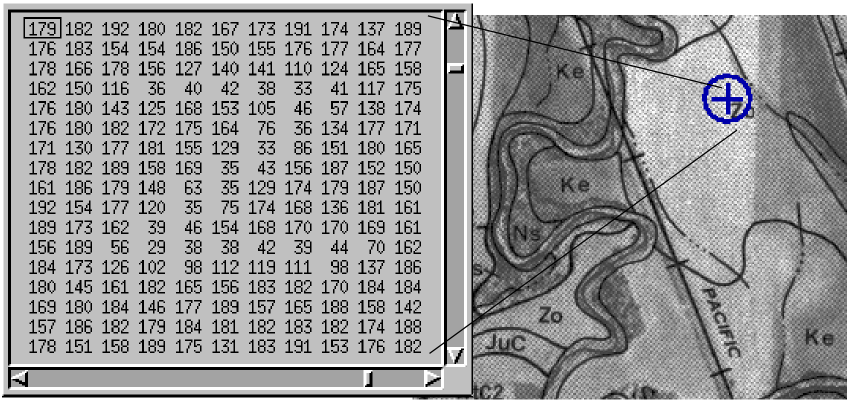
Raster objects in TNTlite are limited to 314,368 cells with 1024 as the maximum dimension. Thus 1024 x 300, 614 x 512, and 300 x 1024 all fit the TNTlite limits.

Techniques for displaying raster objects in color, pseudo-color, and enhanced grayscale are presented in a later exercise.

A *raster object* is a two-dimensional numeric array that contains values of a single data type. Each number in the raster object represents the value of some spatial parameter, like spectral reflectance, image color, elevation, type of ground cover, or chemical concentration. Cell values in a raster object are used to control the color and intensity of pixels on a display screen. When the dimensions of a raster object exceed the resolution of the display, the image can be zoomed or scrolled to accommodate the size difference.

The Examine Cell Values feature is available from the Tools icon menu in the layer list of the display process. You can use Examine Cell Values to view the numeric cell values that correspond to the raster display.

Cell **data type** refers to the number of storage bits assigned to each cell. Raster object cells can have data types of 1-bit (binary), 4-bit, 8-bit, 16-bit, 32-bit, or 64-bits of either integer or real number values. 128-bit raster objects are supported for special processes that deal with the real and imaginary components of complex numbers.



179	182	192	180	182	167	173	191	174	137	189
176	183	154	154	186	150	155	176	177	164	177
178	166	178	156	127	140	141	110	124	165	158
162	150	116	36	40	42	38	33	41	117	175
176	180	143	125	168	153	105	46	57	138	174
176	180	182	172	175	164	76	36	134	177	171
171	130	177	181	155	129	33	86	151	180	165
178	182	189	158	169	35	43	156	187	152	150
161	186	179	148	63	35	129	174	179	187	150
192	154	177	120	35	75	174	168	136	181	161
189	173	162	39	46	154	168	170	170	169	161
156	189	56	29	38	38	42	39	44	70	162
184	173	126	102	98	112	119	111	98	137	186
180	145	161	182	165	156	183	182	170	184	184
169	180	184	146	177	189	157	165	188	158	142
157	186	182	179	184	181	182	183	182	174	188
178	151	158	189	175	131	183	191	153	176	182

The window shows the numeric cell values for part of the 8-bit grayscale raster object illustrated. The letter “Z” which shows in a soil type label in the image can be visually distinguished in the numeric array by the lower cell values.

Vector Objects

A vector object is the collection of vector **elements** (**points, lines, polygons, nodes**, and **labels**) and attributes stored together in a TNT Project File. Points, lines, and polygons can be assigned to classes, have attached database records, and be displayed in a selected drawing style (such as point symbols, line patterns, and polygon fill patterns).

Processes that manipulate and analyze vector objects can do so only with vector objects that have a consistent and complete **topology.** The TNT products automatically enforce one of three levels of vector topology. **Polygonal** topology is the most rigorous level, ensuring that a point lies in at most one polygon, and that no two lines intersect. Automatic topology maintenance requires a certain amount of internal bookkeeping about the relationship of vector elements to one another, including

- which lines emerge from a particular node,
- what polygon elements are on either side of a line element,
- which line elements form a particular polygon,
- which polygons are islands within other polygons, and
- what polygons they are islands within.

Vector topology does not support the idea of "layered elements" as CAD topology does.

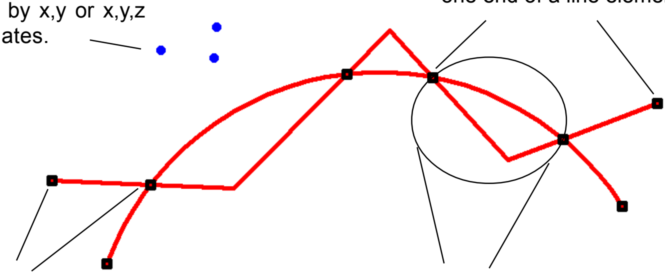
☑ display and examine the PARCEL vector object in the BLACKBRN Project File from the BLACKBRN collection

The TNT products support three levels of vector topology: **Polygonal**, **Planar**, and **Network**. For more information on the levels of vector topology supported by the TNT products, refer to the TNT Reference Manual.

Vector objects in TNTlite are limited to 1500 lines, 500 polygons, and 1500 points.

