Terrain Navigator Pro User Guide

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Introduction

Welcome to Terrain Navigator Pro.

What's New

Terrain Navigator Pro 7.0 brings you:

- **Export of markers/routes/tracks to ESRI's Shapefile format.** Save your data in ESRI's .SHP file format for use in a wide range of GIS programs. (Page 113)
- **Access to higher-resolution aerial photos and updated topo maps (where available).** Click **File > Map and Aerial Photo Updates via Web** to check for updated aerial photos/topographic maps online, and download any new versions that are available. In addition, some photo coverage is available in color.
- **3-D Route Animation.** Record an .AVI animation file showing progress along any route, shown in 3-D View. (Page 27)
- **Expanded management of Projects.** You can now rename projects, export them for storage or sharing, and import other people's projects. Project name is noted in program title bar for reference. (Page 34)
- **Superimpose your own custom grid on maps/photos.** Adjust the size and shape of grid rectangles to suit your purpose. Grid may be based on the coordinate system you're using, or measured against magnetic North. (Page 22)
- **Waypoint creation by Public Land Survey System (PLSS) bearings.** (Page 82)
- **GPS Position Averaging** feature helps maximize accuracy when marking single locations. (Page 68)
- **Automatic GeoPin placement based on time/date stamp.** Drag-and-drop files with a time/date stamp directly onto a GPS track. Files will attach themselves chronologically to the track based on the time the track points were recorded. (Page 49)
- **Flexible printing options** let you specify exact scales more easily, and define margins for the printed page. New optional scale bar graphic may be included on printouts. (Page 93)
- **Track appending** lets you connect multiple tracks to form a single line. (Page 90)
- **Additional export formats** let you save your coordinate data in .GPX or .GEN format.
- **Optional locking of windows in two-window mode.** A new mode button allows you to lock both windows on the same geographic area and scroll them simultaneously. (Page 21)
- **New fill options for looped routes and tracks:** Create buffer zones at specified widths. (Page 79)

New in 6.x

If you're upgrading from a pre-6.0 version of Terrain Navigator or Terrain Navigator Pro, here are some of the major new features you'll notice:

Maps:
- **View/Download Aerial Photos.** Your purchase entitles you to one year of access to USGS aerial photos for your map region. (Page 13))
- **Copy Maps to Hard Drive.** Terrain Navigator Pro 6.0 will read maps from CD-ROM or directly from your hard drive. Aerial photos may be copied to your hard drive too. (Page 15)

New Layer Tools:
- Use **Labels** to add your own captions to map images. (Page 45)
- **GeoPins** let you link external files to map locations. (Page 48)

- Use **Range Rings** to gauge distance in all directions from a particular point. (Page 51)
- **Range/Bearing Lines** let you measure distance and bearing between any two points. (Page 56)
- Use **Projects** to classify, manage and store all your layers. (Page 34)

Other Enhancements:
- **ESRI ArcGIS ArcPad Extension.** New PDA menu allows transfer of maps to handheld PocketPC device, for use in ESRI's ArcPad mobile GIS software. (Page 102)
- **Profile: Adjust Vertical Axis.** Customize the vertical minimum/maximum against which a profile is shown. (Page 39)
- **Line of Sight: Apply Height Offsets.** Raise either end of the sight line, to achieve clearance and anticipate obstacles. (Page 42)
- **GeoTips: Customizable Tooltips.** GeoTips provide a handy data readout when you hold the cursor over a specific layer or map location. (Page 20)
- **AutoText: Self-Updating Location Info.** AutoText can show coordinates, elevation, grade or street address. Attach AutoText to marker names, waypoint names, or labels. If the layer is moved, the AutoText will update accordingly. (Page 46)
- **Search for Street Addresses.** Address information is available on Geographic Data Enhancement CD. If you didn't receive this CD with your purchase, contact Maptech for information. (Page 11)
- **3-D Video Clips.** Record .AVI video files of a rotating 3-D landscape. (Page 26)
- New **line styles and widths** for all layers that use lines.
- An optional **opaque background** is now available for marker and waypoint names.
- **GPS Setup Wizard.** An automated setup utility is now available to make configuring your GPS settings quick and easy. Click **GPS > GPS Setup Wizard** to run the Wizard. The Wizard will automatically detect your GPS manufacturer, model, and the port where it is connected to your computer, and will make the appropriate configuration settings in Terrain Navigator Pro. Of course, you can still configure your GPS settings manually if you prefer, by clicking **GPS > Setup**.
- **New preferences for aerial photos:** Aerial photo cache size has been increased to 200MB, and a new preference setting tells Terrain Navigator Pro to download new photos to the cache when new versions are detected.

Contacting Maptech

If you have a question and you can't find the answer here, Maptech's technical support staff will be happy to assist you. Support is available from 9:00 AM to 5:00 PM Eastern Time, Monday through Friday:

Telephone: (978) 792-1197
E-mail: support@maptech.com
Fax: (978) 792-1095
Internet: http://www.maptech.com/support

Maptech's Support site provides software updates, plug-in utilities, and Technical Documents. In addition, you will find an online technical support discussion forum, where Maptech software users and technical support staff can share information, suggestions and comments.

The Basics

Opening Maps

Double-click any square in the map grid to open that map.
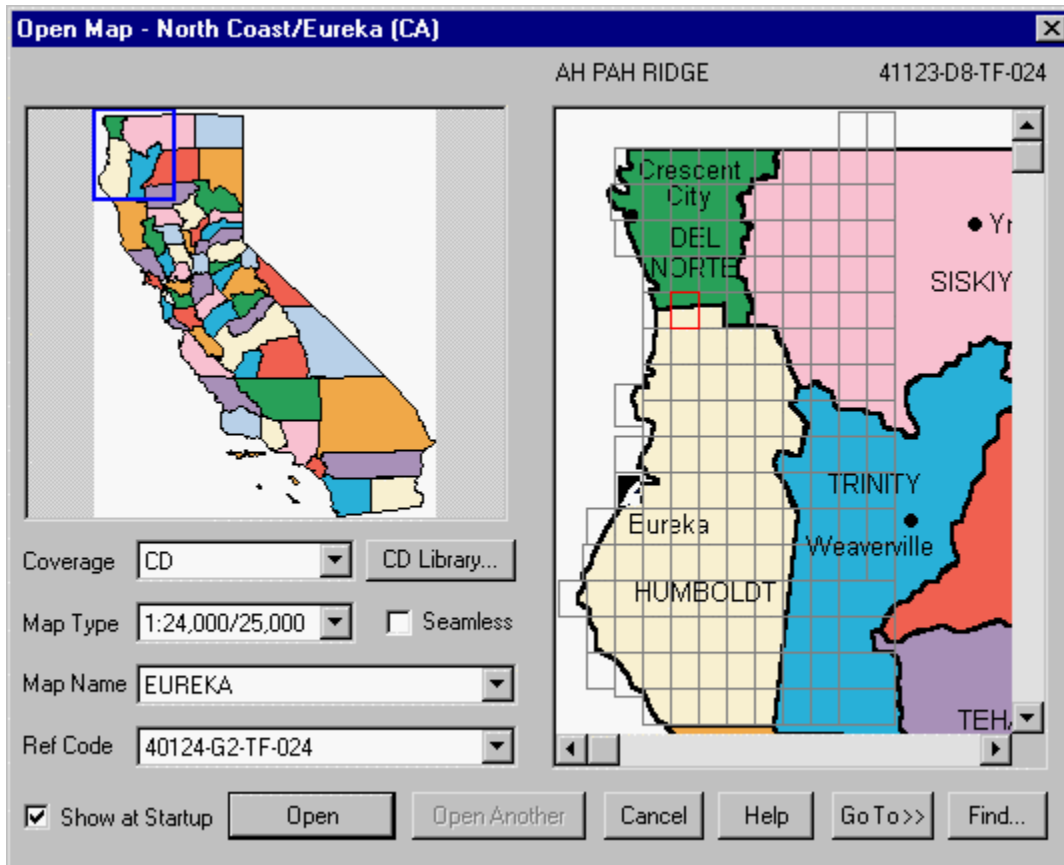
When you first start Terrain Navigator Pro, the Map Selector appears. You can also open the Map Selector by clicking **File > Open**. The Map Selector is an overview of the state or region, with a grid showing the area covered by each map. As you move the cursor over the grid, each map's title and USGS reference code are shown at the top of the window. Double-click any square to open that map.

Moving Around the Map Selector

You can move around the Map Selector using the scroll bars, or by holding down the **Ctrl** key while dragging with the mouse.

Choosing a Different Map Scale

Maptech Professional USGS Topographic Series CDs provide two map scales to choose from. In most cases, the two scales are:

♦   1:24,000/25,000 - The standard 7½-minute "quads" most often used for hiking, hunting, etc.
♦   1:100,000 - These maps cover a lot more ground. They don't provide as much detail, but they give a good view of the "big picture."

In addition, your Terrain Navigator Pro purchase entitles you to one year of access to Maptech's

downloadable aerial photos (see page 13). Most are presented at 1:12,000 scale, but scales as large as 1:3,600 are available in some areas.

Select a scale under **Map Type**. When you switch scales, you'll notice that the map grid's squares will change size, to represent the different amount of area covered by each map at that scale.

Selecting Maps by Name

You can also select maps by **Map Name**, using the drop-down menu provided. Click on a title to highlight it, then press **Open**.

Switching to Another CD Region

To see the map grid for another CD in the *same* state, just click on another region of the state overview. The map grid will shift to that area. If you have installed coverage for *another* state, use the **CD Library** button to select another CD.

Moving Around the Map

Drag Tool

The drag tool (represented by the hand-shaped cursor symbol) is the default tool for moving around the maps: just click and drag the map image around on the screen. The exact coordinates and approximate elevation of the cursor position are indicated on the Toolbar, and are updated as you move.
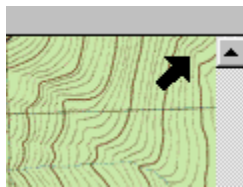
Drag Tool Changes to Scrolling Arrow

When you hold the drag tool at the edge of the screen, the cursor changes to a black arrow. Hold down the left mouse button, and the map will scroll in the direction of the arrow.

Map Overview

Beneath the Compass is the Map Overview: a thumbnail image of the map that you're viewing. The blue box represents your screen, and indicates what part of the map is being displayed. To view a different portion of the map, move this blue box. You can click-and-drag the blue box to a new position, or you can click outside the box on another part of the Map Overview, and the box will move to the place where you clicked. The corresponding map area will appear.

Tip: To enlarge the Map Overview, press the black arrow button that points up to the Overview.

Press arrow button to enlarge overview

Blue outline indicates screen area; drag to move
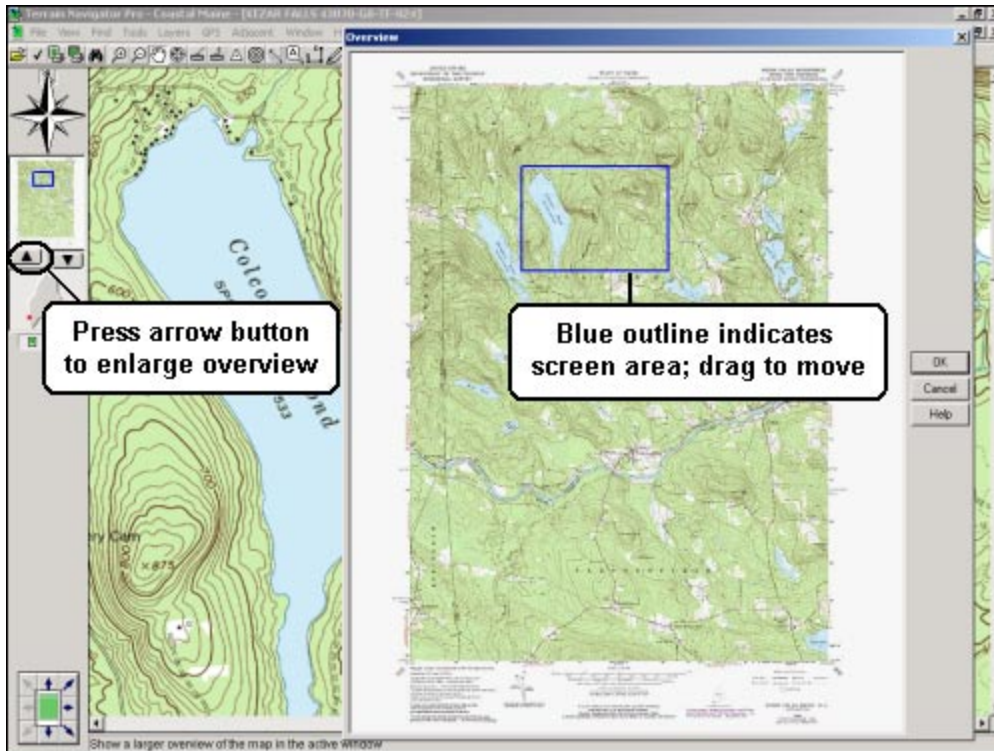
State Overview

The State Overview is a thumbnail image of the state. The red dot gives a general idea of what portion of the state you're viewing. For a more detailed overview, click on the black arrow button that points to the State Overview. This will take you to the Map Selector, where the map you're viewing is highlighted. (Click on a different square in the map grid to open a different map.)

Centering Tool

Select the Centering Tool from the toolbar, then click on the map. The map image will be centered on the point that you clicked.

Compass Control

Click any point of the compass to shift the map in that direction. The map image will shift half a screen each time you click the compass.

A few other ways to move around the map:
♦ Scroll bars on the map display
♦ **Page Up** and **Page Down** keys move map up and down
♦ Hold the **Shift** key and press **Page Up** for left, **Page Down** for right.

Zooming In and Out

Zoom Levels

Terrain Navigator Pro provides four zoom levels for viewing maps.

1:4	Zooms the map out to 25% of actual scale.
1:2	Zooms the map out to 50% of actual scale.
1:1	Original scale.
2:1	Magnifies the map by 200%.

When you first open a map, it is shown at 1:1 zoom ratio. To see more of an area, zoom out. For a closer view, zoom in.
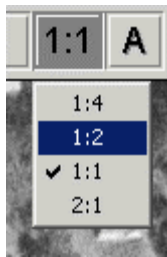
Use the toolbar to select a specific zoom level, or—

Select the Zoom In or Zoom Out tool, then click on the map. The zoomed map will be centered on the point that you click.

You can also right-click directly on the map and choose **Zoom In** or **Zoom Out**.

Note: At 1:1 zoom, every pixel that makes up the map image is shown. To achieve other zoom levels, pixels are either added or taken away.

Changing Map Scales

Your CD provides maps at different scales. For most regions, topographic maps are provided at 1:24,000/25:000 and 1:100,000 scale. You also have access to 1:12,000-scale aerial photos. Use the toolbar's scale control to switch between scales.

If an item is grayed out, that scale isn't available. (For example, when viewing a 1:100,000-scale map you might find that the 1:24/25,000 option is grayed out. Since 1:100,000-scale maps cover a lot of ground, you might be viewing coverage for an area outside the state, so the corresponding 1:24,000-scale maps are not included on your CD.)

Finding Places of Interest
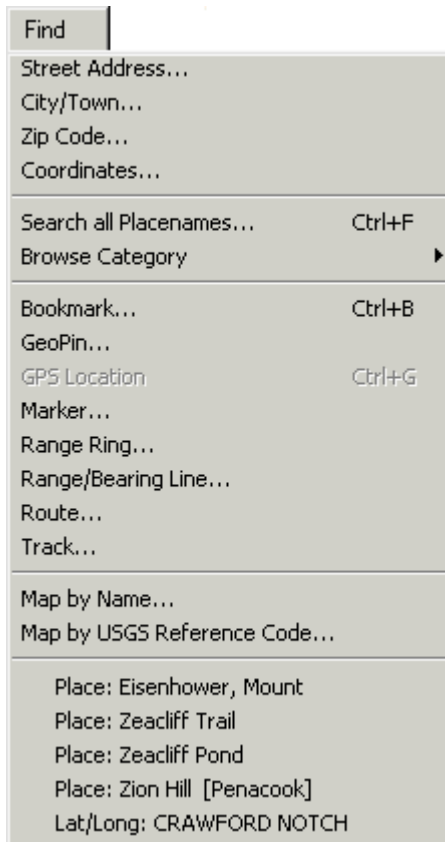
Terrain Navigator Pro's Find menu provides several search options to help you find specific places quickly and easily. These search options are powered by the GNIS (Geographic Names Information System), a database of place names compiled by the USGS. Each place listed in this database is referenced to its location on the map.

The Find menu lets you search specific categories, including **city** or **town** name, **map** name, **zip code**, etc. You can also choose from more than fifty **Geographic Categories** (terrain features). Once you have selected a category, Terrain Navigator Pro provides a list of possible matches for you to choose from. Select the best match from the results list, and press **Open** to see that location on the map.
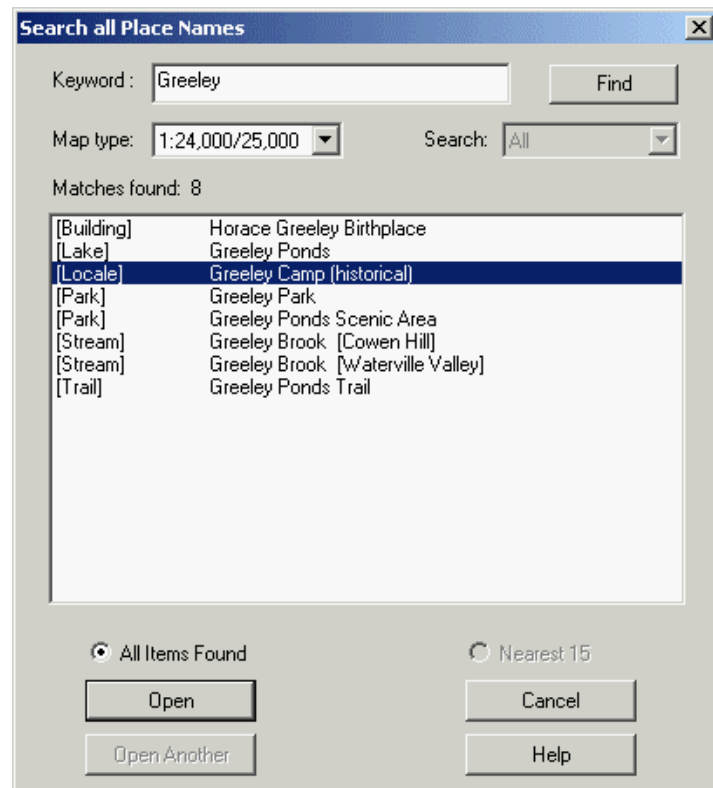
Red Circle Indicates Location

A red circle is drawn around the location you searched for. (To remove the circle, click on it.)

Tips:

♦ To sort the search results by proximity, click **Nearest 15**. This will shorten the list to the 15 locations nearest to the map area you're already viewing, and give you the distance to each location. (Of course, the Nearest 15 option is unavailable if you aren't already viewing a map.) Click **All Items Found** to return to the complete results list, which covers the entire CD region.

♦ If you don't want to limit your search to a specific category, you can search all categories: click **Find > Search All Placenames** and type a word (or even just a few letters) to search for.

♦ The bottom portion of the Find menu shows the last five places you located using this search function. (This is handy for returning to a recently-visited map.)

♦ If you can't find the place you're looking for, make sure the correct CD region is specified: click **File > Change CD**.

Bookmarking Locations
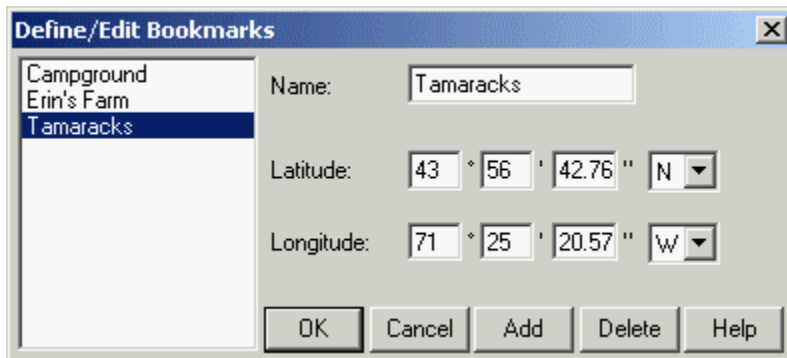
Use Bookmarks to keep track of specific locations so you can easily return to them later.

When you create a bookmark, Terrain Navigator Pro memorizes your location, zoom level and map scale. To set a bookmark, click **View > Bookmark this View**, then type a name for the bookmark. (The coordinates shown in this window represent the point at the center of your screen.) To return to this map view later, just click **Find > Bookmark** and select the name of this bookmark from the list provided.

♦ You can create up to 16 bookmarks per map.
♦ At the bottom of the Find menu is a list of the most recent map locations that you Found—that is, that you brought into view using the Find menu. You can use this list for quick access to recently-visited maps.

Seamless/Single-Map View

Terrain Navigator Pro provides two different modes for viewing maps: Single-Map View, and Seamless View.

Single-Map View
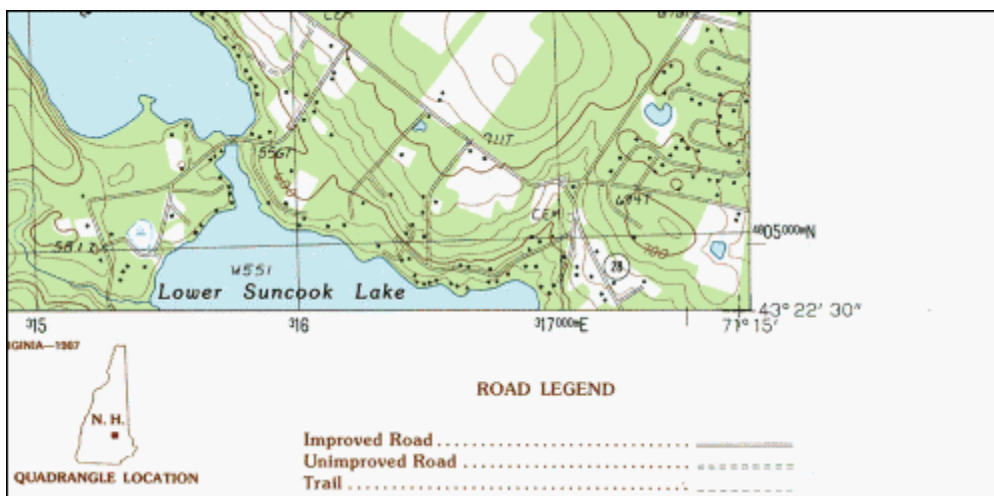
In Single-Map View, the map window contains a single USGS map, in its entirety. The white map

collar, with its printed data (map title, scale, date, etc.), is included in the image.
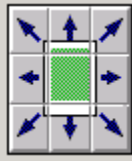
 While in Single-Map View, you can use the Adjacent Map Control, located on the left side of your screen, to switch to any adjacent map. The square in the center represents the map you're viewing. To switch to the map directly to the north, click the square above center; to move east, click the map directly to the right, etc.

You can also use the Adjacent menu, which lists all adjacent map titles, to select adjacent maps by name. (The Adjacent menu only appears when you're in Single-Map Mode.)

Seamless View

Seamless View solves the all-too-common problem that occurs when your area of interest falls on more than one map. In Seamless View, the white map collars are removed, and adjacent maps are aligned and "stitched" together, forming the equivalent of one large map (made up of all the individual USGS maps on the CD). This means you can scroll smoothly from map to map, without having to open each map individually. Seamless View also lets you join multiple maps together in a single print image.

 You can toggle back and forth between these two view modes, using the Seamless/Single-Map toggle button on the toolbar (just to the left of the coordinate display). Or you can select **Seamless View** or **Single-Map View** from the View menu.

Note: When in Seamless View, the Adjacent Map Control disappears, and the Adjacent map list (on the menu bar) is grayed out. This is because in Seamless View, you can move from map to map without having to specify which map to open.

Aerial Photos
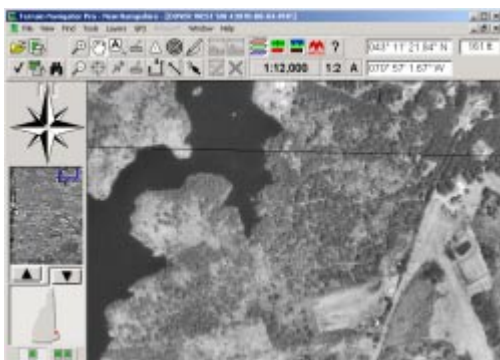
 As a registered Terrain Navigator Pro customer, you have one year of unlimited access to aerial photo coverage for all areas where you have topo map coverage. Most are presented at 1:12,000 scale, but scales as large as 1:3,600 are available in some areas.

Your layers—measurements, annotations, etc.—will appear on the aerial photos just as they appear on the

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topographic maps, and you can continue to add layers while you're working with aerial photos.

Registration and Internet Connection Required

The aerial photos are stored online at servers operated by Maptech. Access to aerial photos requires an Internet connection from the computer where Terrain Navigator Pro is installed. Registered Terrain Navigator Pro customers have unlimited access. You may view aerial photos over the Internet, or copy them to your hard drive, as you wish.

To register:
Registration is fast and simple. You can register online anytime, or register by telephone during business hours. Click **Help > Register** for detailed instructions.

Your initial Terrain Navigator Pro purchase entitles you to one year of access to aerial photos for the region(s) you own. After the first year, you may extend your subscription if you wish; call (888) 839-5551.

Viewing Aerial Photos

1) You'll need to be connected to the Internet. If you aren't already connected, Terrain Navigator Pro will prompt you to connect via your usual connection procedure.
2a) Open a topo map of the area you wish to view, then from the scale dropdown on the toolbar, select a scale ending in "A," or
2b) In the Map Selector window, set **Map Scale** to **1:12,000** (or to a larger scale, if available), then select a square from the grid on the state overview. (To reach the Map Selector, click **File > Open Map**.)

Switching Between Topo Maps and Photos
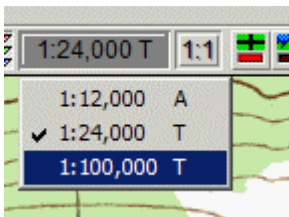
Use the scale dropdown on Terrain Navigator Pro's menu bar to switch between maps and photos. A "T" after the scale indicates a topo map; an "A" indicates an aerial photo.

Finding Out When an Aerial Photo Was Taken

Click **File > Map Information** (or select the Information Tool from the toolbar, then click anywhere on an aerial photo) to get technical details, including the date of the flyover when the photograph was taken. (See page 116 for more about the Map Information window.)

Copying Aerial Photos to Your Hard Drive

Just like topo maps, aerial photos may be copied to your hard drive, by clicking **File > Copy Maps to Hard Drive**.