A vector **point** element is defined by x,y or x,y,z coordinates.

A vector **node** element terminates one end of a line element.



A vector **line** element has a node at each end.

A vector **polygon** element consists of one or more line elements that define a closed shape.

CAD Objects

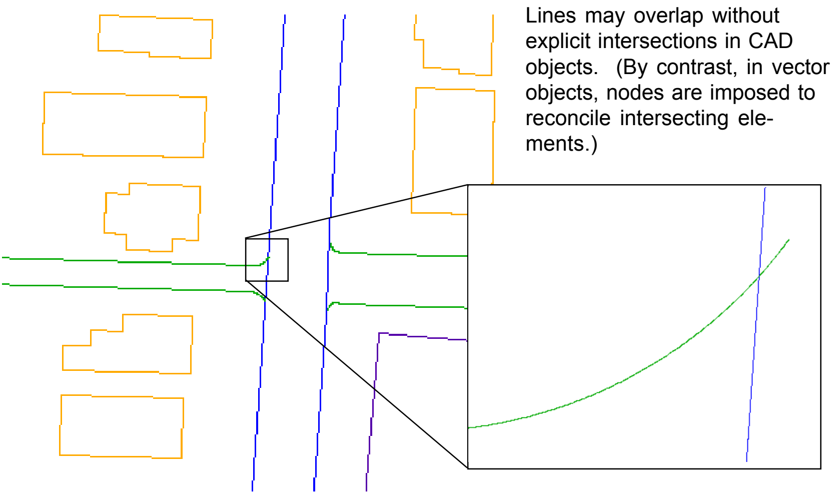
Types of CAD elements include: **points, circles, arcs, arc chords, lines, boxes, polygons, ellipses, elliptical arcs, arc wedges, elliptical arc wedges, elliptical arc chords** and **text**. Individual CAD elements can be organized into **blocks** that are inserted at one or many positions within a single object.

☑ display and examine the FOOTPRINT CAD object in the BLACKBRN Project File from the BLACKBRN collection

CAD objects in TNTlite are limited to 500 elements.

A CAD object has a free-form topology, and is useful for applications that do not require an exact record of the spatial relationships between an object's elements. The CAD object data structure does not reconcile line intersections or polygon overlaps and islands, and thus supports the concept of layered elements. That is, you can move CAD elements around in a drawing without triggering the topological reconciliation of overlapping elements.

The CAD object data structure also allows for the geometric description of elements. For example, in a vector object, an element that appears to be a circle is actually always a polygon, so that at a high enough magnification, the circular shape resolves into discrete vertices and line segments. By contrast, a circle in CAD object is defined by its center point and radius. Thus, at any magnification, a CAD circle looks circular. Unlike a vector polygon, it can be resized simply by changing its radius, or moved by changing the location of its center point.



Lines may overlap without explicit intersections in CAD objects. (By contrast, in vector objects, nodes are imposed to reconcile intersecting elements.)

TIN Objects

A TIN, or Triangulated Irregular Network, is composed of node and line data that represent a surface as a set of adjacent, conterminous triangles constructed from irregularly spaced three-dimensional points. The topology of a TIN object is more restrictive than that of vector objects because in a TIN, every node is part of some polygon, and every polygon is a triangle. The TIN structure is carefully defined so that for any set of nodes in 3D space, there is only one TIN that connects all the nodes. The minimal size and uniqueness of TIN objects make them ideal for processes that treat 3D surfaces.

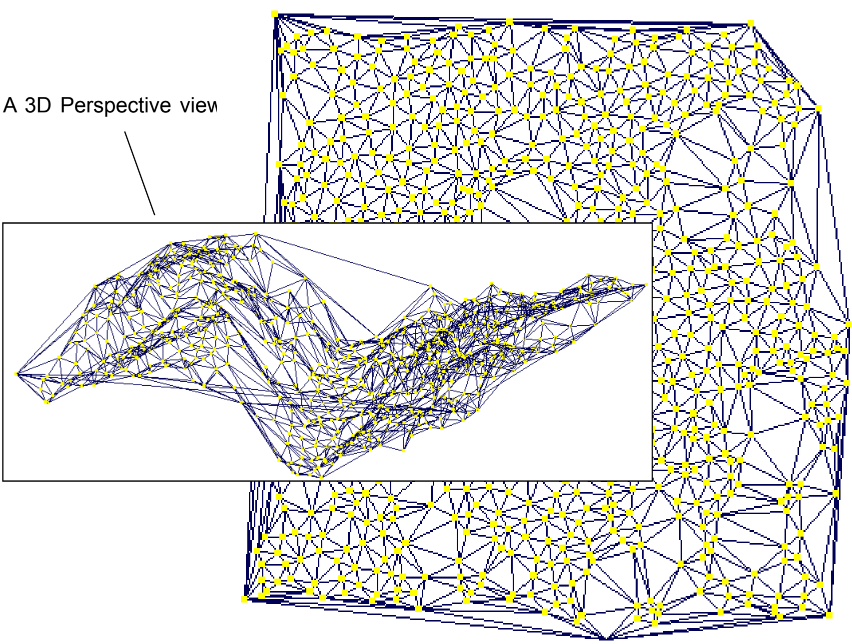
TIN objects can be displayed in 2D or in 3D Perspective as a three-dimensional surface.