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Copying Maps to Your Hard Drive
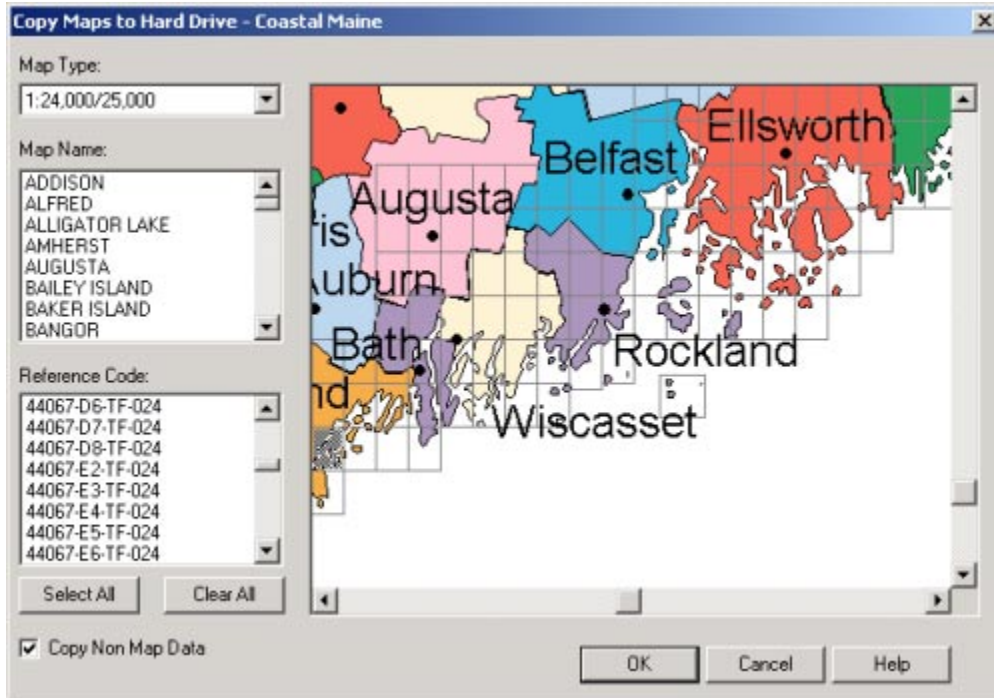
Terrain Navigator Pro allows you to copy maps to your hard drive for ease of access.

Click **File > Copy Maps to Hard Drive**. This opens a state overview much like the Map Selector. Highlight the maps you want to copy, then press **OK**. The maps you chose will be copied to your hard drive.

- ♦   Use the **Shift** key on your keyboard to highlight multiple maps.
- ♦   Press **Clear All** to clear your map list and start over.
- ♦   Press **Select All** to copy all the maps on the CD.

Copying Aerial Photos

To copy aerial photos, set **Map Type** to "1:12,000" (or to a larger scale if available). This will display the photo grid, where you can select which photos to copy.

Deleting Maps/Photos from Your Hard Drive

Maps/photos that are already present on your hard drive are shaded gray. To delete a map or photo from your hard drive, click on the gray grid square. The square will turn transparent (i.e. it won't be shaded or highlighted in any way).

Press OK to start the copying/deleting process. You can copy maps to, and delete maps from, your hard drive in a single step. Depending on how much data you're copying, this process may take several minutes. When the process is complete, a message will appear on the screen, noting how many maps were copied/deleted. (Example: "Copied 8 maps to the hard drive. Deleted 3 maps from the hard drive.")

Maps from Bordering CDs

If you copy maps from bordering CD regions, the maps will appear in the Map Selector window for the bordering CD. This gives you access to the maps without requiring that you switch to the CD region that originally contained that map.

The example below shows the Map Selector overview of New Hampshire, with several maps shared from the Coastal Maine CD region to the east.
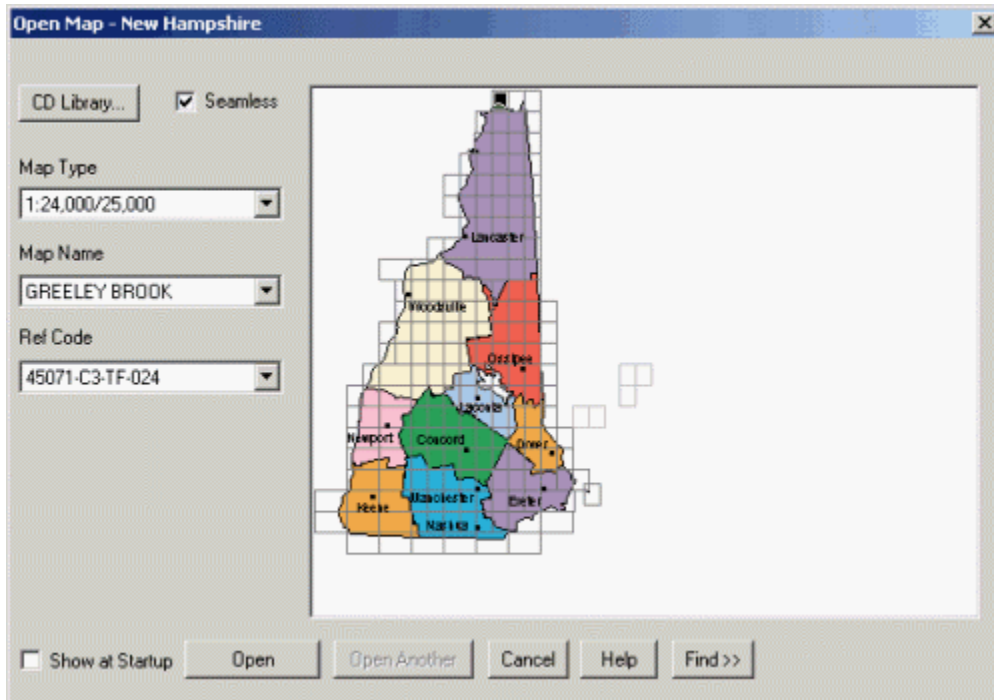
Include Related Non-Map Data

Check here, and in addition to the map image itself, Terrain Navigator Pro will also copy elevation NGS (National Geodetic Survey) data.

Geographic Data Enhancement CD is Best Source for Non-Map Data
Updated NGS data and higher-resolution elevation data is available for most map regions. This data is distributed on CD, labeled "Geographic Data Enhancement CD." You are prompted to insert the Geographic Data Enhancement CD during the Setup process for each map region you install.

If you have already installed enhanced geographic data from your Geographic Data Enhancement CD, the latest elevation/NGS data available will already be present on your hard drive. In this case, Terrain Navigator Pro won't copy anything besides the map image (even if Copy Non-Map Data is checked).

If you bypassed the Geographic Data Enhancement step during installation, you can check Copy Non-Map Data to receive elevation/NGS data now, when you copy maps to your hard drive. However, the data on your Geographic Data Enhancement CD may be more current (NGS data) and of a higher resolution (elevation data). To take advantage of the latest data available, reinstall this map region (insert the CD and click **File > Install Map CD**), and insert your Geographic Data Enhancement CD when prompted.

Updating Maps/Photos via the Internet

Terrain Navigator Pro lets you check for updated topo maps and aerial photos, and download any new versions available. To check Maptech's servers, click **File > Map and Aerial Photo Updates via Web**. If your computer isn't already connected to the Internet, you will prompted to establish an Internet connection. You have two options for checking for updated maps/photos:

Update all maps/photos on hard drive: Terrain Navigator Pro will check for available updates for all the topo maps and aerial photos that you have copied onto your hard drive. Any new versions detected will be downloaded.
Update only maps contained in current CD region: Terrain Navigator Pro will only compare dates for the topographic map titles from the CD region you are presently working with. (This option can save time if you're presently only interested in a particular area of topo coverage.)

IMPORTANT NOTE ON AERIAL PHOTO QUALITY:
Maptech obtains updated aerial photo coverage from the USGS. The USGS has recently produced color aerial coverage for some areas. Unfortunately, some of these digital color images are damaged: lines or blotches may obscure portions of the image.

In cases where the damage is minimal, Maptech has decided to provide the updated image in its current state, rather than not provide the updated version at all. Maptech is working with the USGS to repair all the damaged images and provide access to whole versions of all updated images.

General Preferences

To adjust general settings like coordinate format, preferred units of measurement, true/magnetic North, etc., click **File > Preferences > General**, or press the Preferences button. In addition to these map view settings, the General Preferences window also contains options for adjusting the appearance of the Terrain Navigator Pro window.

Coordinates

Terrain Navigator Pro can display coordinates in various formats.

Latitude Longitude:
    Example:
Degrees Minutes Seconds (Dº M' S")
    43º 02' 08" N   070º 50' 36" W
Degrees and Decimal Minutes (Dº M.m')   43º 02.141' N   070º 50.596' W
Decimal Degrees (DDMM.mmm')   43.0358203º N   070.8439019º W

Universal Transverse Mercator (UTM): The UTM system uses an imaginary grid of equidistant, perpendicular lines, to divide the globe into 60 zones. Position is indicated in meters within a zone.

Example: 19 03 49 787 E   47 66 227 N

Military Grid Reference System (MGRS): Uses a standard-scaled grid square, based on a point of origin on a map projection of the Earth's surface in an accurate and consistent manner to permit either position referencing, or the computation of direction and distance between grid positions. Terrain Navigator Pro allows you to specify 1 meter, 10 meter, 100 meter, and 1 kilometer MGRS grid intervals. Grid positions are calculated based on the MGRS-3 specification.

Example: 19TCH4978766227 (1-Meter Grid)

Datum

Select a datum for use in calculating coordinates. It is important to know the datum of any coordinate data before relying on it for navigation. Terrain Navigator Pro can display coordinates in the following three datums:
  NAD27: North American Datum of 1927
  NAD83: North American Datum of 1983
  WGS84: World Geodetic System of 1984
You may also specify **Local**, which will cause Terrain Navigator Pro will default to whatever datum was used in creating the map you are viewing. (Note: This setting is not available in Seamless View, since the seamless map display may encompass more than one map title.)

Bearings
Specify whether Terrain Navigator Pro should calculate bearings from **True North** or **Magnetic North**. (See Magnetic Declination for important notes on Terrain Navigator Pro's magnetic north calculation.)

Height

Choose the units of measurement Terrain Navigator Pro should use when presenting elevation data.

Check **Local** and Terrain Navigator Pro will always use the same units of measurement as the map you're viewing (the active map). In other words, if you're viewing a map whose contour interval is 20 feet, all elevations will be given in feet. Check **Feet** or **Meters** to always use those units regardless of the active map's contour interval.

Controls

Check the controls you want to show; uncheck the ones you want to hide from view. (Removing controls increases map display area.)

Toolbar: The row of buttons along the top of the window (just underneath the menu bar).
Compass Bar: The compass bar is the panel along the left side of the window, which contains the Compass Rose, Map Overview, State Overview, One-Window/Two-Window buttons, and Adjacent Map Selector
Help Line: The gray area along the bottom of the screen. Hold your cursor over a menu item or a control and check the Help Line for tips and notes about that function.
GPS Line: An extra Help line that comes into view when your GPS is connected. It provides notes on your connection status and what tasks your GPS is performing.
Tooltips: Tooltips are the little yellow text "flags" that appear at your cursor position when you hold the cursor over a toolbar button or other control. Tooltips help you distinguish buttons and serve as reminders of different program functions.
GeoTips: Special tooltips that provide location information. See page 20.
Zoom + Scale: Check here to allow the zoom function to also switch map scales as necessary to provide the requested view. This affects the zoom buttons on the toolbar as well as the zoom in/out commands that pop up when you click directly on the map image. When this is checked, Terrain

Navigator Pro will adjust zoom level as requested until the zoom limit is reached, and will then switch to a larger- or smaller-scale map (if available) to provide the view you want.

Scrolling

When **Live Scroll** is activated, the map picture is updated instantly when the scroll bars are used to move about the map. Without Live Scroll, updates occur only after the mouse button is released. Live Scroll is recommended if you're using a PC with a fast screen update.

If **Edge Arrow** is selected, the cursor will change to a black arrow when placed near the edge of the map display. Once this arrow appears, you may hold down the left mouse button to scroll the map slowly in the direction of the arrow. Double-click the arrow to jump across a larger segment of the map. When the cursor is removed from the edge of the map display, it will change back to whatever tool you had been using.

Control Size

Sets the size of the Toolbar, Compass Control Bar, and Help Line. To adjust this setting, your screen resolution must be set to 1024x768 or higher.

Allow "Delete All"

Check here to gain the ability to delete ALL examples of a given layer type at a single time. For example, when this option is checked, you will be able to delete all your markers at once in a single command.

IMPORTANT NOTE: Once your layers are deleted, they cannot be retrieved. To guard against accidental deletions, this extra step has been added here in Preferences as a safeguard. Once **Delete All** is checked, select a layer type from the Layers menu, and in the window that appears, press the **Delete** button *while holding down the Shift key on your keyboard*. A final confirmation message will appear, asking if you are certain you wish to delete all layers of that type, before the data is permanently deleted.

Distance Tool

Set a line width for measurements made with the Distance tools.

Export Options

These settings apply to maps exported as TIF files. A **tiled** TIF file is broken into separate "chunks," while a **compressed** TIF is one single image file. (Terrain Navigator Pro uses a Pack Bits file compression method.) Consult your application's documentation to find out what TIF settings it is compatible with.

Tips and Tricks

Using GeoTips

GeoTips are small, temporary labels that automatically pop up on the screen when you hold your cursor over a particular item of interest. You can customize your GeoTips to show specific kinds of information, depending on where you place your cursor.

For example, when you rest the cursor on a marker, a GeoTip can show the coordinates of that location. Moving the cursor over a track line, you can find the grade at that particular portion of the track. Over a route leg, a GeoTip can display the bearing or distance to the next waypoint. Resting the cursor on the map image itself, a GeoTip can display coordinates, elevation, etc.

To configure your GeoTips, click **File > Preferences > GeoTips**.

Cursor over map—GeoTip shows elevation
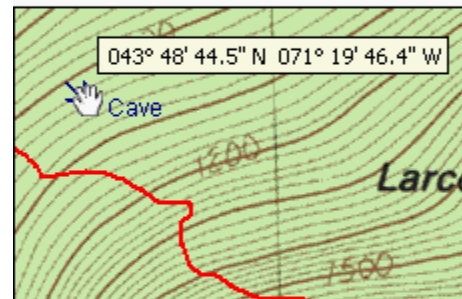
Cursor over marker—GeoTip shows lat/lon
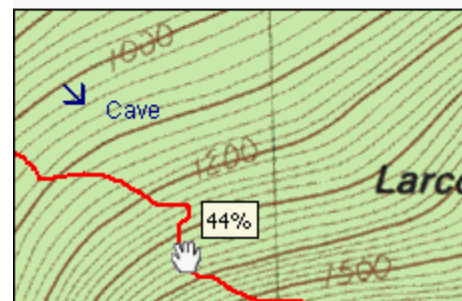
Cursor over track—GeoTip shows grade

GeoTip for: Select the layer or item whose GeoTip you wish to modify.

When cursor is held over: If the layer is made up of more than one part—for example, routes are made up of lines and waypoints—you can set your GeoTips to show different information when the cursor is held over different parts of the whole.

Display this information: Select a value to appear when you hold the cursor over the item highlighted under "When cursor is held over:" Available values will change depending on the layer you have specified.

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Working with Two Map Windows

Window Mode buttons
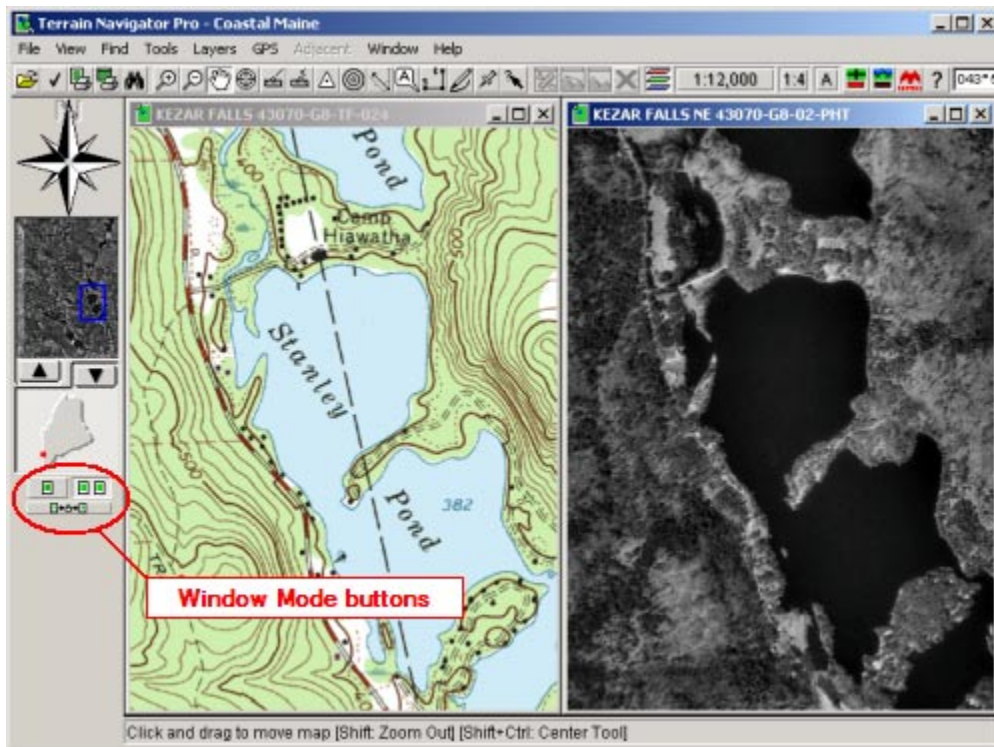
Terrain Navigator Pro can display two map windows at once. This lets you look at two separate geographic areas, or two map scales for the same area, or a topo map and an aerial photo—both on the screen at the same time. You can also view two copies of the same map, at different zoom levels.

Opening a Second Map Window

To enter Two-Window Mode, you can click **Window > Two-Window Mode**, or you can use the buttons found in the Compass Bar on the left side of the screen.

These three buttons let you switch between One-Window Mode, Two-Window Mode, and Two-Window Mode Locked.

One map window (standard mode).

Two map windows. Both windows can be panned independently, to show different geographic locations.

Two map windows, locked on the same lat/lon. Panning the map in one window automatically moves the second map accordingly, to show the same location. (Zoom level and map scale may be adjusted as desired.)

Whenever a second map window is opened, it automatically shows the same view as the first window. Once the second window is open you can adjust settings like zoom level and map scale separately for each map window (and set the second window to show a different area, except when the windows are Locked as described above).

Working in Two-Window Mode

Arranging the Map Windows

Use the Window menu to arrange map windows: choose **Tile Horizontally** to share the screen side by side, **Tile Vertically** to arrange maps one above the other, and **Cascade** to arrange the windows in a cascade pattern, so that both windows are near maximized but both title bars are still visible.

Window > Auto Tile will automatically split the screen evenly between the two maps, placing them to best represent their actual geographic locations relative to each other. For example, if map A shows an area several miles north of map B, the maps will be tiled horizontally, with map A above map B. If the two maps differ more in longitude than latitude, then they will be tiled vertically, with the western map on the left side of the screen.

The "Active" Map Window

When you have two map windows open, one is the *active* window and the other is *inactive*. The active map window is the one you were last working with, whose title bar is highlighted. Commands such as Print, Zoom In/Out, Seamless View, 3-D View, etc. are automatically applied to the active map. (Obviously, if you have only one map window open, that window is the active window.)

Replace Active/Replace Inactive

Any command that requires opening a map gives you two choices: **Replace Active** and **Replace Inactive**. These two choices appear as buttons in the Map Selector and in all of the "Find" windows. You can decide whether the new map should replace the *active* map window, or the *inactive* map window.

The default selection is Replace Active. If you don't specifically choose either button—for example, if you just press the Enter key on your keyboard after using the Find menu, or if you open a map by double-clicking a map square in the Map Selector grid—the new map will automatically replace the active map window.

Creating a Custom Grid
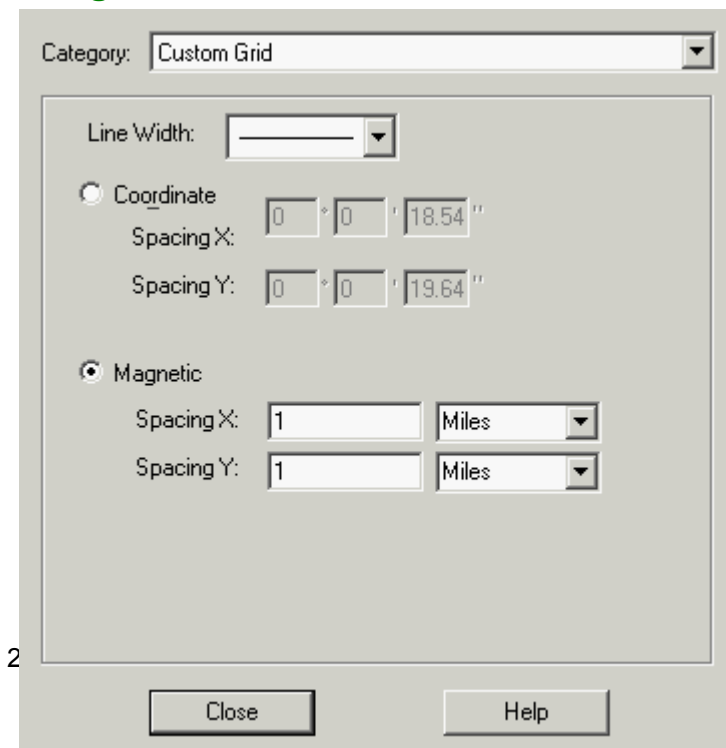
Terrain Navigator Pro lets you place grids on the map image, to serve as visual aids. The Layer Visibility window lets you opt to include a fixed lat/lon grid, a map grid (showing map borders), and a custom grid, that you can adjust yourself.

To specify the size and shape of your Custom Grid, click **File > Preferences** and select **Custom Grid**. You may choose to place your grid lines in references to the Coordinate system you have specified in General Preferences, or you may place grid lines in reference to Magnetic North (X represents the width of the rectangles, Y represents their height).

Note: In order for the Custom Grid to

be visible, it must be checked in the Layer Visibility window (page 33).

E-mailing Maps

Send Map

To e-mail a .JPG image of the map on your screen, click **File > Send Map**. Terrain Navigator Pro will take a picture of the map on your screen, save it as a .JPG image file, and automatically open a blank e-mail message with the map image attached. All you have to do is type your message.

Notes:
♦ When you Send a map, the .JPG file that you send will NOT be saved on your computer. If you want to save the image, export the map instead.
♦ If you need more than what shows on your screen, use **File > Export > Active Map**.

Maptech MapServer

The Maptech MapServer, found at www.maptech.com, is our free, on-line library of topographic maps, nautical charts, coastal aerial photographs and aeronautical charts. The MapServer is a great resource for when you're curious about an area outside your CD map coverage. You can view, print and e-mail maps and charts, for free. Press the Maptech button on Terrain Navigator Pro's toolbar to go straight to the MapServer (an Internet connection is required). Navigation controls let you scroll around the maps and charts. You can also toggle between different types of coverage, and personalize maps online.

The maps on your Maptech CDs may also be viewed at the MapServer via an Internet connection. This makes the MapServer a useful tool for sharing map images with friends and associates.

Send Link

When you're viewing a map, click **File > Send Link** and Terrain Navigator Pro will automatically open a blank e-mail message with a link to this particular map title on the MapServer. All you have to do is type your message, and the recipient needs only to click on the URL link to go straight to the MapServer and see the same map image that you're viewing on your screen. (An advantage of using the Send Link option is that the MapServer allows you to scroll in different directions and switch map scales and types—so the recipient of your message can not only see the image you sent, but can also view surrounding areas.)

The Send Link feature lets you share map images without having to send actual e-mail attachments. If you prefer to send a .JPG file attachment instead of a MapServer link, click **File > Send Map**.

Keyboard Shortcuts

♦ Use your keyboard's **Control** key to temporarily switch to the Drag tool while you're using a different cursor tool.
♦ Press the **Shift** key to switch to the Zoom Out tool.
♦ Right-click on the map for zooming options.
♦ Pressing **Backspace** erases the last-drawn Distance, Track or Route segment. (Hold Backspace down to keep erasing.)
♦ Use your keyboard's **Delete** key to delete the current example of the active layer tool.

Ctrl+B   Find bookmark
Ctrl+C   Copy map to clipboard
Ctrl+E   Edit markers
Ctrl+F   Find placename
Ctrl+G   Center map on GPS position
Ctrl+K   Start GPS Tracking
Ctrl+L   Tile windows horizontally
Ctrl+O   Display Map Selector (Open Map)
Ctrl+P   Print
Ctrl+Q   Quick Print
Ctrl+S   Change CD region
Ctrl+T   Tile windows vertically
Ctrl+Y   Toggle layers on/off
Ctrl+A   Place marker at GPS location (during Tracking)

3-D View
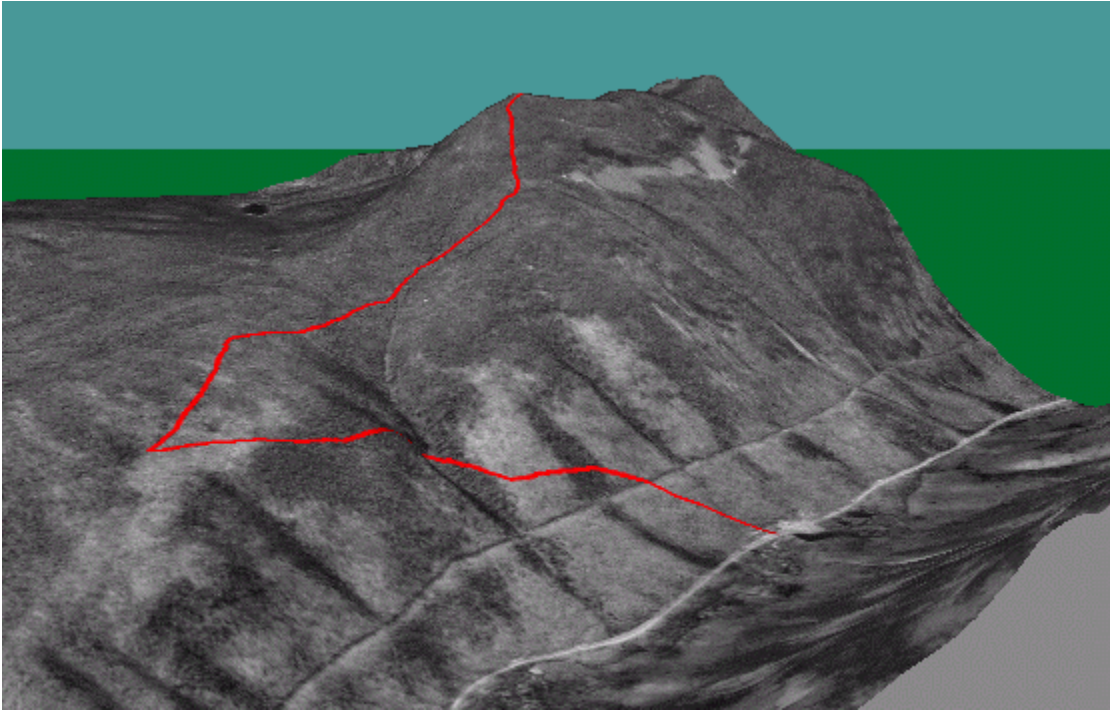
On a topographic map, elevation changes are represented by contour lines. Terrain Navigator Pro gives you an additional way to get a sense of the shape of the terrain: 3-D View. Both topographic maps and aerial photos may be viewed in 3-D.

Press the 3-D button, and the area you're viewing will be displayed in 3-D, so that hills and valleys are pictured as actual contours. In 3-D view, you can see the land's rises and dips in relation to each other, which makes it easier to judge relative height. Special controls along the left side of the screen let you view the terrain from any angle, including from above.
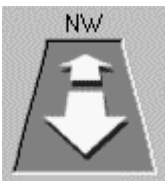
Zooming In/Out: These arrows control how close you are to the landscape. The notation above the arrows tells you the direction in which you are looking.

You can choose whether the arrows should move your viewpoint, or move the landscape. Terrain Navigator Pro's default setting is for the arrows to move your viewpoint, which means that if you press the forward-facing arrow, you'll be moved in closer to the landscape. Click **File > Preferences > 3-D** to change the way these arrows work.

Raising/Lowering your Viewpoint: Drag this sliding lever to adjust the height from which you are viewing the map. The three vehicles give you an idea of the height of your viewpoint.

Rotation/Steering: These arrows let you adjust the angle at which you are viewing the landscape. You have two choices for how these arrows work: they can either move you (your viewpoint), or they can move the landscape. This setting also controls the zoom in/out arrows, above. Click **File > Preferences > 3-D** to change the way these arrows work.

When you first start Terrain Navigator Pro, the arrows are set to refer to your viewpoint. For example, suppose the map is centered on a summit. To view the summit from the right, click the Right arrow. This will rotate the map, giving the effect that you are moving around the summit, to your right. To view the map from higher up, click the Up arrow.

Each time you click an arrow, the map image shifts slightly. Click the arrows as many times as you need to find the angle you want.

Height Exaggeration Buttons: Use these buttons to exaggerate the vertical scale of the 3-D display. For example, press the Up arrow to increase the vertical scale, and accentuate height differences in areas that are relatively flat. Or, if you're viewing a particularly mountainous region with deep valleys, you may sometimes want to decrease the vertical scale (with the Down arrow), to make it easier to read map data along steep slopes.

The exaggeration amount is shown on the toolbar at top right corner of your screen (next to the latitude/longitude display). The default setting is 1.5x. This means that the elevations depicted are shown at 1.5 times their actual value. This makes elevation differences easy to distinguish, with minimal distortion.

3-D Glasses: What's 3-D without 3-D glasses? We could not resist adding this feature, just for fun. Put on your 3-D glasses, press this button, and enjoy the view. (Sorry, map rotation is not possible in 3-D Glasses view. We got dizzy enough just sitting still.)

Viewing a Different Area of the Map

In 3-D View, Terrain Navigator Pro shows a portion of the topographic map. To view a different portion of the map, do one of the following:

♦ Change zoom level (press one of the four zoom level toolbar buttons)
♦ Change to a different map scale (again, use the toolbar), or
♦ Use the Map Overview or the Compass Control to move to a different area of the map.

Using Your Cursor to Rotate/Tilt the Map

You can rotate and tilt the map image simply by clicking on it and dragging your cursor in the direction you want the map to turn. To get a sense of how this works, imagine that you are reaching out and taking hold of the map's foreground, and moving it by hand. If you click and drag to the right, the map will rotate counter-clockwise. If you click and drag up, the map's foreground will rise, which brings your viewpoint level down closer to the surface of the terrain.

3-D Landscape Effects

Changing the lighting setting in 3-D Preferences lets you apply different effects to the 3-D display. View the landscape in fog or by moonlight, or replace the map image with a wire frame or white shading to accentuate the relief.

To return to regular 2-D map view, just press the 3-D toggle button again.

Recording a 3-D Rotation Video Clip

You can record an .AVI video file of any 3-D landscape, shown in 360° rotation. These video clips are useful for presentations, etc.

To record a video clip:

1) Find the location you want, and enter 3-D View.
2) Adjust viewpoint angle and zoom level to the desired settings.
3) Press the Video button on the 3-D control bar, or click **File > Export > Rotation Video Clip**.
4) Assign a name to your video file, and specify a location to save it. Press **OK**. The landscape will start rotating and video recording will begin.

In a few moments, the .AVI animation will be completed and saved under the file name that you specified. You may then insert the .AVI file into other programs, presentations, e-mail, etc.

Recording a 3-D Route Video Clip

Terrain Navigator Pro lets you record 3-D animation files showing the landscape along a route, as seen from an adjustable "camera" height and angle. The imaginary camera will always be stationed on (or directly above) the route line, but you can control where the camera points as it moves along the route.

Click **File > Export > Route Video Clip**. This will prompt you to select a route: highlight the route you want and press Select Route.

Next, set options for camera viewpoint and clip details:

Camera Height

Specify how many feet above **Sea Level** or **Ground**. When positioned in reference to sea level, the camera will remain at a fixed height. When positioned in reference to the ground, the camera will move up and down as the contours beneath it change.

Camera Tilt

Tilt sets whether the lens should point up, down, or straight ahead. Specify an angle and select **Up** or **Down**.

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When the camera height is measured from sea level (see above), your Tilt setting is applied to an imaginary horizontal line (0 degrees). Examples: To look straight ahead, specify an angle of 0 degrees. To look straight down, set the tilt at 90 degrees Down. To look down at an angle, set Tilt between 0 and 90 degrees Down.

When the camera height is measured from the ground, the camera will automatically be tilted along an imaginary line that follows the contours of the landscape. (For example, if the route ascends a 10% grade, the camera will automatically tilt to 10 degrees Up.) The angle that you type here will be applied in addition to the tilt angle already determined by the landscape. In other words, if you specify 0 degrees, no adjustment will be made, and the tilt of the camera will match the grade of the landscape. If you specify 5 degrees Up, the camera will ascend a 10% grade tilted at 15 degrees (10 + 5 = 15). If you specify 5 degrees Down, the camera will ascend a 10% grade tilted at 5 degrees (10 - 5 = 5).

Camera Direction

There are three options for setting the direction in which the camera should look:

Always look in this direction: Specify a heading in which the camera should face. This is like moving along the route, while keeping your gaze focused in a particular direction. For example, to continually face northeast, specify 45 degrees. To face south, specify 180.

Follow route line with offset of: As always, the camera will travel along the route line, but with this option you can point it in a direction measured from the route line. Examples: To keep it pointed straight ahead on the route line, specify an offset of 0 degrees. To point it off to the right, set an offset of 90 degrees.

Always face specific point with offset of: Select this option to record progress along the route while keeping the camera trained in reference to a specific point. Type the coordinates of the point in the space provided.

To keep the camera trained directly on the point, set an offset of 0 degrees. For example, imagine hiking on the slopes around a summit. An offset of 0 degrees will keep the summit constantly in view, at the center of the 3-D landscape.

For a 3-D view that shows the summit off to one side, instead of centered, set an offset angle wide enough to move the summit to the edge of the landscape being shown. For example, if you're following a route that encircles a summit counter-clockwise, an offset angle of 30 degrees would shift the focus to the right of the summit, moving the summit itself off to the left of the display. (The effect of an offset angle will vary, depending on the distance between the route line and the point you have specified. You may need to experiment with different offset angles to achieve the view that you want.)

Clip Details

Duration: Set by the **number of frames** you wish the finished clip to contain, the **speed** at which you want the camera to travel the route, or the amount of **time** you want for the clip playback.
Frames per second: The more frames per second, the smoother the animation, but keep your computer's graphics capabilities in mind when setting this figure. The default setting is 15 frames per second.
Frame size: Determines how much map area to show in the animation. Again, set this according to your computer's graphics display capabilities. The default setting is Medium.

Options

Bank camera on turns: Lean the camera to the right for right turns, to the left for left turns.

Smooth view when turning/tilting: Instead of switching the view immediately from one heading to the next, include views from intermediate headings for a smoother visual effect.

Show route on map: Include the route line, waypoints, and any visible waypoint names on the 3-D landscape in the animation.

3-D Preferences

Click **File > Preferences > 3-D** to configure options for viewing maps in 3-D.
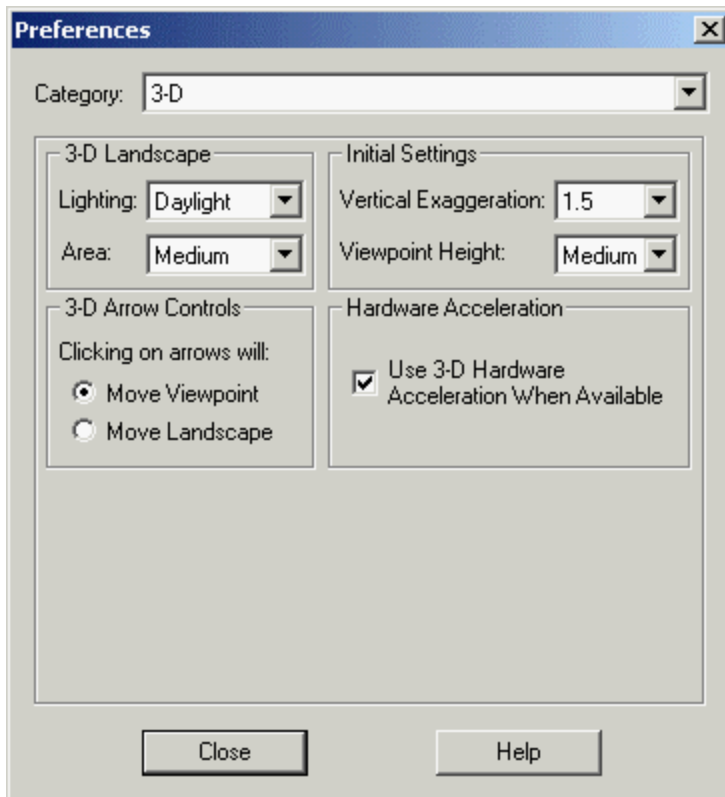
3-D Landscape: Lighting

You can apply different effects to the 3-D landscape. Use these options to improve contour visibility, or to simulate different weather conditions or times of day.

Daylight: The standard lighting mode. (This is Terrain Navigator Pro's original default 3-D lighting mode.)

Fog: Shrouds the landscape in a simulated fog. Fog is thickest at the most distant portions of the map.

White: The topo map image is removed, and the landscape is portrayed in white and shades of gray (looks like a moonscape).

Moonlight: Darkens the terrain.

Wire Frame: The actual topo map image is replaced by a "wire" mesh pattern. (Removing the map detail helps draw attention to the contours themselves.)

Overhead: Positions the light source directly over the map, which changes the shadows. Overhead lighting is useful for brightening relatively flat areas, so you can see the map details better.

3-D Landscape: Area

Choose **Small, Medium** or **Large** for the size of the map area to be displayed. (On some computers, a Large area might slow performance. If you find that the 3-D rotation/tilt controls seem slow, choose **Small**.)

Initial Settings: Vertical Exaggeration

Vertical exaggeration emphasizes contours, making it easier to distinguish differences in relative height differences. Terrain Navigator Pro's default setting is 1.5, which means that all elevations are shown at 1.5 times their actual value.

The lowest setting available is 0.5, which actually downplays the elevations, showing all contours at half their true height. You can choose varying degrees of exaggeration, up to 5.0 times actual height.

(High exaggeration is useful for emphasizing contours in relatively flat areas.)

Since this is an Initial Setting, this means that the setting you specify will be automatically used whenever you first enter 3-D View. (You can, of course, adjust these settings manually whenever you like, but this is what Terrain Navigator Pro will use for your initial 3-D view.)

Initial Settings: Viewpoint Height

Select a viewing angle for Terrain Navigator Pro to use when you first start 3-D View. Choose **Ground, Low, Medium, High,** or **Very High**.

Since this is an *initial* setting, this means that the setting you specify will be automatically used whenever you first enter 3-D View. (You can, of course, adjust these settings manually whenever you like, but this is what Terrain Navigator Pro will use for your initial 3-D view.)

3-D Arrow Controls

This setting affects how the 3-D arrow controls respond. Choose whatever movement method you find more intuitive.

Move Viewpoint in Direction of Arrow: When this option is checked, the arrows represent the direction in which you want to "go"- as though you were at the controls of an airplane or a car. For example, pressing the Right arrow will move your viewpoint to the right. Pressing the In arrow will move you closer in to the map image. (This is Terrain Navigator Pro's default setting.)

Move Landscape in Direction of Arrow: This produces the exact opposite effect. The arrows refer to the map image itself (rather than your viewpoint). So, if you press the Right arrow, it's as though you are reaching out and spinning the map image to your right. Likewise, pressing the In arrow is like pushing the map away from you, which gives you a broader view of the area.

Use 3-D Hardware Acceleration

If your computer system provides this option, check here to tell Terrain Navigator Pro to take advantage of this feature. You may find that you need to update your video drivers before you can take advantage of Hardware Acceleration.

Hardware Acceleration

The speed and performance of 3-D View depends largely on your computer's video card. The video card is the component of your computer that controls display performance and speed. Video cards are powered by drivers. To ensure that 3-D display performance is maximized, you should maintain updated video drivers. Choose **3-D Accelerator Info** from the Help menu to get details on your video card make and model, and the status of its drivers.

About Video Drivers
There are two types of drivers:

Software drivers: All video cards have software drivers. Provided by Microsoft, these drivers generally work well but some applications may still experience slow display.

Hardware drivers: Some video cards have hardware drivers (in addition to software drivers). Hardware drivers are designed to provide faster display. A video card's ability to use hardware drivers is called *hardware acceleration*.

Terrain Navigator Pro's 3-D View mode is pre-set to take advantage of hardware acceleration if possible: click **File > Preferences > 3-D** and you'll see that "Use 3-D Hardware Acceleration When Available" is checked. This means that if your video card has working hardware drivers, it will use them. (Many computers don't have hardware acceleration, but since this checkbox is checked, Terrain Navigator Pro looks for hardware acceleration anyway, just in case.)

Getting Information about Your Video Card and its Drivers
For information on your video card's settings and capabilities, choose **3-D Accelerator Info** from the Help menu. The resulting window gives details on your video card's software and/or hardware drivers, and it also tells you which driver your video card is currently using.

(If your 3-D Accelerator Information window says "Hardware driver found, but not functioning," this means that although the driver is classified as a hardware driver, it does not have the capabilities necessary to provide hardware acceleration in Terrain Navigator Pro's 3-D View. An updated driver may correct this problem.)

3-D View is greatly improved by Hardware Acceleration. In order to try using Hardware Acceleration, you MUST update your video card's drivers.

Updating your Video Card Drivers

Video card manufacturers routinely update their drivers. You can download the latest drivers from your video card manufacturer's website--in fact, it is a good idea to check every so often to make sure you have the latest drivers available.

To find out the make and model of your video card, click **Start > Settings > Control Panel, Display,** then select the **Settings** tab, press the **Advanced** button, then select the **Adapter** tab. This window tells you the manufacturer of your video card, the model name, and the version of the driver ("software version"). You may want to make a note of this information for reference.

Next, visit the manufacturer's website. Typically, you can select your video card model from a listing (usually found in the site's Support or Downloads section). Check to see that the driver version listed for your model matches the driver version that you're using. If it doesn't, you need to download and install the latest driver, following the instructions at the manufacturer's website.

Note: There are two types of generic 3-D rendering methods available for use by graphics programs: OpenGL and DirectX. Terrain Navigator Pro uses the OpenGL rendering model to create 3-D View. Therefore, look for a driver that supports OpenGL rendering.

Things you may run into:

"Uncertified" drivers: Video card manufacturers often distribute additional drivers, often classified as "uncertified," "unsupported," "special purpose," or "beta" drivers. These drivers may not have received the same extensive quality-assurance testing as the company's retail/generic drivers. It's also a common practice to provide beta versions of drivers: drivers that may still undergo some modifications before their official release.

Generally speaking, these are drivers that the manufacturer makes available for you to use if you like, but the manufacturer cannot offer technical support for their use. If you decide to try such a driver and find that it causes display problems, you can follow the manufacturer's instructions to uninstall the driver and install the generic, supported driver instead. It is up to you to decide what drivers to install: read all information provided before downloading any drivers.

Driver requires DirectX: Produced by Microsoft, DirectX is an extension to a computer's operating system that allows applications to communicate directly with the display controls. Applications that support DirectX can take advantage of this direct communication, resulting in faster display. (Computer games often use DirectX.)

If you try to install your new driver and you receive a message that DirectX is required, a download is available at Microsoft's website:

http://www.microsoft.com/directx/

If you are unable to find suitable drivers at your video card manufacturer's website, try the website of your computer manufacturer as well. Computer manufacturers often distribute the latest drivers for components of their computer systems.

Once Your Video Card Drivers Have Been Updated:
Once you have downloaded and installed the latest available drivers for your video card, restart your computer and restart Terrain Navigator Pro. Click File > Preferences > 3-D and make sure that Hardware Acceleration is checked. If the speed of your 3-D display is not improved, there are a few more things you can try:

♦   For some video cards, hardware acceleration is only available under certain system configurations. Try changing your display Colors setting: Right-click on the desktop and choose **Properties**, then select the **Settings** tab. Under **Colors**, specify a different setting, and see if your 3-D view is improved. Also in the Properties/Settings window, press the **Advanced…** button, and select the Performance tab. Slide the Hardware Acceleration lever to "Full."
♦   Try displaying a smaller area of terrain: click **File > Preferences > 3-D** and under Area, choose **Small**.

If Your 3-D Display is Still Not Working:
Terrain Navigator Pro's 3-D View performance is limited to the capabilities of your video card. If you have followed all instructions above, you have done everything possible to ensure that Terrain Navigator Pro's 3-D View is operating at the maximum performance level provided by your computer system.

(The same principle applies to your favorite computer games: their special effects are likewise powered by your video card. If Terrain Navigator Pro's 3-D performance is slower than you'd like, you will most likely encounter the same limitations when running a computer game with complex graphics display.)

Remember to keep an eye out for updated video card drivers, so that you can take advantage of any future driver improvements.

Working with Layers

About Layers

The term *layer* refers to anything added to the map image. For example, Terrain Navigator Pro includes a Benchmark layer, with symbols for all NGS benchmarks in your CD region(s). You can create other layers yourself, including annotations (GeoPins and Labels), GPS-related data (Markers, Routes and Tracks), and measurement tools (Range Rings, Range/Bearing Lines, and the Distance Tool).

All of these layer types are discussed in detail later in this document. The following section deals with general characteristics common to all Layers, and explains how to use them most effectively in Terrain Navigator Pro.

Layer Visibility

Layers are separate from the underlying map image, and separate from each other. This means that you can decide which ones to show and which ones to remove from view. Click **View > Layer Visibility** to choose what layers you want to include on the map. This lets you show some layers while hiding others from view. Terrain Navigator Pro will store your layer settings from session to session.

Layers: The top half of this window lets you remove an entire layer type from view: for example, you can hide ALL range rings.
Sublayers: The bottom half of the window lets you select specific items to show or hide. (For example, you can show certain range rings, and hide others.)
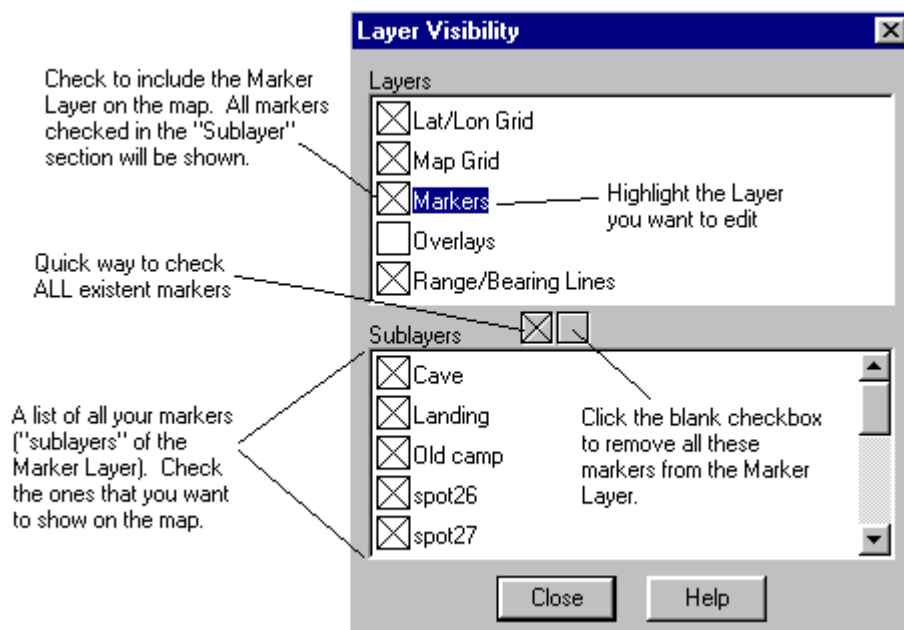
Toggling All Layers On/Off

If you just want to temporarily hide all layers from view, for a clean view of the map, press the Layer Visibility toggle button. Or, click **View > Show Layers**. This will remove the check mark

from the "Show Layers" menu item, and remove all layers from the map display. Simply recheck View > Show Layers to restore the layers.

Hiding Individual Layers

You can right-click on any layer and choose **Hide** to temporarily remove it from view. This lets you create and view other layers in the same area without overlapping. To bring the layer item back into view, click **View > Layer Visibility**, or locate the item via the Find menu (which will automatically restore the item to view).

Organizing Layers with Projects

A Project is a set of layers. By storing your layers (markers, range rings, tracks, etc.) in different Projects, you can group and organize your layer data.
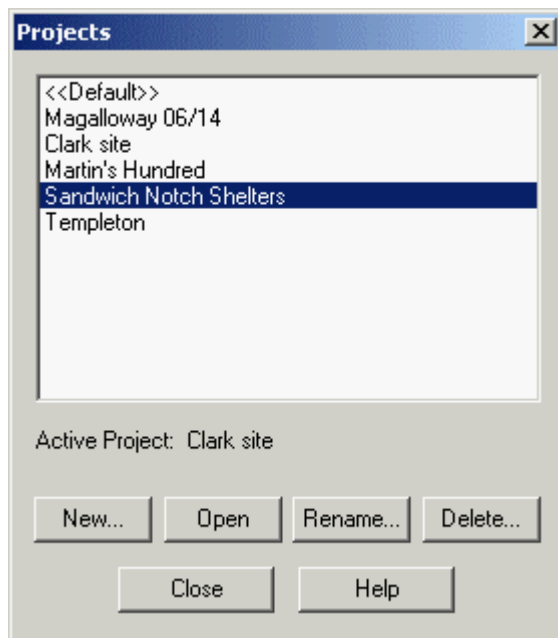
Every layer you create is stored in a Project. A Project may contain multiple types of layers. For example, you can create a Project to store all your track logs from a hiking trip, or save line-of-sight and range rings for a particular job site, or group a set of GeoPins linked to a collection of photographs, etc. When a Project is in use, no other layers are shown. If you work often with a particular map area, Projects can help you keep the area from becoming cluttered with layers.

When you first start using Terrain Navigator Pro, all your layers are stored in the same Project, given the name "<Default > ". If you want to create a new Project, click **Layers > Change Project**. Press the **New** button and assign your new Project a name. Any new layers you create will be stored under this Project name.

To stop adding layers to this Project, click **Layers > Change Project** again and select a different Project from the list. Press **Open** to open the selected Project. (Whenever you create new layers, they are automatically added to whatever Project is open.)

- ♦ You may only work with one Project at a time. This is the *active* Project.
- ♦ Any new layers you create are automatically added to the active Project.
- ♦ To stop adding layers to a Project, you must switch to another Project (that is, make another Project active).
- ♦ Projects may not be combined, nor may layers be shared across multiple Projects.
- ♦ Projects are saved every time you close Terrain Navigator Pro or switch to another Project.

Renaming Projects

Select a Project from the list and press the **Rename** button to assign it a new name.

Deleting Projects

To delete a Project, click **Layers > Change Project**, highlight the Project you want to delete, and press the **Delete** button.

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Importing/Exporting Projects

Projects may be exported from Terrain Navigator Pro and saved in a single file, ending in .TPA. This allows you to share projects with friends and colleagues who use Terrain Navigator Pro, or save projects for future reference. To export a project, click **File > Export > Active Project**. The project you're working with will be saved in a file ending in .TPA. You may then store or share the file as you wish. To import a project that has been archived, click **File > Import > Archived Project**.

Layer Information

To get information about a specific layer item, right-click on it and choose **Information**. The resulting window will also provide data about the map containing this layer.

Printing Layers

To include a layer on a printed map, check **Print Layers** in the Print window. All layers *presently visible on the map image* will be included in the printout.

To print information about specific layers, you must print the map that contains the layers. In the Print window, check **Print Layer Information**. After the map image is printed, additional page(s) will be printed with information about all layers shown. See page 93 for more about printing.

Deleting Layers

To delete a specific layer item, right-click directly on it and choose **Delete**.

You can also use a layer's Edit window to delete items of that layer type. From the **Layers** menu, select a layer type. All items of that type will be listed: highlight an individual item and press **Delete**.

Deleting a Layer Project

If you use Projects to organize your layers (see page 34), you can delete certain projects if you wish: click **Layers > Projects**, highlight the name of the Project, and press **Delete**. (Since Projects allow you to shelve certain layers while working with others, thereby keeping your maps free from extra clutter, you may find that using Projects lessens your need to delete layers in the first place.

Deleting ALL Layers of a Given Type

Terrain Navigator Pro also includes a feature whereby you may delete ALL layers of a particular type (within the current Project--see page 34). This command is irreversible, so as a precaution against accidental deletion, the process requires multiple steps:

1. First, you must enable the "Delete All" function: click **File > Preferences > General**, and check **Allow "Delete All"**
2. Next, use the Layers menu to select a layer type.
3. HOLD DOWN THE SHIFT KEY while pressing the **Delete** button found in the given layer's Edit window. A message will appear, asking you for final confirmation before your layers are permanently deleted.

IMPORTANT: ONCE DELETED, LAYERS CANNOT BE RESTORED. Be absolutely sure you wish to delete ALL layers of the given type before using this command.

Distance/Area Tools

Distance Tools

Use the Distance tools to quickly measure distance or area. Two Distance tools are provided:

For straight-line measurements, including segment length and bearing, and total length.

Allows curved line measurements.

Select either Distance tool, then click on a starting position on the map. Click again, and a distance line will join the points that you clicked. Add as many segments as you like. When you click and hold the mouse button down, the total **Path Length** is noted at the bottom of the screen as you add segments. If you're using the straight-line Distance tool, you'll also see **Segment Length** and **Bearing**.

Tips for Using the Distance Tools

♦   *To back up and erase the last segment you drew,* press the **Backspace** key. You can press the key multiple times to remove more of the line.

♦   *To temporarily switch to the Drag tool,* hold down the **Control** key on your keyboard.

♦   *To delete the entire line,* press the **ESC** key.

♦   *To create curved lines* with the Freehand distance tool, just click-and-drag the cursor.