☑ display and examine the TINLITE TIN object in the TINLITE Project File from the SF_DATA collection

TIN objects in TNTlite are limited to 1500 nodes.

A TIN object in a normal 2D view.

A 3D Perspective view



Region Objects

A Region Object is a special type of polygon construct that defines a complex collection of areas (including any islands) and stores it in a map projection. Regions can be created in display processes and in the Object Editor by generating them over a georeferenced image. Once defined, a region can be used as a control object in other processes: for element selection or area definition for processing, or in the application of other geospatial manipulations and analyses.

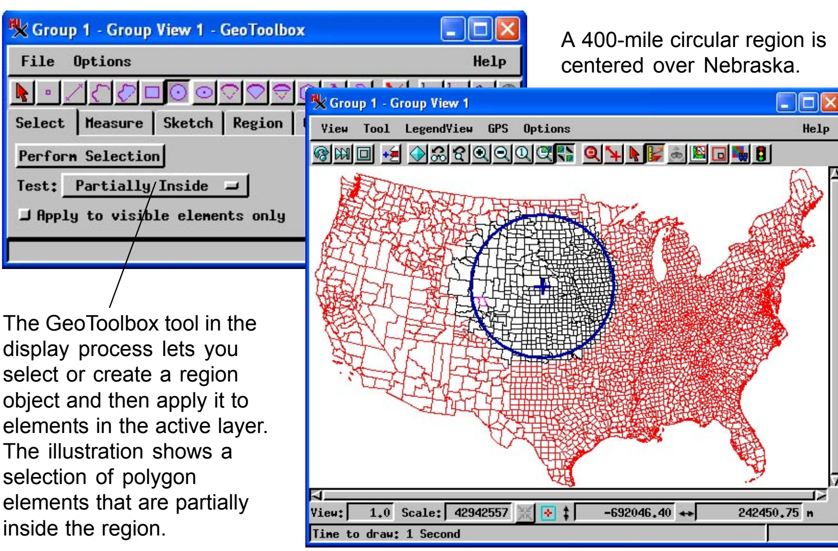
Region objects in TNTlite have no explicit limits since they are useful only in conjunction with other objects (which already have TNTlite limits).

Region objects are useful only in conjunction with other geospatial objects (raster, vector, CAD, TIN, and database); they have no particular usefulness by themselves. Region objects are particularly useful in Element Selection operations, which are introduced on page 20.

Look for more information in the tutorial booklet *Interactive Region Analysis.*

The illustration on this page shows a U.S. counties vector object with polygon elements selected by a region object with a 400-mile radius.

In the GeoToolbox window (see page 20 in this booklet), the select operation uses a region object to select polygon elements in a vector object of U.S. counties.



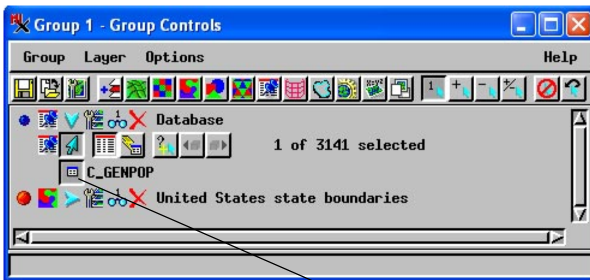
A 400-mile circular region is centered over Nebraska.

The GeoToolbox tool in the display process lets you select or create a region object and then apply it to elements in the active layer. The illustration shows a selection of polygon elements that are partially inside the region.

Database Objects

TNT database objects can store both direct geospatial data and related reference information for other Project File objects. Database files can be linked or imported either as primary objects for direct use, or as subobjects that contain data cross-referenced to elements in raster, vector, CAD, or TIN objects. Databases can be linked to a Project File either through ODBC (Open Database Connectivity), or with direct support for particular formats.

Database objects in TNTlite are limited to 1500 records.

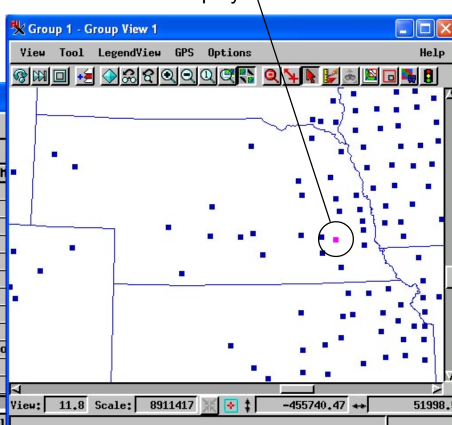


Open a database window by pushing its icon button in the layer list.

Database objects can be manipulated **relationally**, that is, a field in one table can index a record in another table. Thus, a chain of relational links can be established whereby an element references a record containing field(s) tied to records in other tables. Records in more than one table can also be attached to a single element. Complex logical constructs can be applied to values in multiple databases to govern selection and processing operations "by query" in many TNT processes.

Select an element by clicking on a record in the database window.

Select a record by clicking on an element in the display.