Distance/Area Information
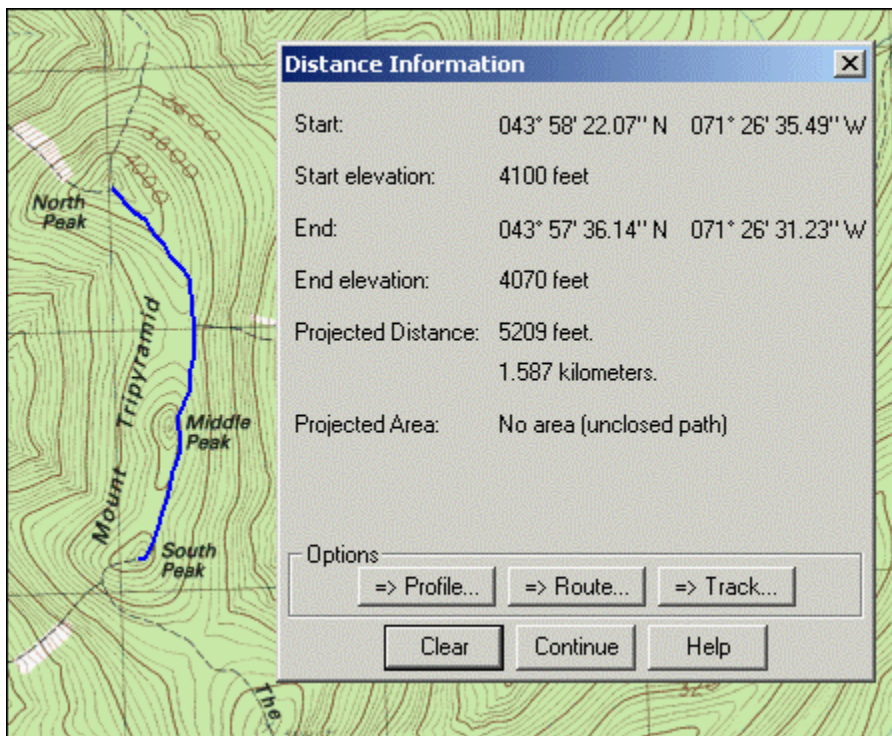
To get precise data about a distance line, right-click on the line and choose **Information**.

The Information window gives you the **Projected distance** of your distance line, in both English and metric units. *Projected* distance is "as the crow flies"—it does not take ground contours into account. For ground distance, press Profile.

Calculating Area

Projected area is also given IF the entirety of your line forms an enclosure. The start and end points must meet, and the line must not cross back over itself or overlap. If only a portion of the line forms a loop, area calculation is not possible.

In addition to line length, the Information window gives you the exact coordinates and approximate elevation of your distance line's starting and ending points.

♦ *To continue adding line segments:* Press **Continue** (or press the "X" button to close the Information window).
♦ *To erase the distance line:* Press **Clear**.
♦ Distance can be measured over multiple maps.
♦ You can switch between the Freehand Distance Tool and the Distance Tool during the same measurement. This can be useful for calculating distances whose path varies between straight and curved sections.

Other buttons in the Distance Information window provide additional options:

Profile: View a cross-section profile of your distance line.
Route: Create a route based on your distance line. Several methods are provided.
Track: Save your distance line as a track, so it can be kept for future reference.

Converting the Distance Line into a Track

The Distance Tool is designed purely for measurement, rather than map annotation. Therefore, the Distance line is not saved on the map image. However, if you wish to save the path created by the Distance line, you may convert it into a track, which *will* be saved. (For more about tracks, see page 88.)

Right-click on the Distance line and choose **Convert to Track**. This feature lets you create an entirely **New** track, **Append** to an existing track, or **Overwrite** an old track and replace it with a new track of the same name.
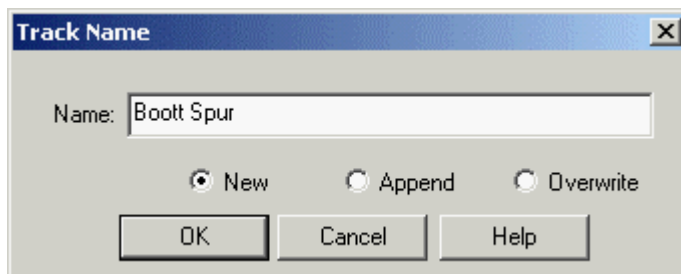
If you choose **Append**, the Name blank will become a drop-down list of all your existing tracks. Select the name of the track to which you want to attach this distance line. Your distance line will be added to the end of the track, matching it in color. (**Note:** The new portion will be appended to the *end* of the track line.)

The Name drop-down list also appears when you **Overwrite** a track. Select the name of the track you wish to replace, and it will be overwritten with a new track of the same name.

Elevation Profile/Line of Sight

Profile
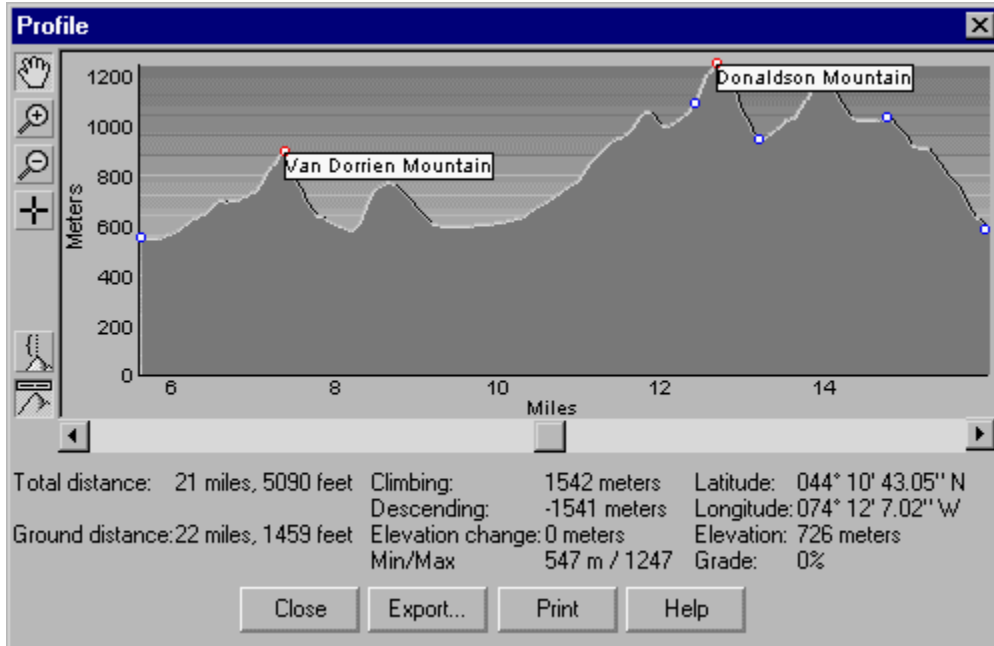
Terrain Navigator Pro provides a Profile option for use with the distance tools, tracks or routes. The Profile is a graphic representation of the changes in elevation along a defined path. The profile window provides total distance, ground distance, and overall elevation change, etc. You can also find approximate grade and elevation measurements for specific locations along the path: hold the cursor over the profile to get readings for that location.

Press **Print** to print the profile graphic; press **Export** to save it as a .BMP image.

Data Provided
Total Distance: The distance of this line, without regard to elevation changes (as though you were following the route in an airplane). For example, two hills, with a valley between them, might really be two miles apart in total distance, even though traveling between them on the ground might be a journey of two and a half miles (ground distance).
Ground Distance: The ground distance between the starting and ending points, taking elevation changes into consideration. This is the actual distance you would walk if you followed this route on foot. For example, two hills, with a valley between them, might really be two miles apart (total distance), but to travel between them on the ground might be a journey of two and a half miles' ground distance.
Climbing: This is the sum of all the ascending portions of this path. Every upward slope is counted towards this figure, even if there are downward portions that counteract these temporary elevation gains. This figure gives you an idea of how much of your actual movement will be uphill. Compare this figure to the Descending figure for a good idea of how hilly a trail will be.
Descending: This is the sum of all the descending portions of this route. Every downward slope is counted towards this figure, even if there are upward portions that counteract these temporary drops in elevation. This figure gives you an idea of how much of your actual movement will be downhill. Compare this figure to the Climbing figure for a good idea of how hilly a trail will be.
Elevation Change: The amount of change between the elevation of the route's starting and ending

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points.

Min/Max (Minimum/Maximum Elevations): The highest and lowest points on the entire profiled route.

Latitude, Longitude, Elevation, Grade: These figures refer to the position of your cursor on the profile. As you move the cursor over the profile graphic, these figures will change.

Grade refers to the steepness of the terrain at the point you clicked.

White Dots on Profile

When you are profiling a Route or a Distance line, there will be small white dots along the profile graphic. On a route, these dots indicate waypoints; with the distance tool, they indicate the points where you clicked on the map in creating the line.

Tools for Manipulating Profile/Line of Sight Graphics

Zoom In/Out, Scroll

Zoom buttons are provided in the Profile/Line of Sight window so you can zoom in and out on the profile graphic. When you're zoomed in, a Drag tool becomes available, along with scroll bars so you can pan along the length of the profile.

Adjust Vertical Axis

Press the Options button to change the minimum/maximum elevation against which the profile is pictured (see below). For line of sight calculations, the Options button also lets you specify height offsets (page 42).

Peak Names

If your profile line passes over any major peaks, press this button to include peak name labels on your profile.

Center Map on Profile Point Clicked

Select this crosshair tool, then click on any point along your profile to center the map image on that point.

Adjusting the Profile's Vertical Axis
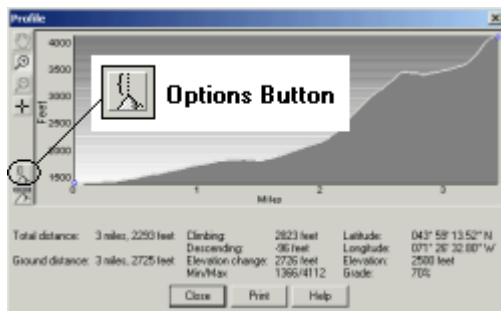
In addition to zooming, scrolling, and centering tools, the Profile/Line of Sight window also contains an Options button. This lets you adjust the vertical axis of the profile.

Grayed-Out Options are for Line of Sight

When working with profiles, half of the Options window is grayed out. When used with a Line of Sight calculation , the other options become available (see page 41).

Automatic Range

The vertical axis is the total height range against which your profile is shown. By default, the Profile window sets the vertical axis to fit exactly within the height limits of the path you're profiling:

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the profile cross-section starts at the lowest elevation in your path and doesn't extend beyond the highest point in the path. These values are automatically filled in under Vertical Axis in the Options window. These figures constitute the Automatic Range. The minimum value is on the left, the maximum on the right.

Assigning New Minimum/Maximum

To assign different min/max values for the profile, uncheck **Automatic Range**. You can then change the values as you wish. Type new numbers, or use the sliding levers.

The shape of the profile will change as the vertical axis changes. The original min/max figures are shown for your reference. To return to the original setting, recheck **Automatic Range**.

Note: Axis Adjustments are Not Retained

Please note that any adjustments that you make are NOT retained after you close the Profile window.
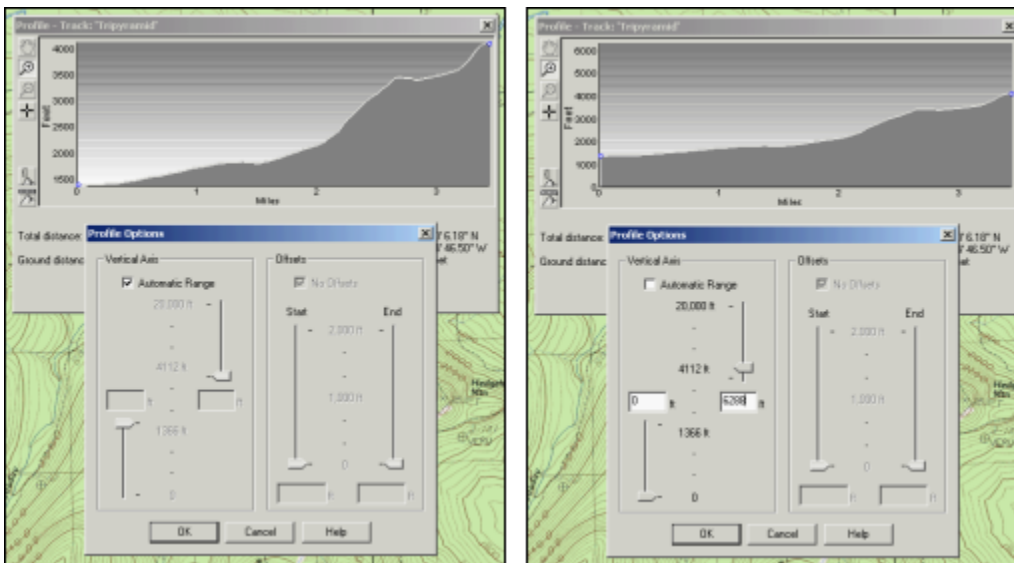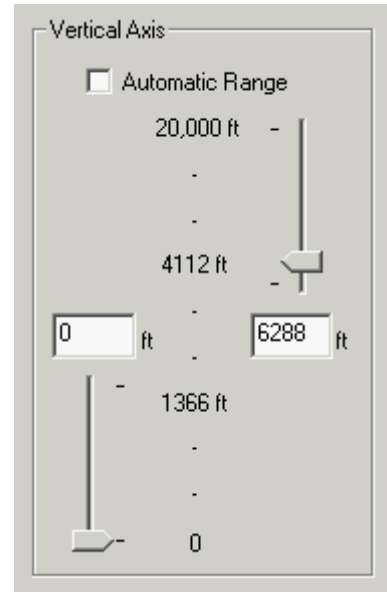
Line of Sight
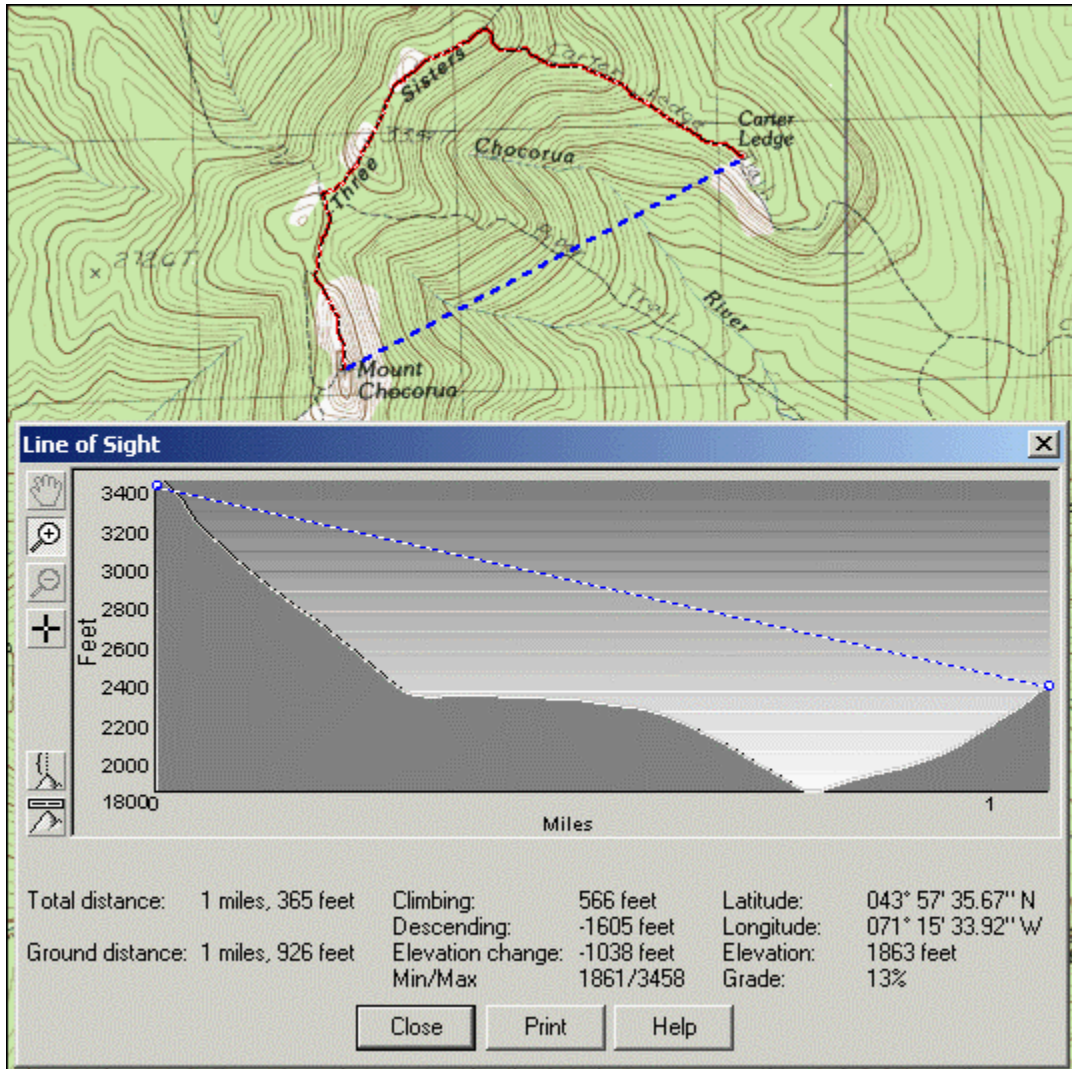
Terrain Navigator Pro can calculate the line of sight between any two points on the map. To make a line-of-sight calculation, you must first establish the start and end points, using either a distance line, route, or track.

When using a distance line, you can right-click on the line and choose **Line of Sight**. For routes and tracks, press the line-of-sight button on the toolbar.

Note about Routes and Tracks: Unless the distance, track or route tool is selected, the line-of-sight button is unavailable. For routes and tracks, the Line of Sight window will portray the **selected** example of that layer type (the route/track that you last created or edited). To make sure the route or track you're working with is selected, simply click on it with the route/track tool. A dotted line indicates that the route/track is selected.

Data Provided
Important Notes:
- When considering the figures provided, it is important to remember that this data refers to the line of sight between the starting point and ending point—NOT to the length of the track,

route, or distance line itself. The line of sight is shown as a dotted line, both on the map image, and on the cross-section graphic.

- Line-of-sight calculations do NOT account for the curvature of the earth. Use care when calculating specific line-of-sight measurements over very long distances.

Total Distance: The distance of the line of sight, without regard to elevation changes (as though you were flying an airplane from the starting point to the ending point via the shortest path possible). For example, two hills, with a valley between them, might really be two miles apart in total distance, even though traveling between them on the ground might be a journey of two and a half miles (ground distance). **IMPORTANT:** This is not to be confused with the total length of the route, track, or distance line itself. This figure refers to the straight-line distance between the starting point and the ending point.

Ground Distance: The ground distance between the starting and ending points, taking elevation changes into consideration. This is the distance that you would travel if you could walk in a perfectly straight path over the intervening terrain between the starting point and the ending point.

Climbing: This is the sum of all the ascending portions of the line of sight's path. Every upward slope is counted towards this figure, even if there are downward portions that counteract these temporary elevation gains.

Descending: This is the sum of all the descending portions of this line of sight. Every downward slope is counted towards this figure, even if there are upward portions that counteract these temporary drops in elevation.

Elevation Change: The difference between the starting point's elevation and the ending point's elevation.

Min/Max (Minimum/Maximum Elevations): The highest and lowest points on the entire line of sight.

Latitude, Longitude, Elevation, Grade: These figures refer to the position of your cursor on the profile image underneath the dotted sight line. As you move the cursor over the profile graphic, these figures will change.

Grade refers to the steepness of the terrain at the point you clicked.

Tools in Line-of-Sight Window

As in the Profile window, several tools allow you to manipulate the line-of-sight graphic; see page 39.

Applying Height Offsets to Sight Line

When you first view a line of sight, the starting and ending points of the sight line are attached to the ground. The beginning of the sight line is set at the elevation of the point at the start of the distance line, route or track. Likewise, the end of the sight line is set at the elevation of the end of the distance line/route/track.

By applying height offsets, you can raise either end of the sight line, to see what height(s) are required for clearance over obstacles or terrain.

Press the Options button and uncheck **No Offsets**. You can then either type new height numbers, use the sliding levers, or simply drag the start and end points. The dotted sight line will move as the offset figures change. This shows you what height is required for clearance over the given terrain.
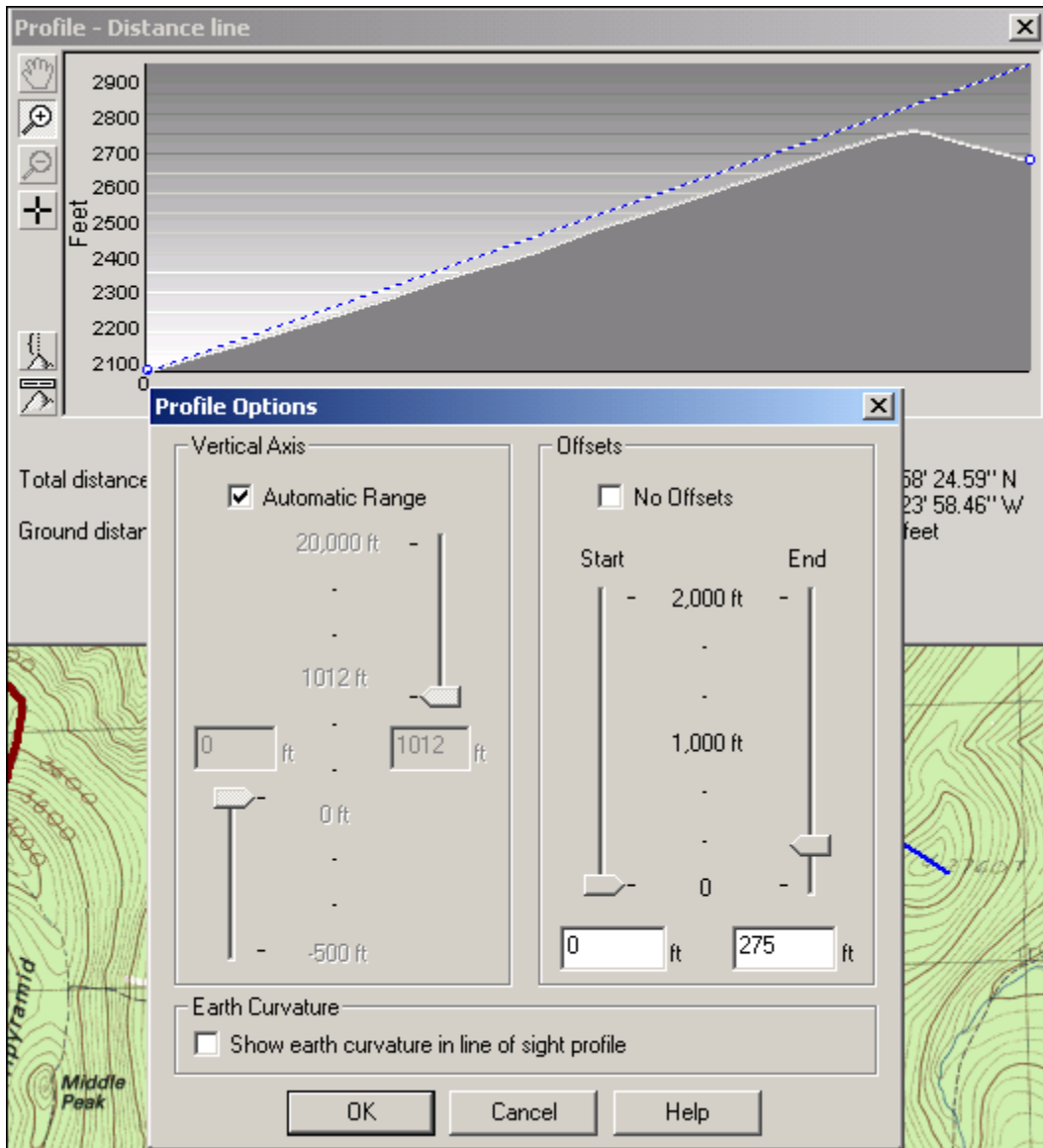
Show Earth Curvature in Line of Sight Profile

Over long distances, the curvature of the earth affects the line of sight. Check **Show Earth Curvature in Line of Sight Profile** and Terrain Navigator Pro will take this into account when calculating the sight line. If you're measuring a long enough distance, you will notice that the dotted sight line dips in the middle. This is because the landforms in this window are portrayed along a flat graph. Since the profile graphic itself is not curved to mimic the earth's surface, the adjustment is made instead to the sight line. (What would be a convex curve of the ground is a concave curve of the sight line.)

Original Settings

The original Start and End elevations are shown in the Options window for your reference. To restore the original settings, check **No Offsets** again.

Note: Height Offsets are Not Retained

Please note that height offsets are NOT retained after you close the Line of Sight window. You can use the Print button provided in the Line of Sight window to print the graphic showing your offsets.

Enhanced Digital Elevation Data

When you install any map CD for use with Terrain Navigator Pro, you are given the choice of installing elevation data. Elevation data is necessary for profiles, line-of-sight calculations, and 3-D view mode.

Elevation data also provides approximate spot elevation for your cursor position. This approximate elevation is displayed in the top right corner of the Terrain Navigator Pro window, and it may also be included in GeoTips. *Remember, these spot elevations are approximate.* A visual check of the surrounding contour lines is the best way to determine actual elevation at any given point.

Your map CD purchase may have included one or more Enhanced Digital Elevation Data CDs. The elevation data contained on these CDs is of a higher resolution than the elevation data that you can opt to include during your initial software installation. This enhanced data makes for more accurate profiles, greater 3-D detail, and closer spot elevation approximations. If you do not have the Enhanced Digital Elevation Data CD title mentioned in the message on your screen, you may purchase this data from Maptech; call (888) 839-5551 for details.

Note: Enhanced Elevation Data requires several hundred MB of free space on your hard drive.

Labels: Annotating Maps

Labels

Use Labels to add your own notations and comments directly to the map image.

Click **Tools > Label** or select the Label tool from the toolbar, then click on the map location where you'd like to place your label. Type your text in the space provided.

Adjusting Label Size/Shape; Moving a Label

When you're creating or editing a label, a series of small black squares appears on the label. These serve as "handles" for sizing and moving the label. If the squares aren't visible, select the Label tool and click on the label.

To adjust the size or shape of the label, place your cursor over any of the small black squares around the label edge, and drag to stretch or shrink the label.

To move a label, drag the small black square in the center. If the central black square isn't visible, click once outside the label. If no black squares are visible, hold the cursor over the center of the label until the cursor changes shape, then click. (Remember, you must use the Label tool in order to move or resize labels.)

When using a Balloon border, you can also move the balloon's "tail": hold the cursor over the end and move it to a different location.

Editing Labels

To make any changes to a label, right-click on the label and choose **Edit**.

Text: Type the text for your label (if you like, press **Ctrl+Enter** to create line breaks/carriage returns).
Border: Select one of three available borders, or choose **none** and your text will appear directly on
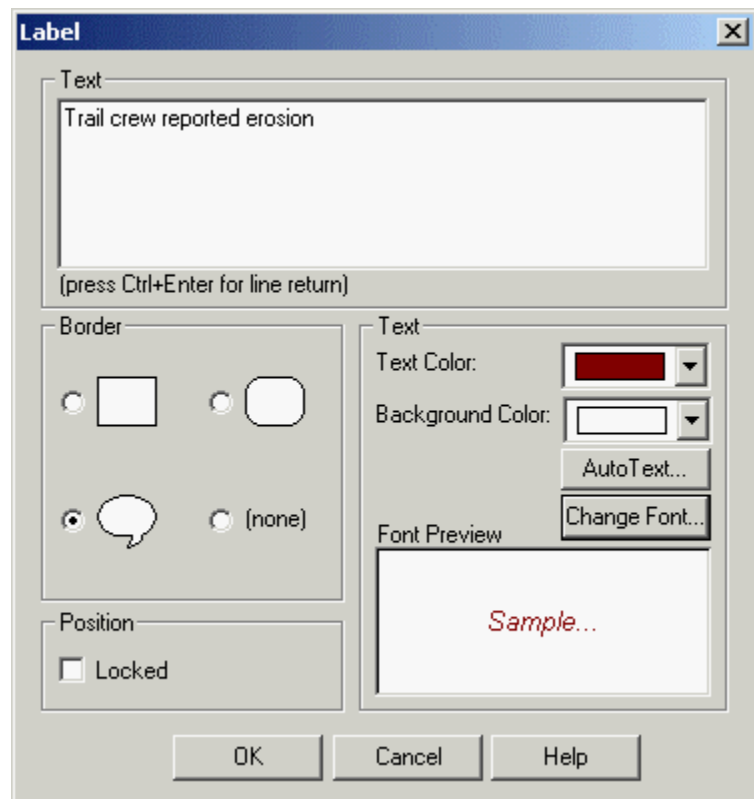
the map image, without a colored background.