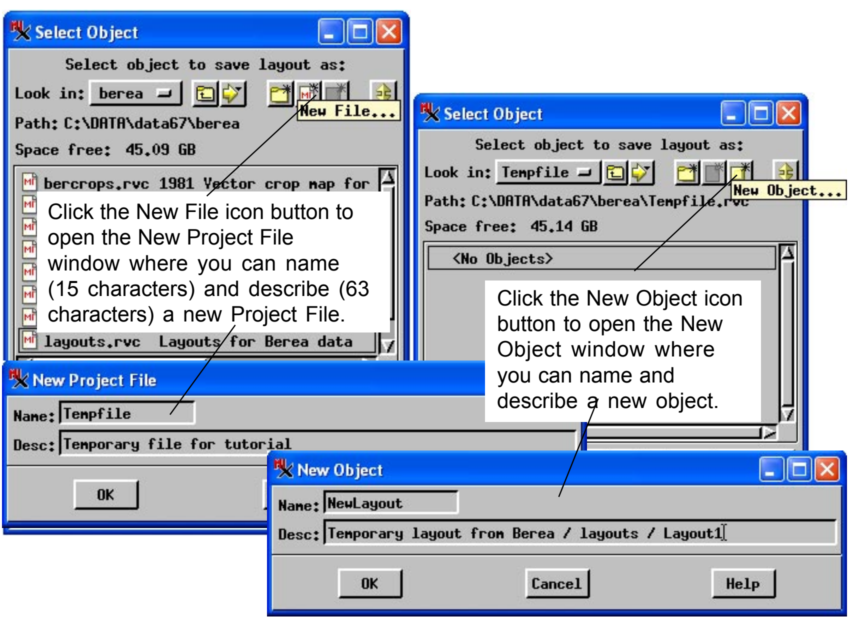
File and Object Naming

STEPS
- ☑ in the Display / Spatial Data process, open LITEDATA / BEREA / LAYOUTS / LAYOUT1
- ☑ choose Save As from the Layout menu in the Layout Controls window
- ☑ navigate to the file level and click the New File icon button
- ☑ type in a file name and description and click [OK]
- ☑ click the New Object icon button
- ☑ type in an object name and description
- ☑ click [OK] to complete the operation

If you have a large collection of project materials, you need to follow a good organization and naming practice. Use descriptive names and give a clear description with each name.

Project File names may be fifteen characters long and always use “rvc” as the file extension. Note that you may need to tailor your file names to comply with the limitations of your operating system and network environment. (Special characters allowed by one system may be illegal in another.)

The names of folders, objects, and subobjects in a Project File may be 15 characters long with an optional 63-character description. Object names must be unique for each object type within a folder. Similarly, subobject names must be unique within an object. Folders, objects, and subobjects can be copied, renamed, and erased with the Project File Maintenance process (Support / Maintenance / Project File) described on the next page.



Project File Maintenance

A Project File is a single data structure organized in a multi-level, logical hierarchy that may contain raster, vector, CAD, database, region, and TIN objects and subobjects. During the course of your work, you may have occasion to copy an object from one Project File to another, or perform other maintenance functions. To access Project File Maintenance, select Support / Maintenance / Project File from the menu. The Project File Maintenance window opens and displays a list of directories and files. Maintenance operations are applied to the currently selected item with the push buttons at the bottom of the window.

Use the Info button to get general information, such as an object's type, source, and a list of attached subobjects. The Edit button lets you modify the item's name and description and some other things, depending on the type of object. For example, you can use Edit to change the assigned Null value and cell size for a raster object.

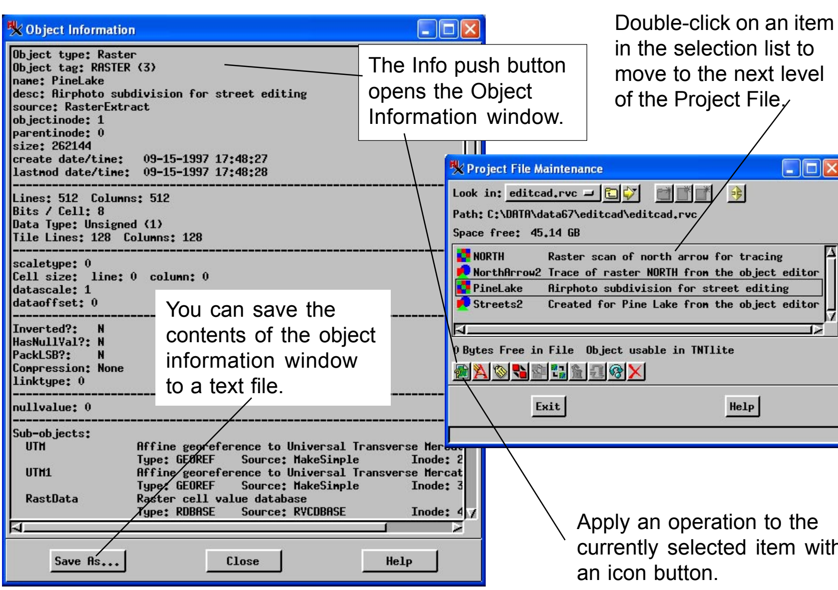
STEPS

☑ select Support / Maintenance / Project File from the main menu

☑ select any object from any Project File

☑ click the Info icon button and examine the Object Information window

- **Break Lock** releases the write lock on a Project File.
- **Delete** removes an object.
- **Link To** lets you link to read-only objects and have read-write subobjects.