Text Color, Background Color: Select from 16 colors. Your choices will be shown in the **Preview** window. (Background color is unavailable if no Border is selected.)

Change Font: Lets you choose a font, specify a font size, and add bold, italics, etc.

Position: Check Locked to ensure that the label will not be moved on the map. Unless Locked, a label may be moved by clicking and dragging with the Label tool.

Label AutoText
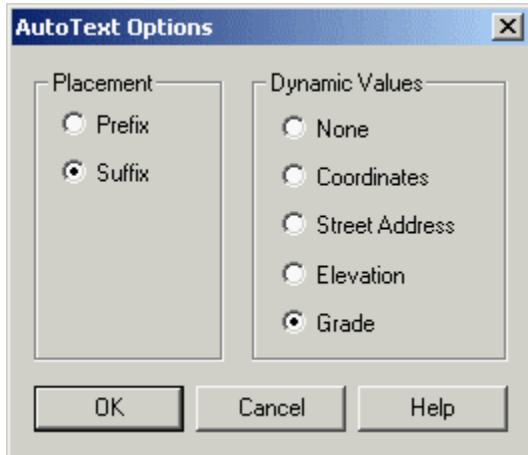
The AutoText button lets you include location data in the text of your label. Press AutoText and choose to include **Coordinates, Street Address, Elevation,** or **Grade**. The information will be added to your label text. To add it *before* any existing text, select **Prefix**. To add the AutoText *after* existing label text, select **Suffix**.
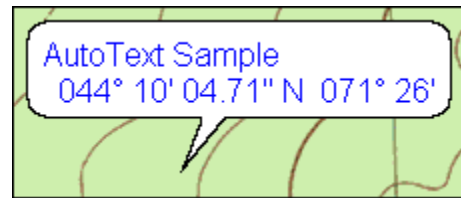
AutoText Updates Itself Automatically
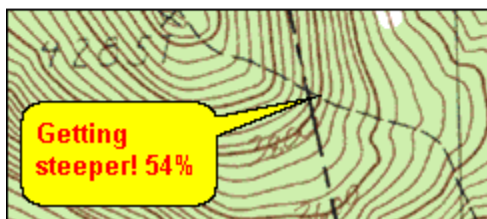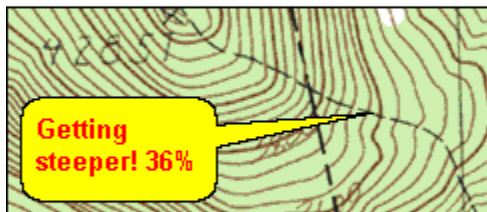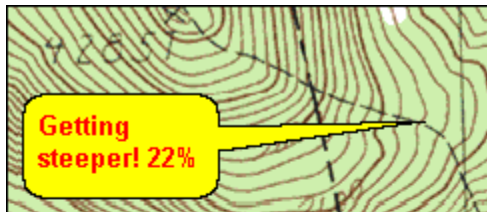
The value you select for AutoText will update itself if the label is moved. For example, if you set AutoText to show grade, and then you move the label from a hillside to a flat area, the grade figure will change accordingly.

The AutoText data refers to the point at the end of the label's "tail." If your label uses a Balloon border, the tail is always visible. For any other Border types, the tail is only visible when you're creating or editing the label with the Label tool. You can use the label tool cursor to move the end of the tail.

Setting Defaults for AutoText

You can set preferred AutoText for Terrain Navigator Pro to use every time you create a label. To specify your preferred settings, click **File > Preferences > Labels**.

Including Date or Time in Label Text

In Label Preferences, you may set Terrain Navigator Pro to use the Date or Time for the text of your labels This is similar to the AutoText feature.

Label Preferences
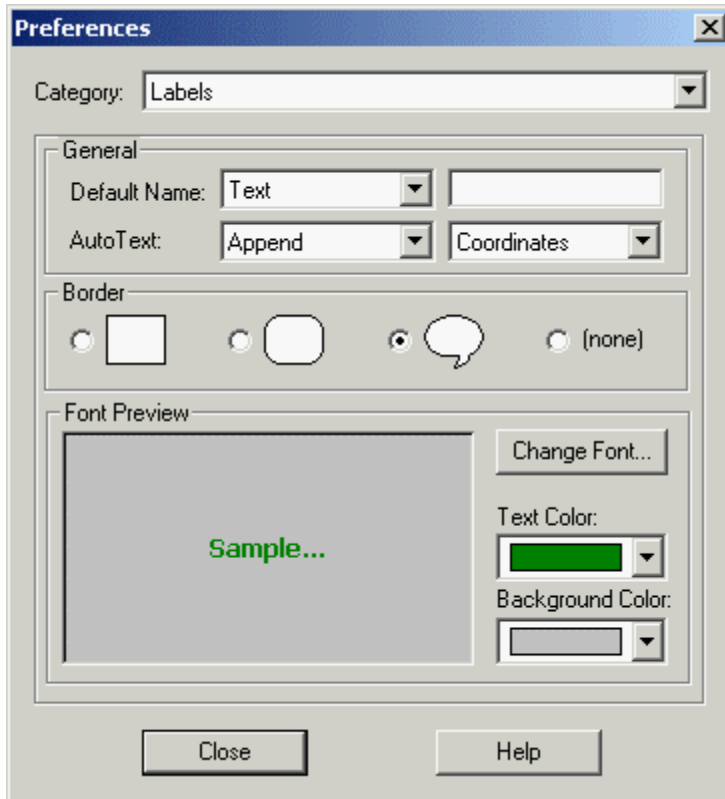
Click **File > Preferences > Labels** to specify preferred font, border and colors to use for your labels. Whenever you add a new label to the map, Terrain Navigator Pro will use the settings you specify here. (You can, of course, change individual labels as you wish.)

Default Name
The Default Name is what Terrain Navigator Pro will automatically fill in for the starting text of your labels. You have three choices.

Text: When you first start using Terrain Navigator Pro, Default Name is set to Text. This means that Terrain Navigator Pro will present each new label as a "blank slate" for you to type whatever text you wish. If you choose Text for your default, you can **type a heading** in the space at right. The heading will automatically appear in the first line of your labels. This feature is useful for marking multiple instances of the same thing: for example, "Shelter," "Work site," etc.

Date, Time: You may choose to automatically start your labels with either Date or Time. (Since Date and Time serve as headings, no additional Heading space is available.)

AutoText
AutoText is location data that you may include in your labels AutoText is so called because it will automatically update itself if the label is moved. You may choose **Coordinates, Elevation, Grade,** or **Street Address**. This data refers to the point at the end of a label's "tail."

To add AutoText *before* any existing text, choose **Prepend**. To add the AutoText *after* existing label text, choose **Append**.

Border
Your label text may be enclosed in a border. Select a squared-edge rectangle, a rounded-edge rectangle, or a text "balloon." If you prefer not to use a border at all, select **(none)**, and your label text will appear directly on the map, with no background color.

Font Preview
Change Font: Specify a font style and size.
Text Color: All text in your label will be this color.
Background Color: The area "underneath" your label text will be this color. (Background Color is unavailable when no Border style is selected.)

GeoPins: Attaching Files to the Map

Add GeoPins to your maps to serve as links to other files, websites, images, etc. For example, place a GeoPin at a trailhead to link to a Word document with a trail description. Use another GeoPin to attach a link to a website with local weather reports for the area you marked.

GeoPins use the Microsoft-designed file-type icons you're already familiar with. Double-click on a GeoPin icon to open the linked document or file.

Creating GeoPins

Drag and Drop

A quick way to create a GeoPin is to drag a file icon from another window and "drop" it directly onto the map image. For example, drag a Word document with a trail description from your "My Documents" folder, and place it on the map image at that trailhead.

Browse to Target File

Use the GeoPin tool to click on a map location (either select the GeoPin button from the toolbar, or right-click on the map and choose **Tool > GeoPin**). When you click on the map, the New GeoPin window will open: use the **Browse** button to locate the file you want to attach to this location.

Editing GeoPins

You can rename a GeoPin, add notes about it, link it to a different document, etc. Right-click on the GeoPin and choose **Edit**, or click **Layers > GeoPins** and highlight a GeoPin in the list to edit its characteristics.

Name: Assign a name for this GeoPin. This name may be included on the map.
Target: The file to which this GeoPin is linked. Double-clicking on a GeoPin on the map

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will open the linked file. Press **Browse** to specify a different file.
Coordinates: The location marked by this GeoPin.
**Show Name:** Check here to include the GeoPin Name on the map image (beneath the symbol).
Lock: Locks the GeoPin symbol in place on the map, so that it cannot be accidentally moved.
(Unless locked, a GeoPin may be dragged to a new location.)
Notes: Space is provided for you to record comments about this map location and attached file.

Searching for GeoPins
To find a particular GeoPin, click **Find > GeoPins** and select it from the list.

GeoPin Placement Based on Time/Date Stamp
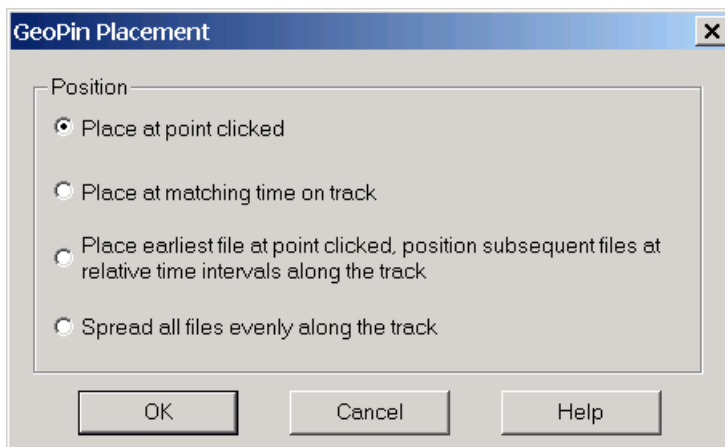
Terrain Navigator Pro lets you drag-and-drop files onto the map image, where they will appear as GeoPins. If the file(s) have a time/date stamp, and if you have a GPS track recorded during the same timeframe, you can drop them directly onto the track. For example: If you go on a hike and record your progress as a GPS track log, and use your digital camera to take photos along the way, you can upload the track log and the photos to Terrain Navigator Pro. The photos may be placed as GeoPins along the track line, at the locations where they were taken.

Place at point clicked: Terrain Navigator Pro will create a GeoPin at the location where you clicked on the track line. (If you're dropping multiple files, they will all be stacked at this location: use the drag tool to separate them.)

Place at matching time on track: As long as the file's time stamp is contained within the time bracket when the track was recorded, the file will be placed on the portion of the track that was recorded at the same time the file was created. (If no track point matches the file time exactly, the file is placed in relation to the closest match.) **Note:** This option will not be available if the file's time/date stamp does not fall within the timeframe of the track.

Place earliest file at point clicked, position subsequent files at relative time intervals along the track: Suppose you took your first picture at a stream crossing ten minutes into a hike. You can highlight all your hike photos, then click at the track line at the stream crossing. Your first photo will be attached to that portion of the track, and all remaining photos will be placed in relation to that first photo.

Using this feature in this way ensures that all the photos will line up accurately with the places they were taken. However, if you choose to start the file sequence farther down the track line, be aware that your later files may not fit onto the track line. For example, if you place your stream crossing photo at a point ten minutes farther into the hike, all the other photos will be shifted accordingly. This will mean that any photos taken during the final ten minutes of your hike won't appear on the track line.

Spread all files evenly along the track: Your files will be placed along the track in sequential order, at regular distance intervals. The earliest file will be placed at the starting track point, and the latest file will be placed at the ending track point. This ensures that all your files will be attached to the track line, and that they will all be visible.

Moving GeoPins as a Group

If you drag-and-drop multiple files at once, you'll be able to move them all as a group. Drag any file up or down the track line, and all the other files will move too, retaining their relative positions in the line. You can continue to make these group adjustments until you close Terrain Navigator Pro: once the program is closed, the GeoPins are fixed in place and if you want to move them again, you will need to move each one individually.

IMPORTANT NOTES:
Use of this feature can create an impressive map display, but for successful GeoPin placement, there are several requirements:

- Your camera must be set to the proper date and time. Otherwise, the photographs you take will bear an incorrect time/date stamp, and will not match up to the track line. Be sure to remember to adjust your camera for Daylight Saving Time.
- Your GPS must be capable of recording a track log with a time/date stamp. At this writing, only certain units manufactured by Garmin, Brunton and Magellan meet this requirement.
- Even these compatible GPS models might have further restrictions to keep in mind. For example, tracks stored in GPS memory may lose their time data. Garmin units have slot-based track storage, allowing you to store a set number of tracks in memory, but time data is not preserved for these stored tracks. In these models, it is only the Active Track that contains time data. Research your GPS unit's behavior, or experiment with uploading active and stored tracks to Terrain Navigator Pro, to determine how time data is handled in your GPS unit. To check whether a track on the map has time data, right-click on the track and choose **Information**.

GeoPin Placement Based on Position Data
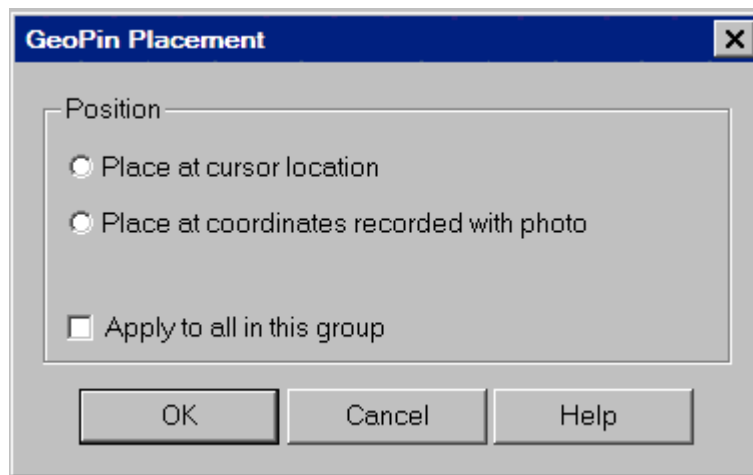
This window appears when you take a file that has position data attached to it, and drag-and-drop the file onto the map image. Such files include, for example, photos taken by a high-end digital camera with a GPS hookup. For these photos, position data is typically included in a portion of the file known as the "EXIF" header.

Place at cursor location: Terrain Navigator Pro will place the GeoPin(s) at the point where you dropped the file(s) on the map image, instead of placing the GeoPin at the location recorded in the file.

Place at coordinates recorded with photo: The GeoPin(s) will be placed at the coordinates indicated in the file(s). When you select this option, all you have to do is drag the file anywhere onto the map screen, and Terrain Navigator Pro will automatically position it at the location indicated within the file.

Apply to all in this group: If you're dragging multiple files at once, you may check this box to place all the GeoPins according to the method selected above.

50
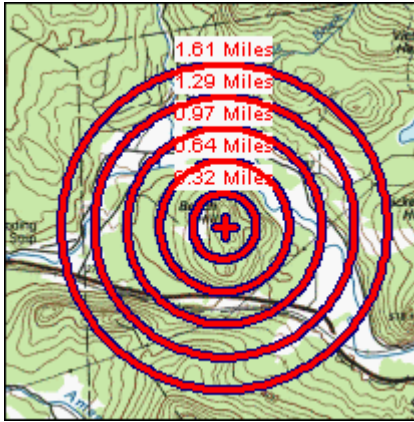
Range Rings

Use Range Rings to see all the terrain within a given distance of a central point. Click **Tools > Range Ring** or click on the range ring toolbar button, then click on the location from which you want to measure.

Grab Rings to Stretch/Shrink; Grab Center Point to Move

You can use the Range Ring tool to "grab" the rings and pull to expand the rings, or push to shrink them. To move the entire set of rings, grab the center point and drag the rings to a new location. To lock the rings in place at their current size, right-click on them and choose **Lock**.

Editing Range Rings

Range Rings

Brookings	**Name**
Created: Fri Sep 13 12:42:19 2002	Newington Office
En route - Rapid City	
Mt. Whittier	**Center Point**
Newington Office	● Center on coordinates below ○ Center on GPS Position
phone zone	Latitude: 43 ° 17 ' 55.53 " N ▼
	Longitude: 71 ° 48 ' 39.68 " W ▼

Ring Spacing

● SET BY DISTANCE: ○ SET BY TIME:

Draw a ring every   Show distance traveled every

[5] [Miles ▼]   [6.000000] [Minutes ▼]

from center.   if traveling at this speed:

No. of Rings: [8]   [2.000000] [MPH ▼]

Display Options

Ring Color: [━━━ ▼]   ☐ Show Name

Line Style: [— — — ▼]   ☑ Show Ring Interval

Line Width: [━━━ ▼]   ☐ Lock

Notes

[Delete]   [New...]

[Close]   [Help]

To see a list of all your range rings and to edit ring characteristics, click **Layers > Range Rings**.

All your range rings are listed in the left side of the window. Highlight the range rings you wish to edit. Press the **Delete** button to delete that set of rings. Press **New** to create a new set of range rings by supplying center point coordinates.

Center Point

Center on coordinates: When you create range rings by clicking on the map, Terrain Navigator Pro centers the rings on the point that you clicked and displays those coordinates here. You can change these coordinates if you like. (To change your coordinate format, click File > Preferences.)

Center on GPS Position: If your GPS is connected, you can opt to center range rings on your GPS position. This is especially useful during realtime GPS tracking, to help you gauge distance and required travel time.

Ring Spacing

Set by Distance: Specify how far apart the rings should be. For example, suppose you want to find the closest body of water to a given location. You could set range rings every quarter-mile and compare the locations of ponds, lakes, etc. to see which are closest to the center point.

Set by Time: This is useful for predicting progress at different speeds. Type a speed, and specify a time increment. For example, you might choose "show distance traveled every 15 minutes at 45 mph, to anticipate your progress and plan stopping points.

If you have chosen to **Center on GPS Position**, the **Speed** figure will be your actual speed, updated as necessary when you speed up or slow down. This way, when you slow down, the range rings will move closer together, since you won't travel as far at the slower pace. When you speed up, the rings will expand, because you'll be able to cover more ground if you sustain a higher speed.

Display Options

Ring Color: Sixteen colors are available.
Line Style: In addition to solid lines, various dashed line options are provided.
Line Width: Adjust line thickness to best emphasize your range rings on the map image.
Show Name: The name of your range ring can be displayed at the center point.
Show Ring Interval: Check here to include text at each ring, noting the distance from center point. This text note will appear at the northernmost portion of each ring.
Lock: Check here to lock this set of range rings in place on the map. Unless **Lock** is checked, range rings may be moved by clicking on the center point with the Range Ring tool selected. (Note: Locking a set of range rings only locks the center point. The rings may still be edited and expanded or shrunk.)

Notes

Space is provided for you to record notes or comments about these range rings.

Stacking Multiple Sets of Rings on the Same Center Point

You can create more than one set of range rings on the same point. First, use the Centering Tool to place the point of interest in the center of the active map window. Then, click **Layers > Range Rings** and press the New button. When you use this method to create new range rings, Terrain Navigator Pro automatically centers the rings on the point at the center of the active map window. Simply leave the coordinates as they are, and specify a ring spacing interval, ring color, etc. Each time you press the **New** button you're creating another set of rings at this location.

Tip: Use different colors to help distinguish between sets of rings.
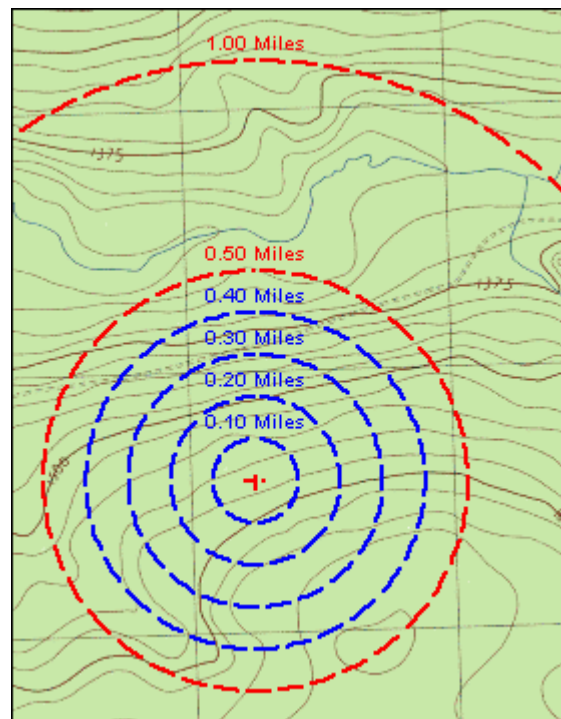
Range Ring Preferences
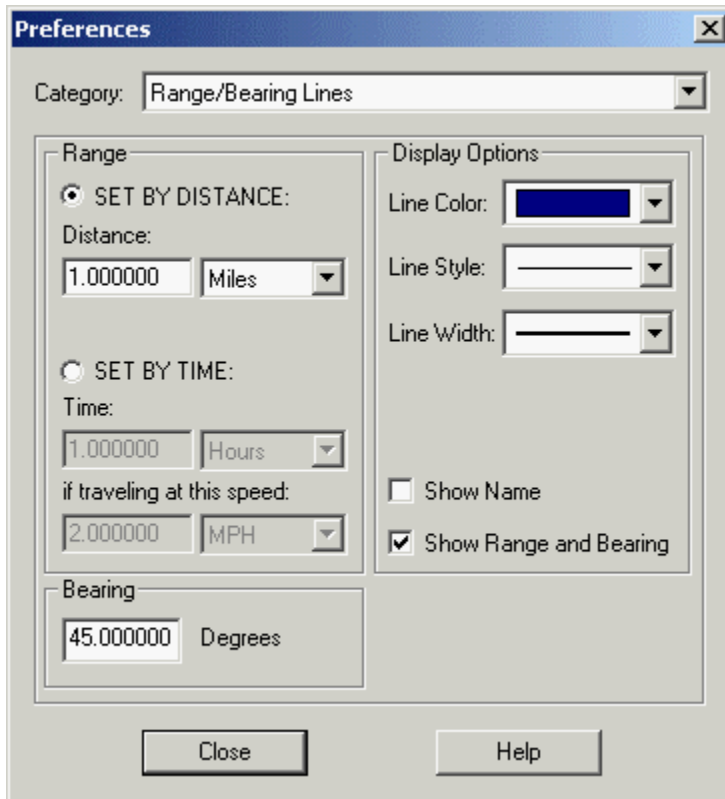
Click **File > Preferences > Range Rings** to adjust the settings that Terrain Navigator Pro will use for all new range rings that you create. (These are your *preferred* settings; you can of course edit your range rings to change specific rings' settings whenever you like.)

Ring Spacing
Set by Distance: Spaces the rings at regular distance intervals. Specify how far apart the rings should be.
Set by Time: This is useful for predicting progress at different speeds. Type a speed, and specify a time increment. For example, you might choose "show distance traveled every 15 minutes at 45 mph, to anticipate your progress and plan stopping points.

Display Options
Ring Color: Sixteen colors are available.
Line Style: In addition to solid lines, various dashed line options are provided.
Line Width: Adjust line thickness to best emphasize your range rings on the map image.
Number of Rings: Specify how many rings to create around each center point.
Show Name: The name of your range ring can be displayed at the center point.
Show Ring Interval: Check here to include text at each ring, noting the distance from center point. This text note will appear at the northernmost portion of each ring.

Range Ring Information

For information on a set of range rings and the map containing them, right-click on the rings and choose **Information**.

Range Ring Information	
CD Name: New Hampshire	**Range Ring Name:** phone zone
Map Name: WARNER	**Ring Interval:** 25.00 Miles
USGS Ref. Code: 43071-C7-TF-024	**No. of Rings:** 1
Map Scale: 1:24,000	**Latitude:** 043° 15' 33.04" N
Map Type: Topographic (Feet)	**Longitude:** 071° 51' 26.40" W
Map Projection: Transverse Mercator	**Centered On:** Static
Vertical Datum: National Geodetic Vertical Datum 1929	**Locked:** No
Horizontal Datum: North American Datum 1927	**Notes:** Company policy dictates that the employee carrying the Emergency Contact cell phone must remain within a 25-mile radius of the office.
Contour Interval: 20 feet	
Year Created: 1987	
Revised/Inspected: None	

OK   Help

Range/Bearing Lines
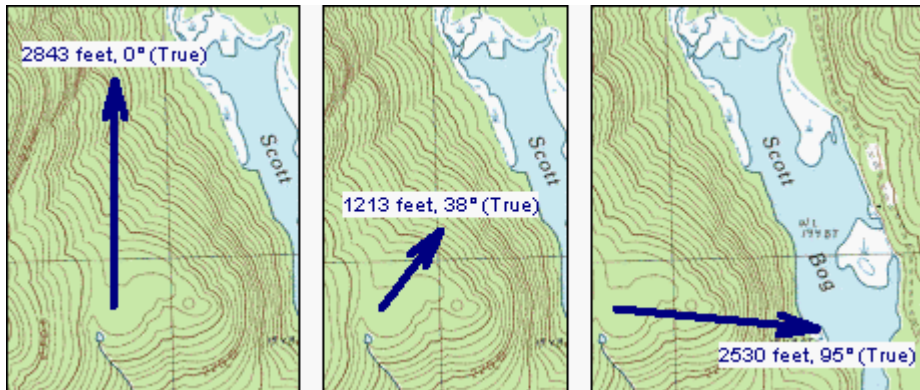
Use the range/bearing tool to find straight-line distance (range) and bearing between any two points.

Select the range/bearing tool from the toolbar or click **Tools > Range/Bearing Line**, and click on the map to set your Start point. A line, in the shape of an arrow, will appear on the map. The range/bearing line starts at the point where you clicked.

Use Cursor to Move Start and/or End Point

Use the cursor to drag the Start or End points as you wish. The range and bearing figures are shown at the end of the line. These figures update themselves as either point is moved.

Specifying Range/Bearing Figures (Instead of Dragging Points)

If you prefer, you may type specific range and bearing amounts: right-click on the range/bearing line and choose **Edit**.

Editing Range/Bearing Lines

To see a list of all your range/bearing lines, and to edit specific ones, click **Layers > Range/Bearing Lines**. (You can also right-click on a range/bearing line and choose **Edit**.)

Name
Replace the default name with a name of your own choosing.

Display Options
Specify a **line color, line style** (dashed, dotted, etc.) and **line width**. Check **Show Name on Map**, and the name of the range/bearing line will be included next to the Start point. Check **Show Distance & Bearing** to include these figures next to the End point. (These figures will update themselves as necessary if either point is moved.) **Lock** will prevent accidental moving of the range/bearing line. (Unless Locked, a range/bearing line may be dragged to another location.)

Notes
Space is provided for you to record comments about this measurement and location.

"New," "Delete"

Press **New** to create an entirely new range/bearing line by assigning values as desired. Press **Delete** to delete the range/bearing line that's highlighted in the list here in the Edit window.

Start Point

When you create a range/bearing line by clicking on the map, the coordinates of the point that you clicked are noted here under Start Point. You can type different coordinates here if you wish. If you have connected a GPS to your computer for GPS tracking, you can use your current GPS position as the start point. Select **Start at GPS Position**, and the coordinates supplied by your GPS will be inserted in this window under Start Point.

End Point

You have several options for setting your line's End point. Select an option based on how you want to use the range/bearing line.

To Find Range/Bearing to a Specific Point

If you know the coordinates where you want to set your End point, choose **End Coordinates** and type them here. For example, suppose you have the coordinates for a location of interest, and you want to know where you are in relation to that location. Use your present location for the Start point and type the coordinates of your point of interest under End Point. Then, right-click on the range/bearing line and choose Information. This will give you your distance to the location, and what direction to head in.

Supply Range and Bearing, to Find Out Where End Point Will Be

Under End Point, choose **Range and Bearing**. By specifying range and bearing for the End point, you can pinpoint locations. For example, if you want to know what the terrain is like five miles southeast of your present location, specify 5 miles for Range and 225 degrees Bearing (True), then pan the map and inspect the area surrounding the End point.

Using this method, you also have the option of getting the Bearing figure directly from a connected GPS unit. Choose **Range (Bearing from GPS)**, and the end point will be placed at the range you specify, and at the bearing in which you're currently traveling. (Note: You must be moving in order for the GPS to supply a bearing.)

Calculating End Point as Function of Time/Speed

Under End Point, choose **Time, Speed and Bearing**. This method is useful for predicting your progress if you traveled in a constant direction for a specific amount of time. For example, to find out where you would end up if you were to travel at a 2.7 mph at a bearing of 149 degrees for two and a half hours, just fill in the blanks. The resulting range/bearing line will not only show you where you would end up, but also tell you how far you would have traveled to get there.

If you're doing realtime GPS Tracking, you may opt to use the **Speed from GPS** and/or **Bearing from GPS**. The end point will move as you speed up or slow down.

Range/Bearing Line Information

To get the specifics about a range/bearing line, right-click on the line and choose **Information**. The resulting window will tell you the coordinates of the Start and End points, the length of the line, and the bearing from Start to End. **Back bearing**—bearing from End to Start—is also provided.

Range/Bearing Line Preferences
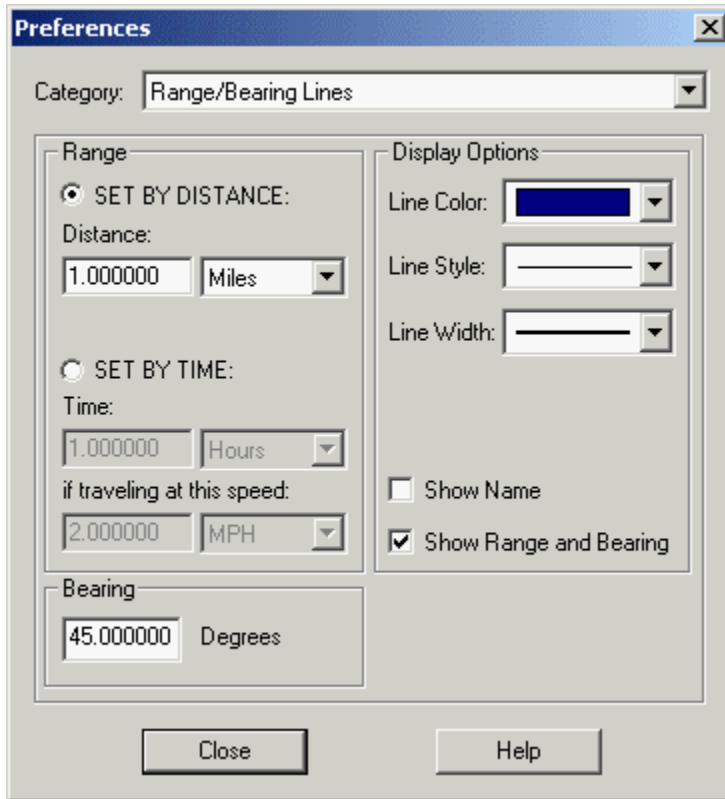
Click **File > Preferences > Range/Bearing Lines** to adjust the default settings that Terrain Navigator Pro will use for any new range/bearing lines you create. (You can always adjust individual lines as you wish—the specifications below are simply the initial settings that Terrain Navigator Pro will use for all new range/bearing lines that you create.)

Range
Set by Distance
Specify how long your range/bearing lines should be.

Set by Time
Use this option to create range/bearing lines based on projected progress at a specific speed. For example, set all your lines to represent distance traveled in 20 minutes at 2 miles per hour.

Bearing
Specify what heading Terrain Navigator Pro should use for your range/bearing lines.

Display Options

Select a **line color, line style** (dashed, dotted, etc.) and a **line width**. Check **Show Name**, and the name of the range/bearing line will be included next to the Start point. Check **Show Distance & Bearing** to include these figures next to the End point. (These figures will update themselves as necessary if either point is moved.)

GPS

Connecting
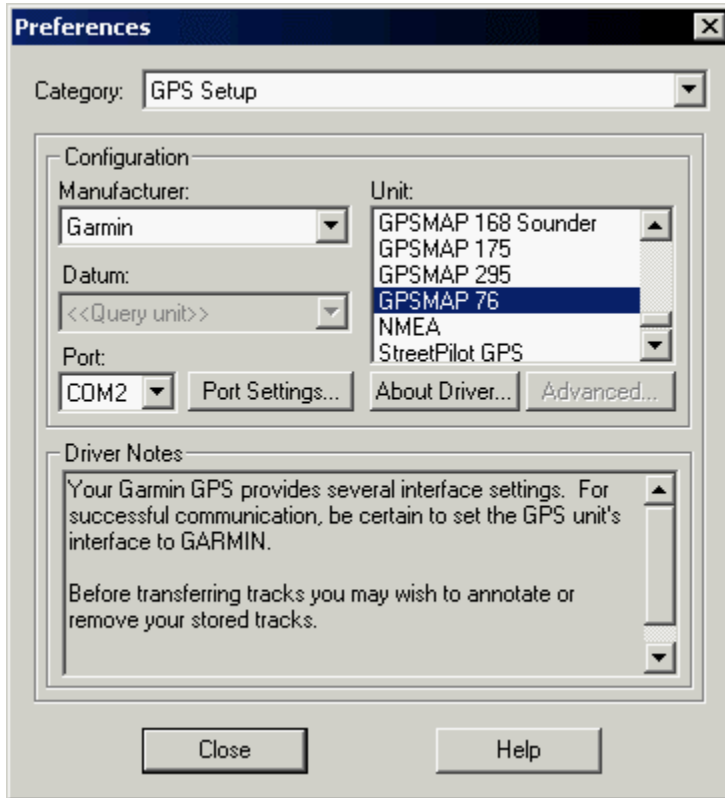
For successful communication, your GPS must be properly configured. To configure your GPS unit, click **GPS > Setup**.

Manufacturer, Unit

For the successful transfer of stored coordinate data between your GPS unit and your computer, your GPS unit must be listed here.

First, select your GPS's **Manufacturer**, then specify your model under **Unit**.

If your model is not listed, you might want to try specifying a similar model produced by your manufacturer. If the two models are internally similar, you may be able to establish successful communication with Terrain Navigator Pro. Trial-and-error is the only way to determine whether this will work.

If your manufacturer is not listed, you will not be able to transfer stored coordinate data. This means that you won't be able to send or receive waypoints, routes, or track logs between your GPS and Terrain Navigator Pro. (If you have a laptop computer that you travel with, you can probably still connect your GPS to perform realtime GPS tracking.)

Driver Notes (Additional Settings Within Your GPS Unit)

The right side of the GPS Setup window contains Driver Notes: specific instructions for using Terrain Navigator Pro with your particular GPS make and model. **IMPORTANT: Be sure to read and follow these instructions.** These Driver Notes often contain vital information, necessary for successful connection. The Driver Notes section will tell you whether there are any additional settings you need to configure within your GPS unit.

Datum

In many cases, you'll find that the Datum setting is unavailable (grayed out). This is because Terrain Navigator Pro has automatically detected what datum your GPS is set to, and taken care of this setting for you. If the Datum setting ISN'T grayed out, you must set the Datum here in the GPS Setup window to match whatever datum your GPS unit is set to.

Port

A COM (Communications) port is a connector on the back of your computer where peripheral devices (such as a mouse or a GPS unit) may be connected. Your computer's COM ports are numbered.

Specify the COM port on your computer where your GPS unit is connected. If you aren't sure of the number of the port you're using, consult your computer's user manual (or use trial-and-error until you successfully connect).

Establishing Communication

Once all GPS Setup settings are correct, you can establish communication with your GPS unit.
1. Ensure that the GPS unit is connected snugly to its data cable, and that the cable is connected snugly to the COM port specified in GPS Setup.
2. Turn the GPS on.
3. Click **GPS > Connect**.

Verifying Communication

To verify your GPS connection, click **GPS > Connect** again. A check mark will appear next to the Connect option to indicate that communication has been established.

When GPS communication is established, a second *status line*—a gray window border—will appear along the bottom of the Terrain Navigator Pro window, directly above the Help line. The screen might flicker momentarily as the map image is shifted up to make room for the GPS Status Line. The GPS Status Line will provide information when you're performing data transfers (like sending waypoints to your GPS, or receiving a track log from your GPS).

To keep the Status Line from appearing, click **File > Preferences > General** and uncheck **Show GPS Line**.

GPS Status Light

When your GPS is connected, you'll be able to tell GPS status at a glance, using the GPS Status light at the bottom of the screen. (If the light isn't visible, check **Show GPS Line** in General Preferences.)

The GPS Status light has four possible "states"--that is, there are four different ways that it can look. Its color and appearance change as necessary to reflect the status of your GPS unit.

      You haven't requested GPS communication.

If you want to use your GPS signal for realtime GPS Tracking, click **GPS > GPS Tracking > Start Tracking**.

If you want to transfer stored coordinate data, or if you just want to test GPS communication click **GPS > Connect**.

      Your GPS is on and is working properly.

A green check mark indicates that your GPS is properly configured, that it is receiving adequate satellite signals, and that it is capable of providing an accurate position fix. (Note: The green check mark doesn't mean that Terrain Navigator Pro is using the position data. It simply indicates that the GPS is receiving adequate satellite signals.)

      Your GPS is configured properly, but it doesn't have enough satellite signals to fix your position.

If this yellow exclamation point appears during GPS Tracking, you should make sure your GPS antenna is properly connected, and make sure that the antenna has a clear view of the sky, in order to pick up as many satellite signals as possible.

If you're only using the GPS for data transfer, and NOT for navigation, you can turn off your GPS unit's satellite search function. This can conserve battery power. (Remember to turn the satellite search function back on when you need position data.)

❌ **No Connection.**

Indicates one of the following: a) the GPS is turned off, b) the GPS has lost power, c) the GPS cable has become disconnected, or d) the GPS is not properly configured.

If this red "X" appears during navigation, you should immediately check all of the above.

If this red button appears at any other time--for example, when you turn your GPS off after completing a data transfer--this is because Terrain Navigator Pro doesn't "know" that you are done using your GPS unit. Click **GPS > Connect** again to uncheck the Connect option. This tells Terrain Navigator Pro that you no longer require GPS communication, and the red X will disappear. **Note:** Being connected to a GPS that has failed, or been physically disconnected, will detract from Terrain Navigator Pro's performance.

GPS Port Settings

Port Settings affect the speed of data transfer during serial communication between your GPS unit and your computer. With most recreational GPS units, these settings are not flexible, but some GPS units do allow for adjustments.

If these options appear grayed out, it means that Terrain Navigator Pro has automatically detected the port settings used by your GPS, and has configured itself to match these settings. In this case, you do not need to concern yourself with the port settings.

If your GPS does allow for adjustments, make sure that the values that you set here in the Port Settings dialog match the settings in your GPS unit. Once you have configured the Port Settings dialog to match the values set in your GPS, the Port Settings dialog will retain these settings for future use, and you won't have to set them again.

Baud rate refers to the number of characters transferred in a given period of time. **Data Bits, Stop Bits** and **Parity** also affect the way that data is divided in the communication stream. If you are not sure what settings to use, consult your GPS manual.

GPS Troubleshooting

If you have followed all instructions in Terrain Navigator Pro's GPS Setup window, *including any instructions in the window's Driver Notes section,* and you still can't establish communication with your GPS, here are a few things to try:

GPS Software Drivers

Remember to visit your GPS manufacturer's website for updated drivers for your particular GPS unit. Manufacturers maintain and update software drivers for use with various GPS units, and these drivers are available via Internet download. It is a good idea to keep current with the latest software drivers available.

Check for Port Conflicts

Sometimes, a computer system may "reserve" a particular COM port for use with another device (like a handheld computer). This means that even when that device isn't connected, the port may still be blocking access by other devices (in this case, your GPS unit). Use your Windows Control Panel to verify the port's status.

Check for Software Conflicts

Certain software programs may also interfere with COM port operation. If you use Microsoft ActiveSync® (for communicating with a handheld computer, for example), make sure ActiveSync is turned off when you connect your GPS to your computer.

Check your GPS Cable

Make sure your GPS cable is snugly connected at both ends, and that it isn't bent or twisted. Twisting can break wires inside the cable.

Use HyperTerminal to Check your Port and Cable

HyperTerminal, a Windows accessory, may be used to monitor the flow of data at your COM port. Use HyperTerminal to determine whether your problem is equipment-related. See page 63 for step-by-step instructions.

Try Getting a Satellite Fix

It may sound funny, but sometimes a GPS unit will not respond properly until it establishes its geographic location—even if this has nothing to do with the task at hand. If you can, place your GPS unit near a window in order to establish satellite communication, then try connecting again.

Try Other GPS Software

Try connecting your GPS to your computer using the software interface provided by the GPS manufacturer and packaged with your data cable. *Until your unit is able to transfer data via the manufacturer's software, it will not work with Terrain Navigator Pro either.* If your unit will not function with the manufacturer's software, or if you do not have this software, contact your GPS manufacturer for technical advice on connecting your GPS unit to your computer.

Contact Maptech

If you have tried these suggestions and still have trouble establishing or maintaining a GPS connection, Maptech's technical support staff will be happy to assist you. Support is available from 9:00 AM to 5:00 PM Eastern, Monday through Friday:

Telephone: (978) 792-1197
E-mail: support@maptech.com
Fax: (978) 792-1095
Internet: http://www.maptech.com/support

Maptech's support site includes an interactive question-and-answer wizard, as well as an online technical support discussion forum, where Maptech software users and technical support staff can share information, suggestions and comments.

Using HyperTerminal to Check your Equipment Connection

HyperTerminal, a standard Windows accessory, may be used to monitor the flow of data at your COM port. Use HyperTerminal to determine whether your problem is equipment-related.

1. Close Terrain Navigator Pro.
2. Set your GPS unit to NMEA output. (Garmin users: choose NMEA/NMEA from the GPS's Setup Menu. Magellan users: choose NMEA 0183 2.0 from the NMEA menu. Refer to your GPS unit's manual for instructions if necessary.)
3. Start HyperTerminal: From the Windows **Start** button, choose **Programs, Accessories, Communications, HyperTerminal**. The HyperTerminal program will start. (If you do not have HyperTerminal installed, see below for installation instructions.)
4. If a window comes up asking if you want to configure a modem now, answer **No** or **Cancel**.
5. The Connection Description window should now appear. Type "Test" for the connection's *Name* and press **OK**.
6. The next window is the Phone Number window. For *Connect Using*, select *Direct to COM1* and press **OK**. In *COM1 Properties*, change the *Bits per Second* from 2400 to 4800 (since the NMEA 0183 standard specifies 4800 baud rate) and press **OK**.

At this point, one of three things can happen:

A) You get an error message.
This means that the COM port you have selected is either unavailable, or is not functioning properly. You may have inadvertently specified the wrong COM port name. Close HyperTerminal and repeat the procedure, trying a different COM port this time. If you are sure that you are selecting the proper COM port and calling it by its correct name, that COM port may be defective. Contact your computer manufacturer for further troubleshooting tips.

B) You get a blank screen with a flashing cursor.
This means that the COM port you have chosen is not receiving NMEA data. Close HyperTerminal and repeat the process, trying a different COM port. If you are certain that you are selecting the proper COM port, contact the manufacturer of your computer or GPS unit for further troubleshooting tips.

C) You get a screen with text scrolling upward.
You are successfully connected to your GPS unit! The data that you see scrolling by are the NMEA sentences coming from your GPS. Note the COM port that you used for this successful test, and exit HyperTerminal. (When asked if you want to disconnect now, answer Yes. When asked if you want to save session "Test," answer No.)

Now that you have determined the correct COM port, start Terrain Navigator Pro. Leave your GPS unit in NMEA mode for a moment. In Terrain Navigator Pro's GPS Setup window, set Manufacturer to NMEA – Generic, set Unit to NMEA 0183 2.1, choose the correct COM port, and press **OK**. Click **GPS, Connect**. You should now be able to set your GPS back to its native mode--that is, from NMEA to the model-specific mode that's specified in the Driver Notes section of Terrain Navigator Pro's GPS Setup window. Make sure that all settings in the GPS Setup window match the settings in your GPS unit, and click GPS > Connect again if necessary. Everything should now be working properly.

Can't find HyperTerminal?

HyperTerminal is a standard Windows application that is included with all modern versions of Windows. If it is not installed on your computer, open the Windows Control Panel, choose Add/Remove Programs, select the Windows Setup tab, click on Communications and press Details. Check the checkbox for HyperTerminal and press **OK**, then **OK** again. (You may need your Windows

CD to complete the installation.)

HyperTerminal not displaying any data (NMEA sentences)?

If you cannot get HyperTerminal to display data after following the above procedure, trying each COM port, there is something wrong with either your COM port, your data cable, or your GPS unit. Since the source of the problem is outside Terrain Navigator Pro, you should contact your computer or GPS manufacturer for further troubleshooting tips.

Realtime GPS Tracking

Designed for use in a moving vehicle, GPS Tracking lets you monitor your progress on the map. If you like, you can record your progress and save it on the map as a track.

In order to perform GPS tracking, you must have a connected, compatible GPS with a satellite position fix. Once GPS communication is established, click **GPS > GPS Tracking > Start Tracking**. As soon as Terrain Navigator Pro receives a position signal from your GPS, Terrain Navigator Pro will open the map containing your location, and mark your position with an icon on the map. This icon will move across the map as you move across the terrain.

GPS Position Icon

Click **GPS > GPS Tracking > Tracking Preferences** to choose from several symbols (car, boat, arrow, etc.) to represent your GPS position. The symbol points in the direction in which you're moving, so you can see at a glance which direction you're headed. Whenever you stop moving, the symbol becomes a circle.

Recording Your Progress (Saving Your Track on the Map)

Realtime GPS Tracking alone does NOT save anything on the map after you turn off tracking. If you want a track line on the map to show where you've been, you can record your track as you move. Not only will this track line appear on the map while you're tracking, but it will also be saved for future reference.

To record your progress as a track while you move, click **GPS > Tracking > Record Track**. You'll have several options for recording:

Log

Name: Assign a name to this track. The track will be stored in your track list.
New: This track will be saved under the name you assigned above.
Append: Click Append to attach this track line to any track you previously created. For example, if you're making a journey over a period of several days with breaks in between, or if you're hiking a trail in segments over time, you can use this Append feature to add on to the original track line each time. When you click Append, the Name field becomes a drop-down list; select the name of the track you want to add to.
Overwrite: Suppose you routinely track your progress on a particular journey and you want to reuse the same track name each time. You can click Overwrite and under the Name drop-down, select the

name of the track you want to replace. The old track will be deleted from memory and replaced with this new track, saved under the same name.

Points

Each time you record your GPS location, your coordinates are saved as a Track Point. These points are then "stitched" together to form a line, or Track Log. Select a recording method to determine how often Terrain Navigator Pro should record your position. There are three recording methods available:

By Time. If you plan to move at a fairly constant pace and direction, you may want to record your position at regular time intervals. This will result in fairly evenly spaced track points, thereby creating an accurate representation of your travels. Specify an interval that's reasonable for your pace and direction. (In general, if you're moving fairly slowly, you won't need to record your position very often. In such cases, set the recording interval to give yourself enough time to move an appreciable distance from your last recorded point. The faster you're going, the more frequently you'll need to record your location in order to get an accurate record of your travels.)

By Distance. If your speed fluctuates, or if you anticipate occasional stops, you may want to record your progress by *Distance*. Terrain Navigator Pro will wait until you have moved the specified distance before recording each new track point. This way you can avoid collecting multiple points in the same general area—something that otherwise may happen whenever you stop moving.

By Direction Change. If your pace might fluctuate, and if your path of travel contains frequent direction changes, your best bet is to record track points by *Direction Change*. Terrain Navigator Pro will base track points on your motion. When you're moving in a fairly straight line, that portion of your journey might only have two or three track points. If you make a switchback turn, Terrain Navigator Pro will mark each turning point with a track point. This recording method is useful no matter what speed you travel or how far you go. You can control your track's accuracy by specifying Minimum Allowable Error: the lower the error you allow, the more track points Terrain Navigator Pro will record. Set the Error amount so that it's low enough for an accurate representation, but not so high that you end up with a large number of unnecessary points.

Reusing Your Track for Navigation

If you want to use your GPS to follow this path of travel again in the future, you can convert this track into a route, then send the route to your GPS.

GPS Tracking Preferences
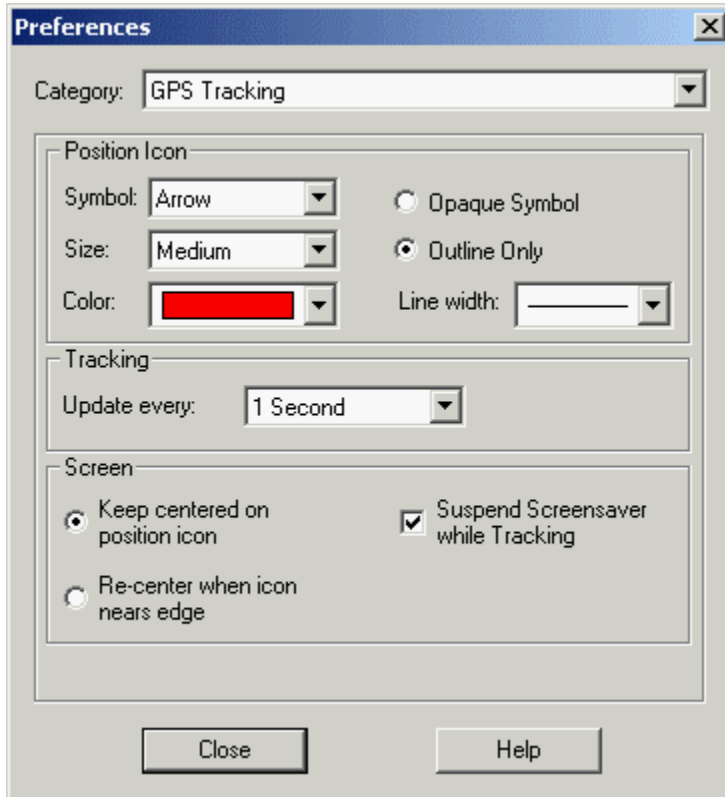
GPS Position Icon

Symbol: Select a symbol to represent your position. The symbol (icon) will be placed on the map at the coordinates received from your GPS.

Size: Controls the size of the symbol used for your position icon. Choose small, medium or large.

Outline: This option controls the width of the line that draws the position icon. Thicker lines will make the icon easier to see, but will obscure more of the map underneath. Several width options are provided, from extra-fine to extra coarse.

Color: Choose a color to use for the position icon.

Filled Symbol: Checking this option fills the tracking symbol with color, making it an opaque symbol (rather than an outline). This may make the icon easier to see. (For example, when driving you can easily locate a filled symbol by glancing at the map.)

Tracking

Update: This determines how often your position will be updated on the map. Choose an interval between half a second and six seconds.

For example, when the update time is set to four seconds, your position will be recorded every four seconds, and the icon will be moved every four seconds to the corresponding map location.

Display: These options control how the screen "follows" your progress during tracking.

Always Centered: The screen is always centered on your location. As you move, the map image "moves" underneath the icon that represents your position. The icon is always at the center of the screen.

Re-Center as Needed: When you start tracking, the screen is centered on your location. The map image remains stationary and your position icon moves across it. When your icon reaches the edge of the screen, the map updates itself, re-centering on your new location. Each time you reach the edge of the screen, the map re-centers on you.

Suspend Screen Saver: Depending on your computer's screen saver settings, your screen saver might be activated during tracking (since you're probably not using the keyboard much). Check this box to prevent your screen saver from appearing and interfering with the map display during live tracking. (Otherwise, you can just press any key to clear the screen saver when you want to view the map image.)

GPS Position Averaging
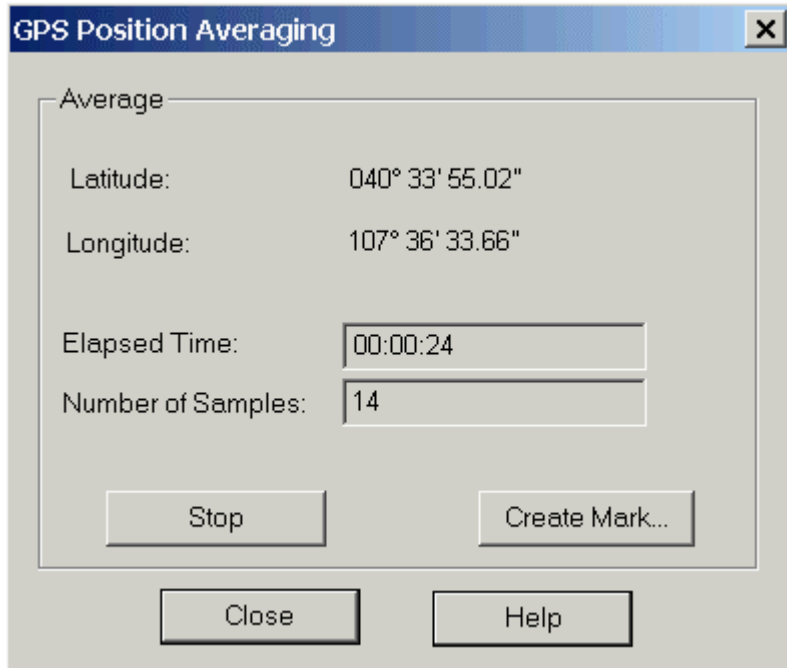
Terrain Navigator Pro is equipped with a position averaging feature, for maximum precision in marking locations. A stationary GPS unit will report slightly different coordinates as satellite signals fluctuate. If you require extreme accuracy for marking a particular location, turn Position Averaging on: click **GPS > Utilities > Position Averaging**. Next, leave your connected GPS in that location for a time in order to allow it to acquire satellite signals and make several position reports. To start collecting those position reports, press the button labeled **Start**. **Number of Samples** tells you how many position reports Terrain Navigator Pro has acquired. **Elapsed Time** indicates how long Position Averaging has been underway. When you feel that enough position data has been acquired, press the button labeled **Create Mark**. Terrain Navigator Pro will take the average of all positions reported by your GPS since GPS Position Averaging was turned on, and will place a mark at the averaged position.
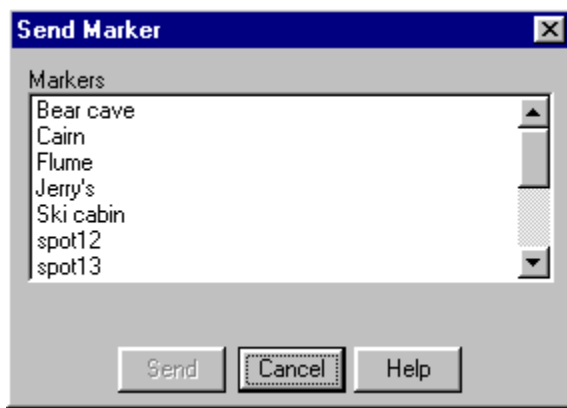
The GPS Position Averaging window will remain open until you press the **Close** button.