Color Maps

STEPS

☑ display the ELEVATION raster object from the CB_TM Project File in the CB_DATA collection

☑ select Edit Colors from the Tools icon drop-down menu 

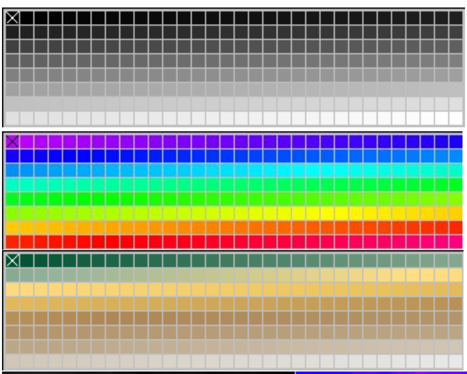
☑ select Rainbow from the Palette menu in the Color Palette Editor window

☑ experiment with color spread and editing tools and click Redraw in the View window 

A raster object is a two-dimensional array of numbers. Display processes use the values in the rows and columns of a single raster object such that the color and intensity of each image display pixel is determined by a corresponding cell in the raster object. A variety of techniques are used to create grayscale and color images from the cell values in one or more raster objects.

A **color map** (also **color table**) associates 8-bit raster data values (0-255) with various display colors. The Edit Colors selection on the Tools menu opens a Color Palette Editor window where colors can be adjusted, and complete color spreads applied.

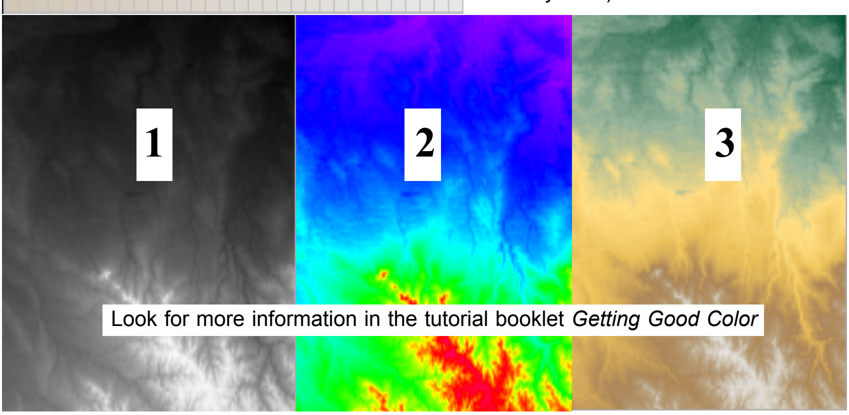
Three color tables applied to the same 8-bit elevation raster object.



1 (1) A simple grayscale spread from 0 (black) to 255 (white);

2 (2) A rainbow color spread that traverses the color space from 0 (violet) to 255 (red);

3 (3) A two-range color spread: from 0 to 122 (dark green to green), and 123 to 255 (olive drab to yellow).



Look for more information in the tutorial booklet *Getting Good Color*

Contrast Tables

To improve display appearance, the TNT display processes apply contrast enhancements to grayscale images. The display processes can use an existing contrast table or they can create one. A contrast table can project a narrow range of cell values into a wide range of display intensities, making the brights brighter and the darks darker for better visual appearance.

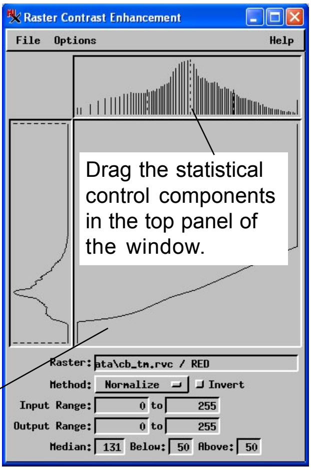
You can adjust the visual appearance of grayscale images by creating and selecting different methods of contrast enhancement. The display processes let you choose from linear, normalized, equalized, exponential, and user-defined translation curves. The Enhance Contrast selection on the Tools icon drop-down menu opens a Raster Contrast Enhancement window where you can select or interactively create a contrast curve. Make the adjustments you want and click Redraw to see the effect.

STEPS

☑ display the RED raster object from CB_TM in the CB_DATA collection

☑ select Enhance Contrast from the Tools icon menu 

☑ experiment with contrast editing 

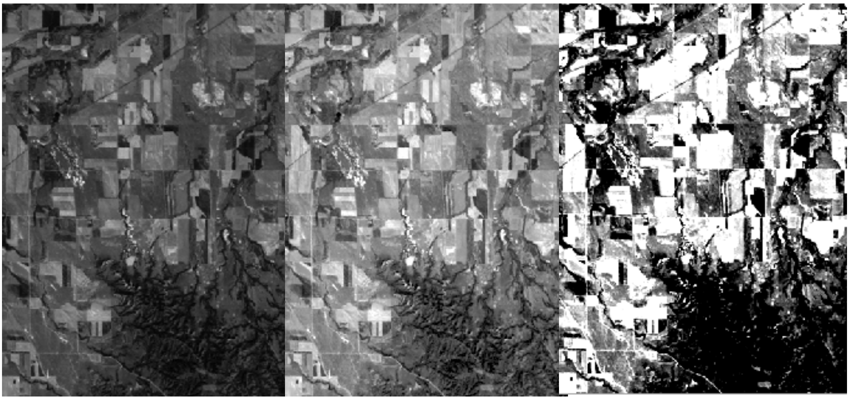


In User Defined mode, you can use freehand drawing techniques to reshape the contrast curve.

In this image, the cell values range from 20 to 164.

A normalized contrast improves the appearance.

A narrow input/output range puts more cells at the extremes.



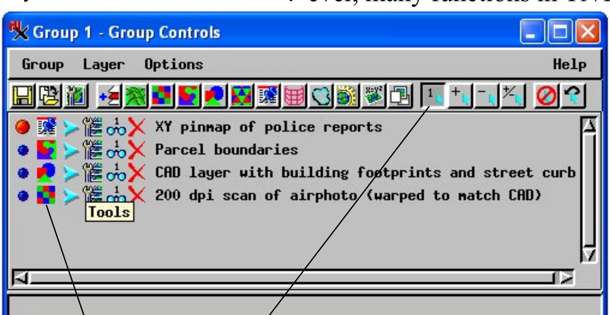
Icon Buttons and ToolTips

Vocabulary: An **Icon Button** is a graphical push button that activates a program function. A **ToolTip** is a label for an Icon Button that appears after you pause the mouse cursor over an icon button.

Some complex programs that offer many menu and button choices tend to crowd the screen with text and labels. In order to reduce this kind of interface clutter, the TNT products employ **icon buttons**, which provide a graphical representation of the button's function instead of space-consuming label text. Icon buttons take less interface space, so a window can present more functions at the main level, letting you apply operations without working through several levels of cascading menus and program dialogs.

Icon buttons in the Display Spatial Data window provide quick access to program functions and object controls.

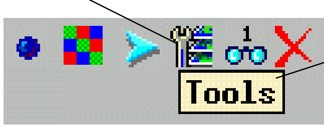
Some standard icons are widely used by other popular computer software, and such icons are instantly familiar to experienced users. The TNT products use such "universal" icons when possible. However, many functions in TNT processes use unique icons designed specifically by MicroImages. Use the **ToolTip** feature to display a temporary label that describes the icon button's function. Position the mouse cursor over the icon button.



Icon buttons appear in the menu bar and also in the layer list of the display process.

Whenever the mouse cursor pauses over an icon button, a ToolTip identifier pops in, naming the function of the icon button.

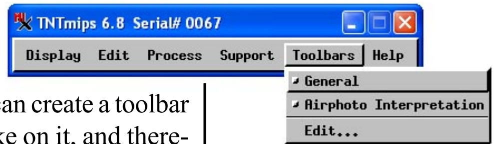
Pause the mouse cursor over an icon button to expose its ToolTip.



ToolTip text disappears automatically when you move the mouse cursor away from its icon button.

Custom Toolbars

TNT provides customizable **toolbars** so that your favorite processes and SML scripts can always be instantly available. You can create a toolbar with as many processes as you like on it, and thereafter access each process with a single click. Launching a process with one click from a toolbar is easier than navigating through a series of cascading menus to find the process you want. For example, to use Feature Mapping, you could navigate four levels of menu cascades for the process (Process / Raster / Interpret / Feature Map), or you could simply click the Feature Mapping icon in your custom toolbar.



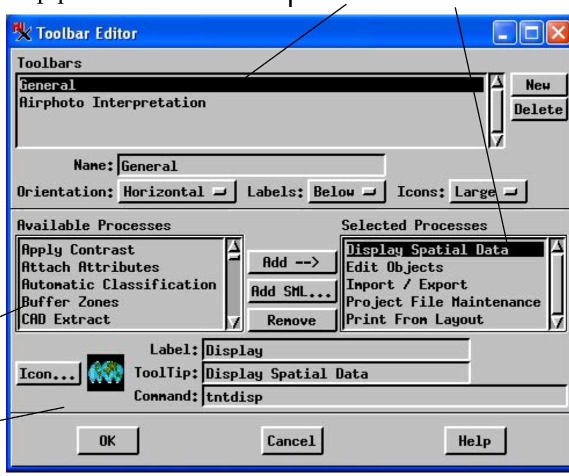
Select toolbars from the Toolbars menu.

Design your own toolbars, by picking an icon and assigning label text to each process you select.

You can create as many different custom toolbars as you like and have any number of tool bars open at a time. You can create your tool bars with labels, and later turn off the label display after you are familiar with the icons. In any event, ToolTips are present automatically over every process-level toolbar icon.

To create a toolbar, select Edit from the Toolbars menu. The controls in the top panel of the Toolbar Editor window let you create and delete toolbars. Select a process from the scrolling list on the left, and add it to the process list on the right.

Pick a toolbar from the list to modify the selection of processes it contains.



Select processes and add or remove them from a toolbar's Selected Processes list.

Choose a process icon, label, and ToolTip text.