Notes:
- The Start button is relabeled "Stop" while averaging is underway. You can use this button to toggle the position collection process on and off.
- You can press the **Create Marker** button as many times as you wish while averaging is underway.

Sending Data to GPS

Markers

You can take markers that you have created within Terrain Navigator Pro and transfer them to your GPS unit. The markers will appear as stand-alone waypoints in your GPS.

Click **GPS > Send to GPS > Send Markers** and Terrain Navigator Pro will present a list of all available markers. Highlight those whose locations you wish to send to your GPS. (Use the Shift or Control key to make multiple selections: Shift to select several markers in a row, or Control to single out specific markers to send.)

Markers Appear as Waypoints in GPS

Your GPS will present your markers as waypoints, identified by their GPS names.

Understand Your GPS Unit's Waypoint Storage Options

Before sending markers to your GPS, be sure that you know how your GPS unit handles waypoint storage.

Route names. Make sure that you don't already have a route of the same name stored in your GPS: for example, if you already have a waypoint named "H2O" in your GPS and you send it another "H2O," the GPS unit may overwrite the old H2O and replace it with the new one.

Number of waypoints. Find out how many waypoints your GPS unit can store. Some GPS units might overwrite existing waypoints in order to accept the new waypoints that you send.

Driver Notes. For tips and cautions for your particular GPS make and model, see the Driver Notes section of Terrain Navigator Pro's GPS Setup window.

Consult your GPS manual. You should also thoroughly read your GPS user's manual and familiarize yourself with storage functions of your GPS unit before attempting any data transfers.

After you send routes to your GPS, your marker data will still be retained within Terrain Navigator Pro. To edit or delete markers in Terrain Navigator Pro, click **Layers > Markers**.

Routes

As you know, you can create routes on the maps in Terrain Navigator Pro, and send these routes to your GPS unit.

First, configure and connect your GPS. Click **GPS > Send to GPS > Send Route**, and Terrain Navigator Pro will display a list of all available routes. Highlight the route you wish to send to your GPS, and press **OK**. (You may only send one route at a time. Repeat this process to send additional routes.)

Understand Your GPS Unit's Route Storage Options

Before sending routes to your GPS, be sure that you know how your GPS unit handles route storage.
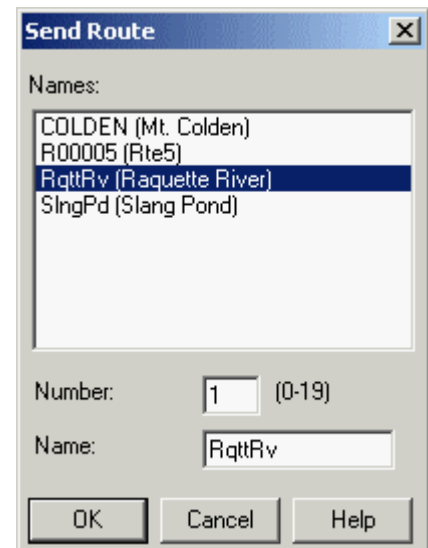
Number of routes. Find out how many routes your GPS unit can store. Some GPS units might overwrite existing routes in order to accept the new routes that you send. For example, say your GPS can store up to 10 routes, and it already has six routes in memory. In a *slot-based* GPS, this means it has four "empty slots" in which to store additional routes: slots 1-6 are occupied and slots 7-10 are available. If you send five new routes, the GPS unit might "wrap around" the route list—placing four of the new routes in slots 7-10, then deleting existing data from slot 1 in order to make room for the fifth new route.

Route names. Make sure that you don't already have a route of the same name stored in your GPS: for example, if you already have a "Route1" in your GPS and you send another "Route1" to your GPS, the GPS unit may overwrite the old Route1 and replace it with the new one.

Driver Notes. For tips and cautions for your particular GPS make and model, see the Driver Notes section of Terrain Navigator Pro's GPS Setup window.

Consult your GPS manual. You should also thoroughly read your GPS user's manual and familiarize yourself with storage functions of your GPS unit before attempting any data transfers.

After you send routes to your GPS, your route data will still be retained within Terrain Navigator Pro. To edit or delete routes in Terrain Navigator Pro, click **Layers > Routes**.
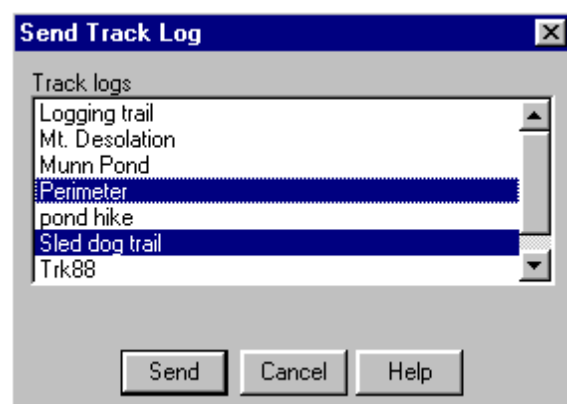
Tracks

As you may know, a GPS unit may be used to record a *track log*—a collection of subsequent position readings which together form a record of your movement over terrain. These track logs may be transferred into Terrain Navigator Pro, where they are displayed as lines on the map. You can also create tracks by hand on the maps in Terrain Navigator Pro, and send these tracks to your GPS unit.

Click **GPS > Send to GPS > Send Tracks**, and Terrain Navigator Pro will display a list of all available tracks. Highlight the track(s) you wish to send to your GPS. (Use the Shift or Control key to make multiple selections: Shift to select several tracks in a row, or Control to single out specific tracks to send.)

Understand Your GPS Unit's Track Storage Options
Before sending tracks to your GPS, be sure that you know how your GPS unit handles track log storage.

Number of track logs. Find out how many track logs your GPS unit can store. Some GPS units can only store one track at a time, in which case you may not be able to send a new track log. Also, some GPS units might overwrite existing track logs in order to accept the new track logs that you send. For example, say your GPS can store up to 10 track logs, and it already has six track logs in memory. In a *slot-based* GPS, this means it has four "empty slots" in which to store additional tracks: slots 1-6 are occupied and slots 7-10 are available. If you send five new tracks, the GPS unit might "wrap around" the track list: placing four of the new tracks in slots 7-10, then deleting existing data from slot 1 in order to make room for the fifth new track.

Track names. You should also find out whether your GPS unit will use the track name that you created in Terrain Navigator Pro, or whether it will assign the track log a new name. Make sure that you don't already have a track log of the same name stored in your GPS: for example, if you already

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have a "Track1" in your GPS and you send another "Track1" to your GPS, the GPS unit may overwrite the old Track1 and replace it with the new one.

Driver Notes. For tips and cautions for your particular GPS make and model, see the Driver Notes section of Terrain Navigator Pro's GPS Setup window.

Consult your GPS manual. You should also thoroughly read your GPS user's manual and familiarize yourself with storage functions of your GPS unit before attempting any data transfers.

Notes:
♦ Some Magellan GPS units supported by Terrain Navigator Pro are not able to receive tracks from Terrain Navigator Pro. This is simply because these GPS units are not capable of storing track data in memory.
♦ After you send tracks to your GPS, your track data will still be retained within Terrain Navigator Pro. To edit or delete tracks in Terrain Navigator Pro, click **Layers > Tracks**.

Receiving Data from GPS

Waypoints

If you have waypoints stored in your GPS and would like to see those waypoint locations on the maps in Terrain Navigator Pro, you can transfer them to your computer. Connect your GPS unit and click **GPS > Receive from GPS > Receive Waypoints**.

Terrain Navigator Pro will communicate with your GPS and present a list of all the waypoints currently stored in the GPS unit's memory. (This can take a few seconds, possibly slightly longer if you have a great number of stored waypoints.) From the list provided, select the waypoints that you would like to bring into Terrain Navigator Pro. (Use the Shift and Control keys to make multiple selections.)

When you have made your selections, press **OK**. A small message will appear on the screen, telling you the number of waypoints received. The waypoints that you selected will appear on the maps as markers. To locate them, click **Find > Marker**. These new markers will be assigned whatever default symbol and color you specified in Marker Preferences.

Routes

If you have routes stored in your GPS unit, you can bring them into Terrain Navigator Pro to view and edit them on the maps. Connect your GPS unit and click **GPS > Receive from GPS > Receive Routes**.

Terrain Navigator Pro will communicate with your GPS unit and create a list of all the routes stored in your GPS unit's memory. (This may take a few minutes, depending on how many routes you have, and how many waypoints
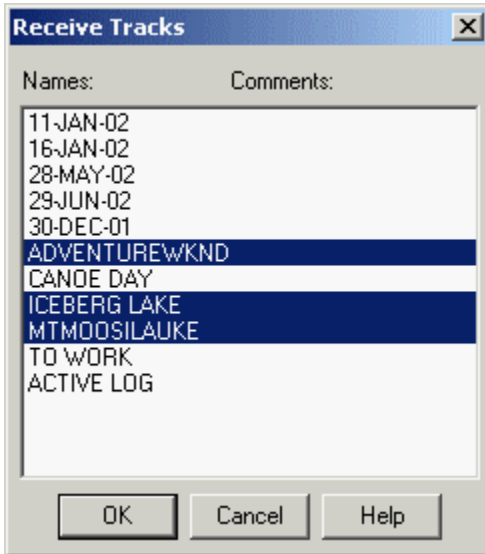
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each route contains.) From this list, select the routes you want to bring into Terrain Navigator Pro. You can use the Shift and Control keys to make multiple selections. When you have made your selections, press **OK**.

Finding a Route

To bring a route into view on the screen, click **Find > Route** and select the route from the list.
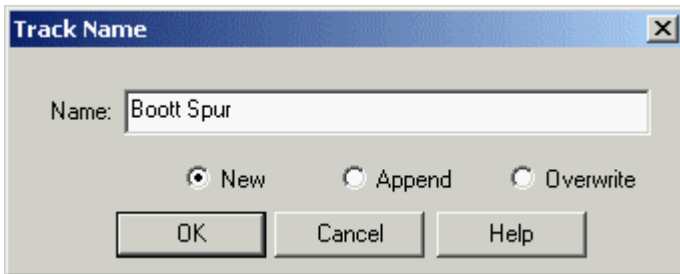
Tracks

As you know, you can create tracks by hand on the maps in Terrain Navigator Pro. In addition, if you have track logs stored in your GPS unit, you can also bring them into Terrain Navigator Pro to view them on the maps. Connect your GPS unit and click **GPS > Receive from GPS > Receive Track Logs**.

Terrain Navigator Pro will communicate with your GPS unit and create a list of all the track logs stored in your GPS unit's memory. (This may take several minutes, depending on how many track logs you have, and how many points each log contains.) From this list, select the tracks that you want to bring into Terrain Navigator Pro. You can use the Shift and Control keys to make multiple selections. When you have made your selections, press **OK**.

Most GPS units use numbers for track names. Terrain Navigator Pro gives you this chance to assign a more descriptive name to the track that you're receiving. This window will appear once for each track that you're receiving.

Naming Options

Choose **New** if you want this to be a completely new, stand-alone track.

To add on to an existing track, choose **Append**. When you choose Append, the Name field becomes a drop-down list, with the names of all existing tracks. Select the track you wish to build onto. The new track points will be attached to the end of this track.

To replace an existing track, choose **Overwrite**. This will delete the old track and use the same track name for this new track.

When you have assigned names to all the tracks you are receiving, Terrain Navigator Pro will retrieve the track points from your GPS. The tracks will appear on the maps and will be added to the list of tracks in the Edit Tracks window.
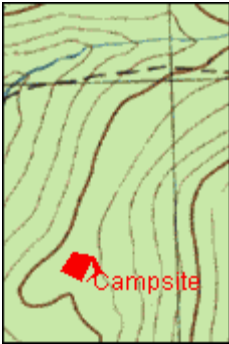
♦   When assigning names to new tracks, it's a good idea to try to keep all your track names unique, so you can tell your tracks apart.

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Markers

 The Marker tool lets you place labeled symbols, or *markers,* on the maps to indicate points of interest.

Creating Markers

Select the Marker tool from the toolbar, then click on the map. A symbol will be placed at the point where you clicked. If you want to move the marker, hold the cursor over the marker until the cursor changes to a combination hand/marker symbol, then drag the marker to a new location. Once you're done creating and moving your marker(s), switch back to the Drag tool.

Terrain Navigator Pro automatically assigns a default name, symbol and color for the marker. To rename your marker, change its color, or select a different symbol, right-click on the marker and choose **Edit**. This will open the Marker Edit window, which lists all your markers and lets you edit each one individually.

Moving Markers

You can move a marker by clicking and dragging it. First, select the Marker tool ( ). Hold the cursor (△) over the marker until the cursor changes to a combination hand/marker symbol ( ). Click and drag the marker to a new location.

Another way to move a marker is to assign it new coordinates in the Edit Markers window.

Edit Markers

Click **Layers > Markers** to see a list of all your markers and to edit individual markers' characteristics. Highlight any marker in the list to change its name, symbol, color, etc. (You can also open the Edit Markers window by right-clicking on a marker and choosing **Edit**.)

General

Full Name, GPS Name: The full name appears in the marker list in this window, and may also be included on the map image. The GPS Name is
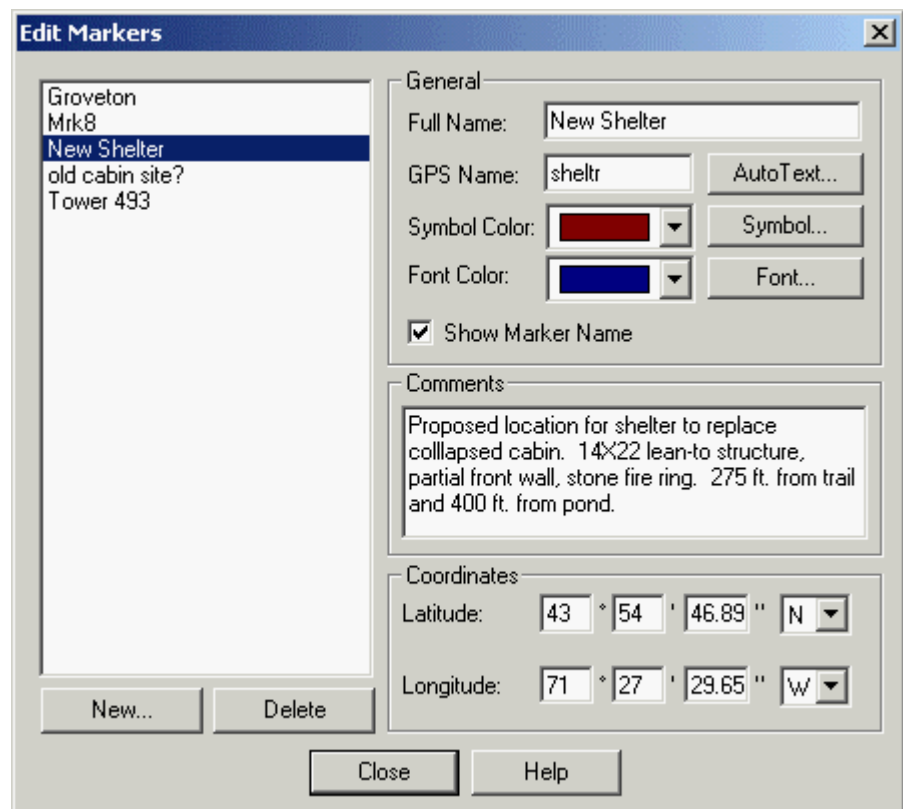
designed for GPS use: when you send markers to your GPS, they will be listed by their GPS Names in your GPS. Since GPS units use a limited number of characters for naming locations, the GPS Names that Terrain Navigator Pro generates are no more than six characters long. In addition, they are guaranteed to be unique, so that no two markers share the same GPS Name. This prevents any confusion when using markers with your GPS in the field. Keep this in mind if you assign your own GPS Names, and make sure all your GPS Names will be easily recognizable when you're out using your GPS in the field.

AutoText: The AutoText feature lets you include location information along with the marker name on the map. Choose **Coordinates, Street Address, Elevation,** or **Grade**. See page 74 for details.
Show Marker Name: Check here to include the marker name next to the symbol on the map.
Lock: Check here to lock this marker in place on the map. (To unlock it, uncheck this box or right-click on the marker itself and choose **Unlock Marker**.)
Symbol, Symbol Color: Choose a symbol to mark this location on the map. 16 colors are available for symbols.
Font, Font Color: Pick a font to use for the marker's full name, which will be included next to the symbol.

Comments

Space is provided for you to record notes about this location.

Coordinates

The coordinates of this location. You may change these coordinates if you want to move the marker. (You can also move markers by clicking-and-dragging them, with the Marker tool selected.)

New/Delete

Press the **New** button to create a new marker by assigning its coordinates. Press **Delete** to delete the marker that's highlighted in the marker list.

Marker AutoText
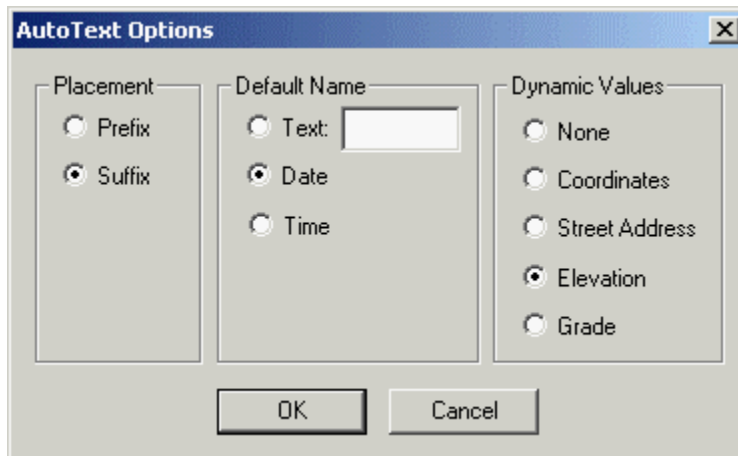
The AutoText feature lets you include location information along with the marker name on the map. You may choose to include **Coordinates, Street Address, Elevation,** or **Grade**.

Note on Elevation: When using AutoText to show elevation, keep in mind that spot elevations in Terrain Navigator Pro are *approximate*.

AutoText Updates Itself Automatically

AutoText is so called because it automatically updates itself whenever necessary. For example, if you attach AutoText Coordinates to a marker, and then you move the marker, the AutoText figure will change accordingly.

Placement

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The AutoText will be included on the same line as the marker's name. Decide whether you want the AutoText to appear before the marker name (as a Prefix) or after the name (Suffix).

Dynamic Values

Choose **Coordinates, Street Address, Elevation**, or **Grade**. The information will appear on the map, on the same line as the marker name

To remove AutoText, choose **None**.

Setting Defaults for AutoText

You can set preferred AutoText for Terrain Navigator Pro to use every time you create a new marker. To specify your preferred settings, click **File > Preferences > Markers**.

Marker Preferences

Click **File > Preferences > Markers** to adjust the default settings that Terrain Navigator Pro will use for any new markers you create.
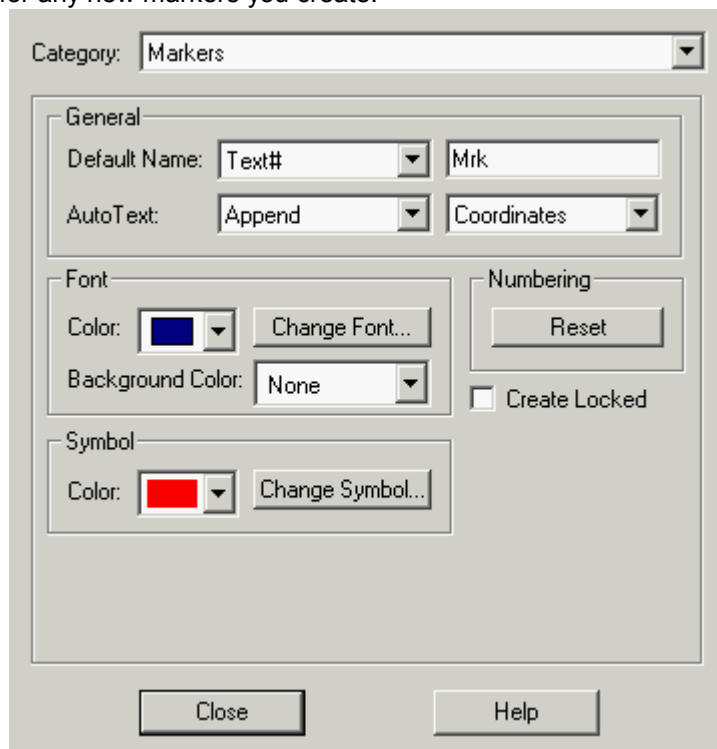
Default Name

The Default Name is what Terrain Navigator Pro will automatically fill in for the starting text of your marker names. You have four choices.
Text: Lets you assign a standard name prefix in the space at right. When you first start using Terrain Navigator Pro, the Default Name is set to Text, with "Mrk" to be used as the prefix for all new markers. You can change this prefix if you like. Each new marker's name will start with the prefix you specify here. (They will be numbered so that you can tell them apart.) This feature is useful for marking multiple instances of the same thing: for example, "Tower," "Site," etc. To include sequential numbering at the end of your marker default name, select **Text #**.
Date, Time: You may choose to automatically start your marker names with either Date or Time. (Since Date or Time serves as a prefix, no additional prefix space is available.)

AutoText

AutoText is location data that you may include on the map along with your marker names. AutoText is so called because it will automatically update itself if the marker is moved. You may choose **Coordinates, Elevation, Grade,** or **Street Address**.

To add AutoText *before* the marker name, choose **Prepend**. To add the AutoText *after* existing marker name, choose **Append**.

Symbol and Font

Choose a symbol, a font style/size, and a color for each.

Reset Numbering

As mentioned above, your markers are automatically numbered, to ensure that all marker names are unique. This prevents confusion, especially when transferring markers to a GPS. If you like, you can **Reset** the numbering to start again at 1, but keep in mind that this may result in duplicate marker names. (For example, if you already have a "Mrk3," and you reset marker numbering, you could end up with two markers named "Mrk3.")

Create Locked

You can lock individual markers in place on the map, by right-clicking the marker and choosing **Lock Marker**. Locking prevents accidental moving of markers. Check the **Create Locked** checkbox here, and all your markers will automatically be locked upon creation. (You can still unlock them individually, by right-clicking the marker and choosing **Unlock Marker**.)

Keyboard Shortcuts:

Ctrl+E	Opens Edit Markers window
Del	Delete Current Marker
Delete Button (on Toolbar)	Delete Current Marker
Right Click on a Marker	Editing Options
Double Click on a Marker	Edit This Marker
Ctrl+A	Place marker at GPS location (during Tracking)

Routes

Creating Routes
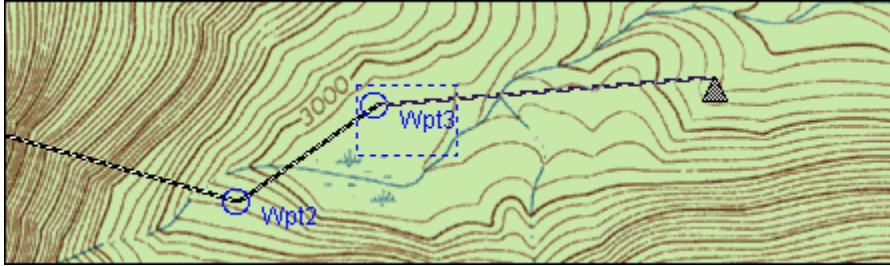
A route is a path of travel along a series of definite points. The points along the route are called *waypoints*. To create a route on the map, select the Route tool from the toolbar and click on the locations where you want to set waypoints. Waypoints are represented by symbols, and are automatically assigned names and numbers. As you create waypoints, the waypoints are joined in sequence by a line. Each line segment is called a route *leg*. When you have finished, press the Route toolbar button again or right-click on the map and choose **Finish Route**. This will save your route on the map.

Tip: Hold down the Control key on your keyboard to temporarily switch the cursor back into Drag mode if you need to move the map.

Inserting a Waypoint

First, select the Route tool ( ), then hold the cursor over the route line where you want to insert the new waypoint. The cursor ( ) will change to a plus symbol ( ). You can then click to insert a new waypoint in that location.

Note: The new waypoint that you insert will be assigned the next number available. For example, if a route contains four waypoints and you insert another, the new waypoint will be called Waypoint 5 regardless of its position in the route. You can modify the names of your waypoints as you like: right-click on a waypoint and choose **Edit Route Waypoints** to change name, symbol, color, etc.
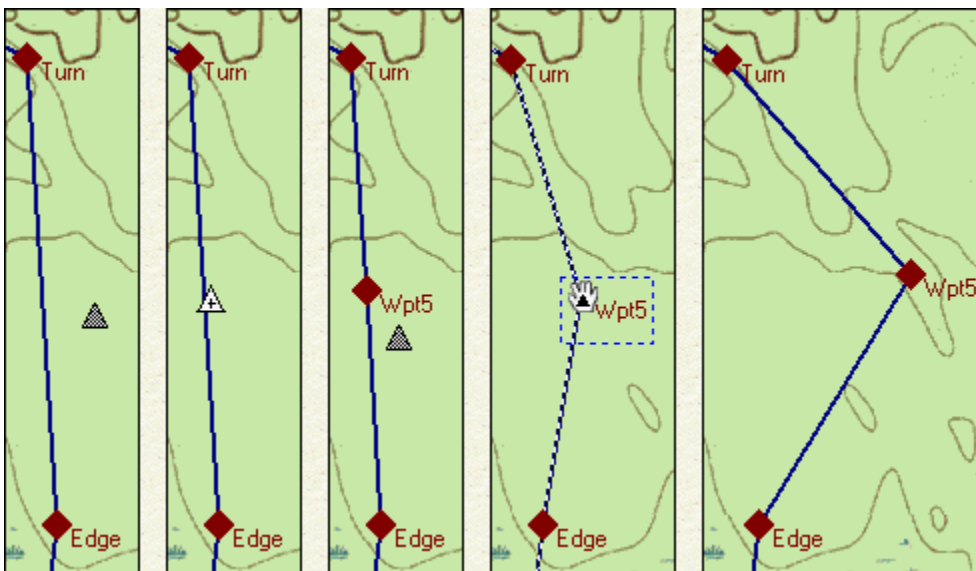
Moving a Waypoint

With the Route tool selected, hold the cursor over the waypoint until the cursor (▲) changes to a hand symbol (✋). Drag the waypoint to a new location.