Element Selection

STEPS

☑ display HYDROLOGY from CB_DLG in the CB_DATA collection

☑ zoom in on the two small lakes in the northwest corner as illustrated below

☑ click the Select tool in the Control window

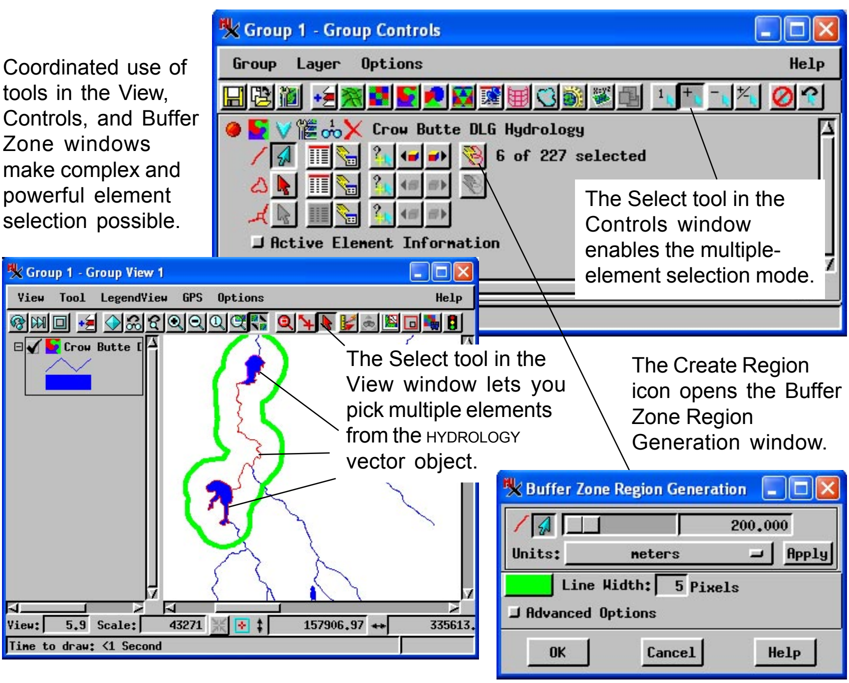
☑ select both lakes and the hydrology that connects them in the View window

☑ click Create Region / Buffer Zone, enter the values illustrated below, and click [Apply]

In many TNT processes, you will want to apply certain operations to *selected* elements only. For example, you may want to select a single polygon element to view its attached database records, or to select multiple line and polygon elements to create a buffer zone around them. Element selection is controlled with tools in the View and Controls windows. Follow the steps listed for this exercise to use the interactive buffer zone tool: just one application of the flexible Element Selection controls.

Other Element Selection features are available in the GeoToolbox window. Click the GeoToolbox icon on the menu bar in the View window and inspect the selection, measurement, and region tools in the GeoToolbox window. Refer to the TNT Reference Manual for more information about the powerful and flexible selection features in TNTmips.

Coordinated use of tools in the View, Controls, and Buffer Zone windows make complex and powerful element selection possible.



Map Projections

In order to draw portions of a spherical surface on a flat page or display, the surface must be geometrically **projected** onto the drawing plane. Many techniques for projecting portions of the earth's surface onto planar maps have been defined over the years. The choice of a map projection determines the appearance and map qualities of the results you produce.

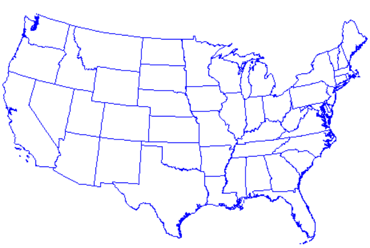
For many applications, particularly when the extent of the project area is local (rather than regional or continental), the choice of a map projection makes little visible difference: the curve of the earth's surface is too slight to matter for short distances. But even at local scales, mixing project materials of different geometry can result in layers that "don't match" other layers. The TNT display processes automatically reconcile different map projections on the fly, but some factors remain that may affect the alignment of features and overlays.

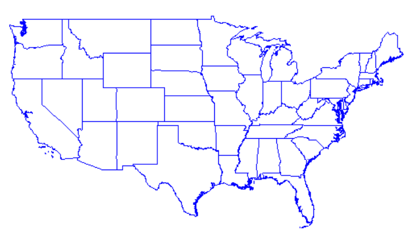
If you want to be more than a casual bystander in the profession of GIS and cartography, you need to develop a strong grasp of the fundamentals of map projections so that you can make informed choices for your mapping projects.

Refer to the Getting Started booklet *Understanding Map Projections*.

STEPS
- ☑ display the STATES vector object from the UNTDSTAT Project File in the USA data collection
- ☑ select Projection / Clipping from the Group menu
- ☑ In the Group Settings window, change Automatch to None
- ☑ click [Projection...] and choose a different System

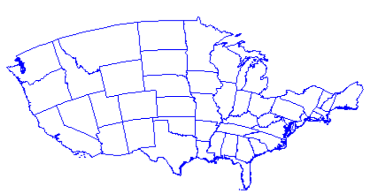
For best results:
- Keep all related project materials in the same map projection.
- If visual discrepancies persist, resample raster objects to the geometry of the map projection.





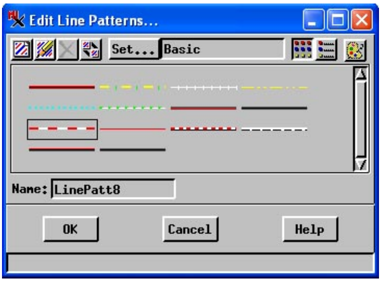
Your choice of map projection affects the geometry of the display.

Large-extent materials show big differences of geometry caused by map projection.



Misapplication of map projections and parameters can cause unwanted distortions.

Style Selection



Point, line and polygon elements in vector and CAD objects can be displayed in an endless variety of drawing styles. For example, you could make points display as oil well symbols, lines with highway patterns, or polygons filled with repeating geologic symbols. You can select styles explicitly, or you can use values from attached databases to determine style selection "by attribute." To get an idea about style operations:

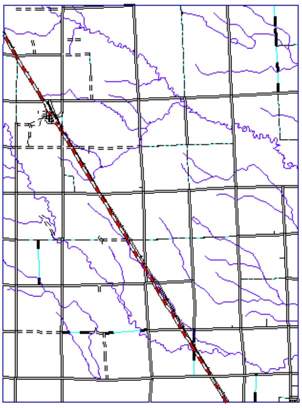
Refer to the tutorial *Creating and Using Styles*.

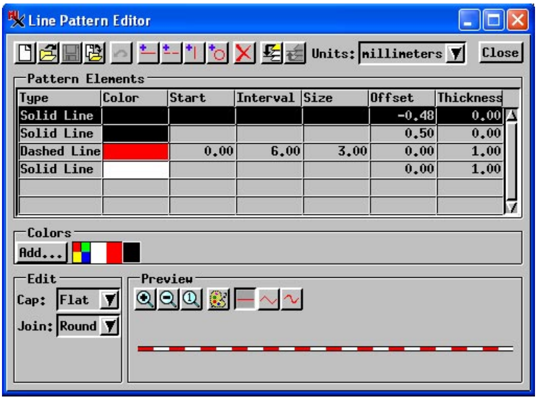
- ☑ display the LITEDATA / BEREA / BERVECT / TIGERBEREA vector object
- ☑ open the Vector Layer Controls dialog and in the Lines tab, select Style: By Attribute, and [Specify...]
- ☑ in the Assign Styles by Attribute dialog, click [Edit Styles...]
- ☑ in the Style Editor dialog, select a pattern sample and then click the Create or Edit Pattern icon button
- ☑ in the Line Pattern Editor window, click the Open icon button
- ☑ in the Select Pattern dialog, select a pattern to open and click [OK]
- ☑ survey the tools in the Line Pattern Editor window

Choose By Attribute in a display process to choose from (or create) a selection of drawing styles.

Obviously, TNTmips offers a rich feature set in support of style selection and design. For more information, refer to the Online Reference Manual or the tutorial booklet *Creating and Using Styles*.

Display a map with line styles for rivers and different types of roads.





Multiple Views and Groups

The display processes let you select and arrange complex views of your spatial data. A ***Group*** can contain many ***Layers*** of geospatial objects. When you create a group, it has one ***View*** window. You can open more view windows and manipulate the controls for each View separately, to give you multiple views of the geospatial objects in that Group. You can turn off certain view windows if you want to focus your work on one View

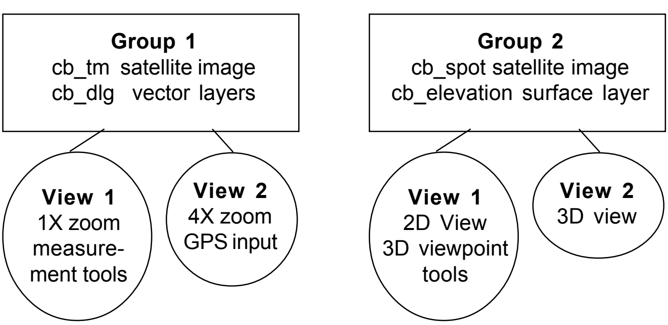
The complex capability of the display process is compounded when you realize that you can also open more than one Group: multiple Groups, with each Group visible in multiple Views. Even more complexity is possible inasmuch as a View can be either 2D or 3D.

If you have a single monitor on your computer, you can quickly fill it with so many Groups and Views that the result is confusion. If your computer is configured with multiple monitors, you can drag multple Groups and Views to different monitors and spread out your work.

The Hide/Show icon toggles the display of each layer in each View.

STEPS
- ☑ open a new display group and add CB_DATA / CB_COMP / _8_BIT, CB_DLG / HYDROLOGY, and CB_DLG / ROADS
- ☑ select Open 2D View from the Group menu in the Group Controls window
- ☑ turn off the GeoLock toggle in the View menu of one of the View windows
- ☑ apply different view controls and tools to View 1 and View 2
- ☑ experiment with the Hide/Show icons for each layer and view

You can open multiple Groups, and look at each Group with multiple Views.



Refer to the tutorial *3D Perspective Visualization*.

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. TNTedit can access geospatial data in a wide variety of commercial and public formats.

TNTview TNTview has all the same powerful display features for complex visualization and interpretation of geospatial materials as TNTmips. TNTview is perfect for those who need flexible access to the TNT project materials but 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 contain multiple versions of the TNTatlas software so that a single CD can be used on any popular computing platform.

TNTserver TNTserver lets you publish TNTatlases on the Internet or on your intranet. Navigate through massive geodata atlases with your web browser by using the free, open-source TNTclient Java applet (or any custom applet you create) to communicate with TNTserver.

TNTlite TNTlite is a free version of TNTmips, TNTedit, and TNTview for students and professionals with small projects. You can download TNTlite for your computer (about 100MB) from MicroImages' web site, or you can order TNTlite on CD-ROM (shipping charges apply).

11th Floor – Sharp Tower
206 South 13th Street
Lincoln, Nebraska 68508-2010 USA

Voice: (402)477-9554
FAX: (402)477-9559

email: info@microimages.com
Internet: www.microimages.com