Appending to a Route

To continue building on to the end of an existing route, right-click on any waypoint and choose **Append to Route**. You can then pick up where you left off, and add as many waypoints as you like.

Looping a Route

To join the last waypoint to the first, right-click on any waypoint and choose **Toggle Route Loop**. If your route forms a single enclosure, you can find out its area by right-clicking on any waypoint and choosing Route Information. To unloop a route, just Toggle Route Loop again.

Reversing the Order of Waypoints

To reverse the waypoint sequence so that the last waypoint becomes first, right-click on any waypoint, choose **Edit Route Waypoints**, and press the **Reverse** button. (This is handy for returning to the start of a route, on the return trip.)

Editing Routes
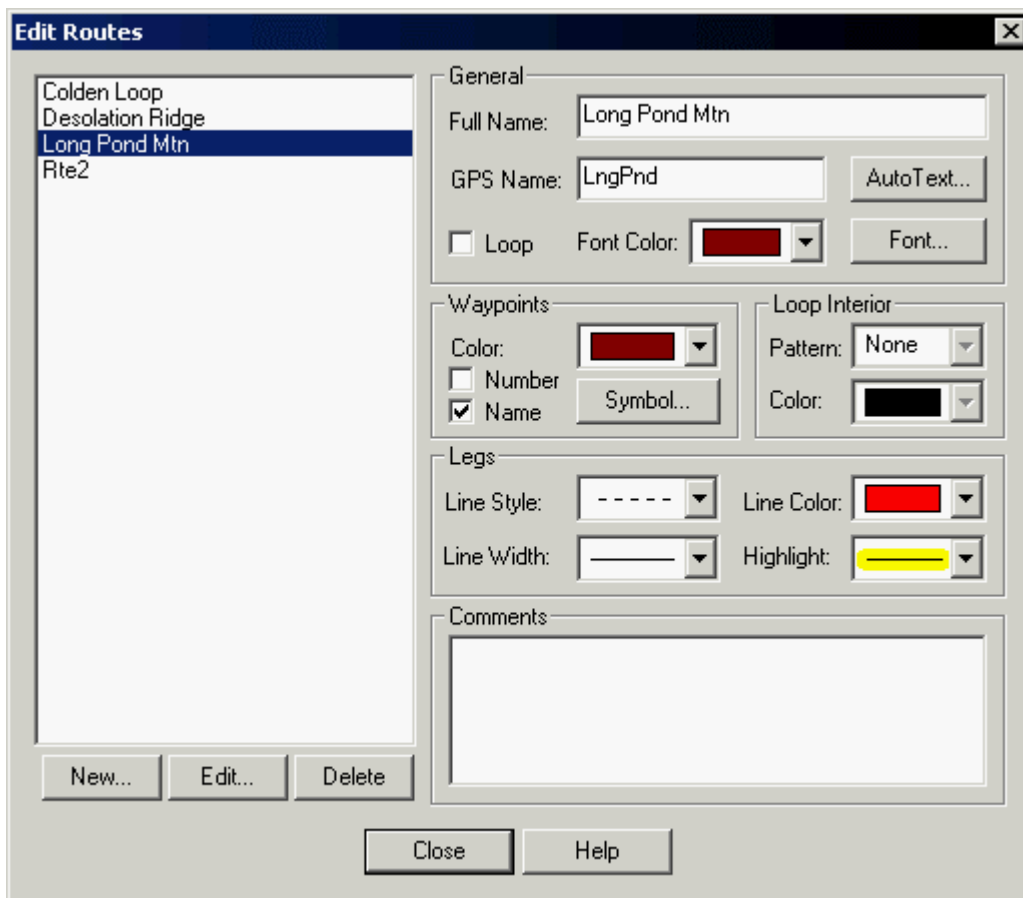
Click **Layers > Routes** (or right-click on a route waypoint and choose **Edit**) to view a list of all your routes and edit individual routes' characteristics. Highlight the route you want to edit, then make your changes in the right half of the Edit Routes window.

Route Characteristics

Full Name: The full name of the route, as it appears in Terrain Navigator Pro's route list (in the left side of this window).

GPS Name: The GPS Name is the name that will appear on your GPS screen when you send a route to your GPS. To accommodate the widest range of GPS units, many of which use a limited number of characters for route names, the GPS Name is limited to six characters.

Font: Select a font to use for the waypoint names and any accompanying AutoText on the map image.

Symbol, Symbol Color: Several symbols are available for marking waypoint locations on the map. **Note:** The symbol you pick here will be used for all waypoints in this route. To specify different symbols for individual waypoints, press the **Edit** button to edit waypoints.
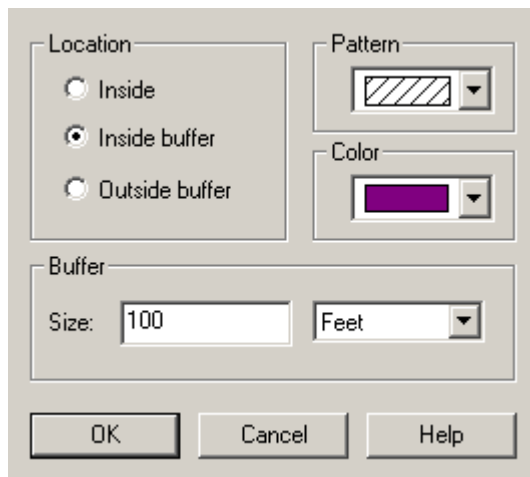
Line Color, Width, Style: These settings affect the route *legs*—the lines that join the waypoints. Select a line color and width, along with a line style (solid, dashed, etc.).

Comments: A space provided for you to record notes about this route.

Loop: Check here to automatically join the last waypoint to the first. Your route will form an enclosure, useful for calculating area (see Route Information).

Number: This will automatically number your waypoints in sequence on the map. Terrain Navigator Pro automatically uses sequential numbers when assigning waypoints' default names, but you may wish to assign different names. This "Number" option lets you take advantage of automatic sequential numbering even if you have erased the waypoints' default names and assigned names of your own.

Fill Options (for Looped Routes/Tracks)

The Fill Options window lets you specify a color and/or pattern for filling looped routes or tracks. To reach the Fill Options window, right-click on a route or track and choose **Edit Route/Edit Track**, then check the "Loop" checkbox and under "Fill," press the **Advanced** button.

Location

Inside: The entire interior of the loop will be filled with the color and pattern you choose.

Inside Buffer: The fill color/pattern will extend inward from the route/track line, towards the center of the loop, but only as far as you specify under Buffer Size.

Outside Buffer: The fill color/pattern will extend outward from the outer edge of the loop, leaving the interior of the loop free of fill. Specify width of the color/pattern under Buffer Size.

Waypoint AutoText (Applies to Entire Route)

The AutoText button in the Edit Routes window lets you include location information along with each waypoint name on the map. This AutoText works the same way as Marker AutoText, described on page 74.

Editing Waypoints
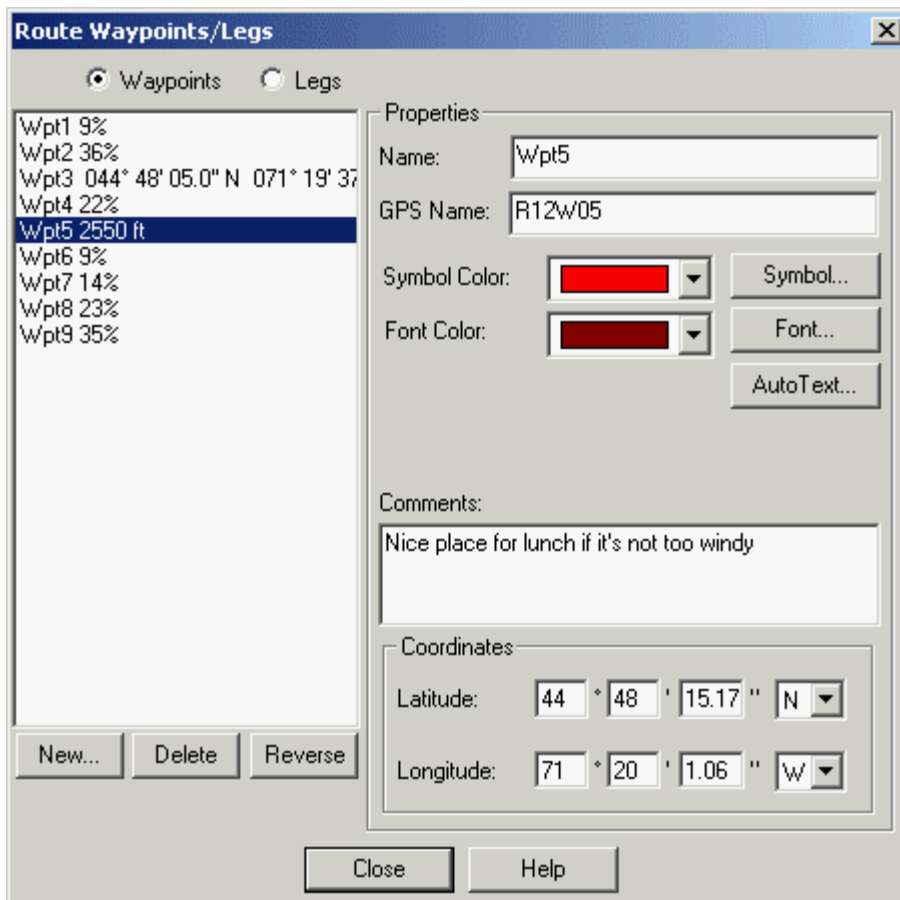
While the Edit Routes window lets you apply settings to a route as a whole, the Edit Waypoints window lets you modify individual waypoints.

To open the Edit Waypoints window, right-click on any waypoint and choose **Edit Route Waypoints**. Ensure that **Waypoints** is selected at the top of the window. (Another way to get to this window is to click **Layers > Routes**, highlight the route you want to work with, and press the **Edit** button).

On the left side of the window is a list of all waypoints in this route. Highlight the waypoint you want to edit.

General Characteristics

Full Name: The full name of the waypoint, as it appears on the map.
GPS Name: The GPS Name is the name that will appear on your GPS screen when you send this route to your GPS. To accommodate the widest range of GPS units, many of which use a limited number of characters for route names, the GPS Name is limited to six characters.
Symbol, Font, Colors: Several symbols are available for marking this location on the map. 16 colors are available for symbols. In addition, a **Background Color** option is provided so that you can set an opaque background behind the waypoint name text on the map. (This may make the waypoint names easier to read.)
Comments: A space provided for you to record notes about this location.
Coordinates: The coordinates of this waypoint. You may type new coordinates if you like. The coordinate format setting is found in General Preferences.

AutoText

AutoText is location information that you may include along with the waypoint name on the map. The AutoText will automatically update itself if the waypoint is moved. You may choose to include **Coordinates, Street Address, Elevation,** or **Grade**.

While the Route Edit window lets you select AutoText to appear with ALL waypoints in a route, here in the Waypoint Edit window, you can assign different AutoText values to individual waypoints. Individual waypoint AutoText works the same way as Label AutoText—see page 46 for details.

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Delete

Deletes the highlighted waypoint.

Reverse

Reverses the order of waypoints, so that the last waypoint will be first in the sequence. This is useful for returning to your starting point. If your GPS unit doesn't have a Reverse Route feature, you can reverse your routes here and send them to your GPS.

Adding a New Waypoint

In the Edit Route Waypoints window, press **New** to add a waypoint to the END of your route.

Why use this method?

♦ To add an existing marker as a waypoint in your route, or
♦ To add a new waypoint at specific coordinates.

If you want to insert new waypoints in the middle of your route instead of at the end, you can simply add new waypoints by clicking on the map—see page 77. If you want to insert an existing marker into the middle of your route, you can do this by adding a new route leg—see page 83.

Adding an Existing Marker as a New Waypoint

To take a marker that's already present on the map, and add it as a waypoint at the END of your route, click the drop-down arrow next to the **Name** blank. This will present a list of all your markers. Choose the one you want to add to your route.

Creating a New Waypoint by Typing Coordinates

To create a new waypoint completely from scratch, fill in all the blanks in this window, including coordinates.

Changing Symbol/Color

To edit the symbol and/or color for this new waypoint, press **OK** to return to the Edit Waypoints window.

Editing Route Legs
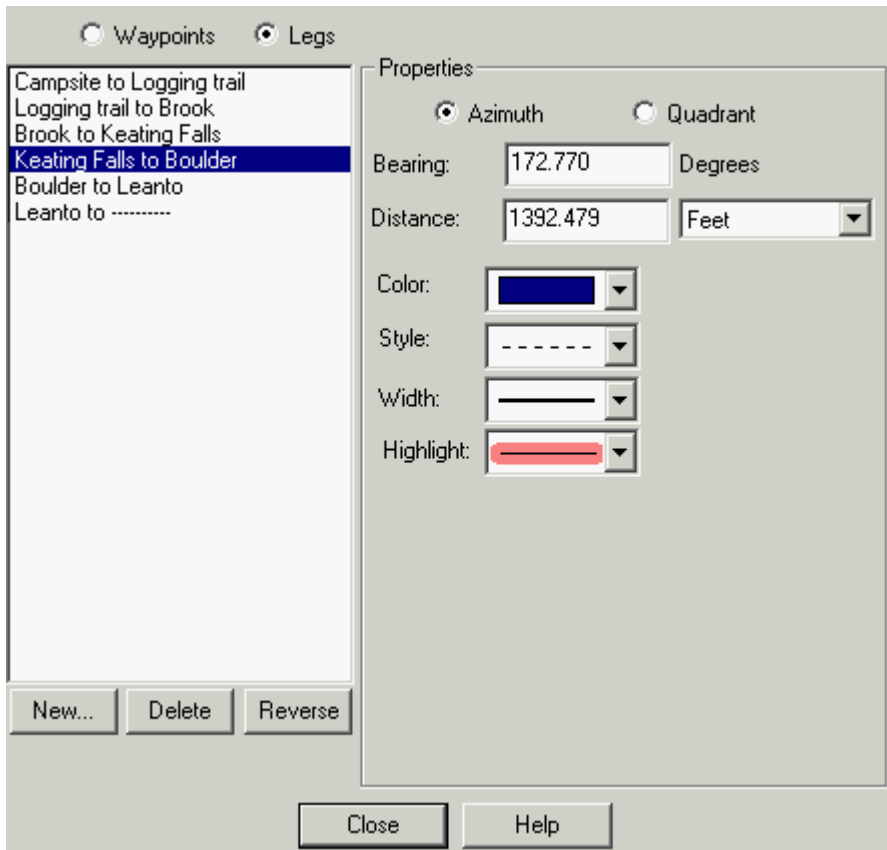
In addition to editing individual waypoints, you may also edit the legs, or segments, of a route. A route leg is the segment between two waypoints.

In the Route Edit window, highlight a route and press **Edit**, then at the top of the window, select **Legs**. This window tells you the distance and bearing from each waypoint to the next. Highlight a route leg in the list at left to view or edit its characteristics.

Bearing: The direction of this leg. At the top of the window, you can select **Azimuth** (the default setting) to assign directions from 0 to 360 degrees, or **Quadrant** to assign directions based on Public Land Survey System (PLSS) quadrants. (To specify whether your bearings should be measured from Magnetic North or True North, click **File > Preferences > General**.)

Distance: The length of this leg. (To change the units of measurement, click **File > Preferences > General**.)

Color: Sixteen colors are available. If you wish, you may specify a different color for each leg of your route.

Style: Choose from a variety of dotted, dashed, or solid lines. You may also opt to use a symbol—the symbol will be placed at intervals along the route line.

Width: Width of the route line.

Highlight: If you like, you may apply highlighting to the route leg. Choose from nine colors.

Delete: Deletes the highlighted leg. The previous leg will bridge the gap created by this removal.

Reverse: Reverses the order of waypoints and legs, from last to first. This is useful for making the return trip of this route and coming back to the starting point.

For a printed copy of the distance and bearing between waypoints, print the map containing this route and check the **Layers** checkbox in the Print window. This will print additional page(s) with your route data. (See page 93 for more about printing.)

Adding a New Route Leg

In the Edit Route Legs window, the **New** button lets you add a new route leg. This is accomplished by adding a new waypoint, at the range and bearing that you specify. (To get to the New Route Leg window, right-click on the route and choose **Edit Route Waypoints**, select the Legs button at the top of the window, then in the Edit Route Legs window, press the **New** button.)

First, highlight the leg where you want to insert the new waypoint (thereby creating a new leg). Then press **New**.

Reference Waypoint
Your new waypoint will be placed in reference to this existing waypoint. The reference waypoint is the waypoint that was highlighted in the Waypoint List (in the previous window). To change the reference waypoint, press **Cancel** to return to the Route Waypoints window, then highlight another waypoint to use as a reference point, and press the New button again to start over.

Insert Before/After
Choose where your new waypoint should be inserted in the route: before or after the reference waypoint.

Distance/Bearing From/To
Specify whether the new location is measured from the reference waypoint, or to it. Then, enter the bearing and distance in the blanks at the bottom of the window. You can specify bearings using azimuth measurements, or PLSS quadrants: make this selection in the Edit Route Legs window (page 82)before you press the **New** route leg button. (Be sure you have set Terrain Navigator Pro to use your preference of Magnetic or True North—this setting is found in General Preferences.)

Example:
If you want to place the new waypoint 800 feet due east of the reference waypoint, you could specify a Bearing of 90 degrees (True) FROM the reference waypoint, and specify 800 feet for Distance. On a north-up map (such as most USGS topos), this would position the new waypoint to the right (east) of the reference waypoint. The same result could be obtained by specifying a bearing of 270 degrees TO the reference waypoint.

Creating a Route from a Track/Distance Line

The easiest way to follow a path of travel with a GPS unit is to create a route. If you have a path,

marked by a track or a distance line, that you'd like to follow with your GPS, Terrain Navigator Pro can convert it into a route for you.

With this feature, you can trace a trail by hand in Terrain Navigator Pro (or transfer a track log from your GPS after a day of hiking), and easily convert the trail into a route that you can use with your GPS, to follow the same trail. (A GPS track log can show where you have been, but you need a route in order to follow a trail with a GPS.)

Right-click on the track or distance line and choose **Create Route**. Several automated methods are available:
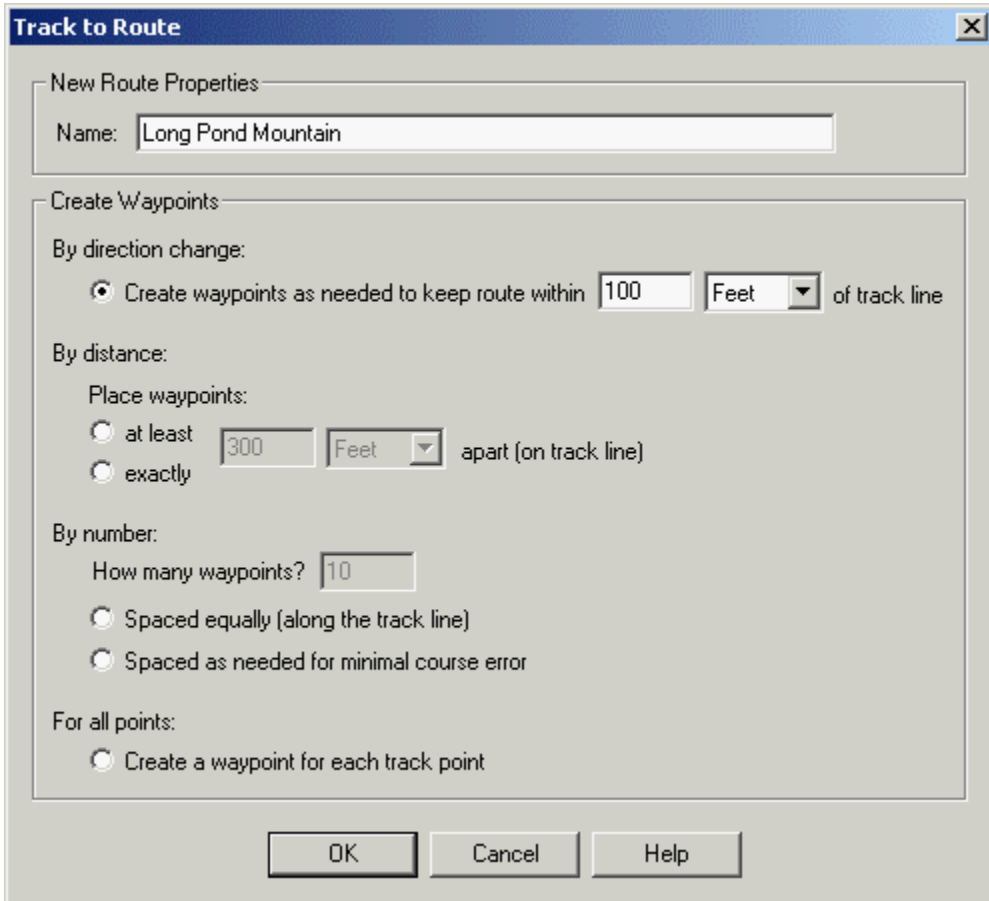
Creating Waypoints by Direction Change

Lets you specify what level of accuracy you require. Terrain Navigator Pro will create as many waypoints as necessary, at whatever locations work best to keep the route in line with the path, within the bounds you specified.

Obviously, the smaller the error you allow, the more waypoints Terrain Navigator Pro will create for your route.

Creating Waypoints by Distance

At least X feet apart

Wherever possible, the legs of the new route will be least this long. For straight stretches, waypoints may be placed farther apart.

Exactly X feet apart

Terrain Navigator Pro will place the waypoints at this regular interval along the track/distance line.
It is important to remember that in calculating the equal spacing intervals, Terrain Navigator Pro is working from the track/distance line. Due to curves in the track/distance line, waypoints may be closer together than the distance you specified. For example:
Suppose you request that waypoints be placed exactly 200 feet apart. Terrain Navigator Pro follows your path and places a waypoint every 200 feet. Between two waypoints there is a hairpin turn. When the path is removed from view and only the route is shown, you'll see that the two waypoints are closer together than the distance you specified. In such a case, you may wish to create a different route, using a different method (like Direction Change—see above).
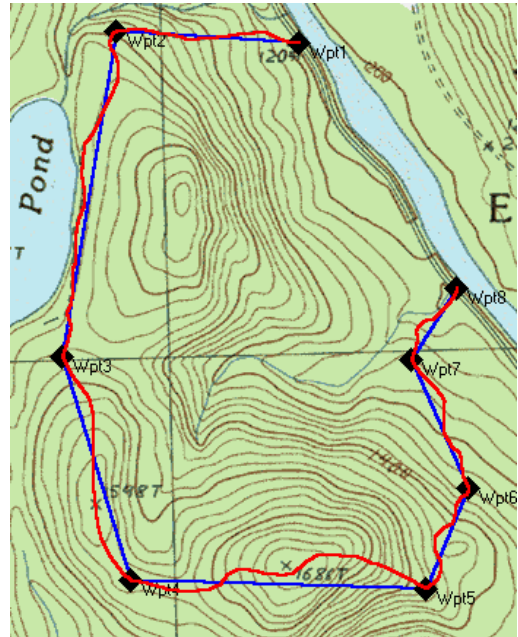
Creating Waypoints by Number

Spaced equally

As when creating waypoints by distance (see above), you should keep in mind that Terrain Navigator Pro is gauging distance by the track/distance line, and that the resulting route legs may not be of equal length.

Spaced as needed

Terrain Navigator Pro will place the requested number of waypoints at whatever locations best follow the path of the track/distance line.

Notes:

♦ You can generate as many routes as you like from a single track/distance line.
♦ The original track/distance line is NOT deleted.
♦ When creating waypoints by distance, the final leg may be shorter than requested, (unless the total path length happens to be exactly divisible by *X* feet).

Route Preferences

Click **File > Preferences > Routes** to adjust the default settings that Terrain Navigator Pro will use for any new routes you create.

Default Names

You can set Default Names for Terrain Navigator Pro to use for all your route names and/or waypoint names. Select **Text** to assign a specific default name ("Rte" and "Wpt" are suggested). Alternatively, you can choose **Date** or **Time** and the route/waypoint names will automatically start with the date/time of their creation. To include sequential numbering at the end of your waypoint default names, select **Text #, Date #,** or **Time#**.

You can also opt to include AutoText in all waypoint names. This setting will apply to all waypoints in any new routes you create. You can choose to **Append** the AutoText (add it to the end of each waypoint name) or **Prepend** it (add it to the beginning of each waypoint name).

AutoText

AutoText is location data that you may include on the map with your waypoint names. AutoText is so called because it will automatically update itself if the waypoint is moved. You may choose **Coordinates, Elevation, Grade,** or **Street Address**.

To add AutoText *before* the waypoint name, choose **Prepend**. To add the AutoText *after* waypoint name, choose **Append**. Waypoint AutoText is much like Marker AutoText (see page 74).

Reset Numbering

Waypoints are automatically numbered, to ensure that all waypoint names are unique. This prevents confusion, especially when transferring routes to a GPS. If you like, you can **Reset** the numbering to start again at 1, but keep in mind that this may result in duplicate waypoint names. For example, if you already have a "Wpt4," and you reset waypoint numbering, you could end up with two waypoints named "Wpt4." This may be especially confusing if viewing waypoint names without noting their route affiliation.

Create Locked

You can lock individual routes in place on the map, by right-clicking any waypoint and choosing Lock Route. Locking prevents accidental moving of waypoints. Check the **Create Locked** checkbox here, and all your routes will automatically be locked upon creation. (You can still unlock them individually, by right-clicking any waypoint and choosing **Unlock Route**.)

Line

Color: Sixteen colors are available.
Style: Choose from a variety of dotted, dashed, or solid lines. You may also opt to use a **symbol**. The symbol will be placed at intervals along route lines.
Width: Width of the route line.
Highlight: If you like, you may apply highlighting to your route lines. Choose from nine colors.

Font, Waypoint Symbol

Choose a symbol, a font style/size, and a color for each.

Loop Interior

When a route is looped, the enclosure that it forms will be filled with the pattern and color that you specify here.

Tracks

Tracks

The Track Tool lets you create lines, or tracks, on the map. Tracks are saved for future reference and may be included on printed maps.

Creating a Track

To create a track by hand, select the Track Tool button on the toolbar. Click where you want to start the track, and continue to click to add track segments. You can also drag the cursor (holding the left mouse button down) to create a curved line.

♦ *To back up and erase the last portion that you drew,* press the **Backspace** button or the **Delete** button on your keyboard. (You might have to press the key several times, or hold it down, to see results.)
♦ *To temporarily switch to the Drag tool,* hold down the **Control** key.

When you have finished creating your track and want to save it on the map, click the **Finish Track** button to the right of the elevation display on the toolbar. (You can also save a track by pressing the Track Tool button again, or by right-clicking on the track line and choosing **Finish Track**.)

Note: Once finished, the path of the track cannot be modified. You can change the line's color, and you can append to an existing track line using the Distance Tool (see page 90), but the shape of the track cannot be changed.

Looping a Track

To join the end of your track to the beginning, right-click on the track and choose **Toggle Loop**. If you wish, you can fill the interior with a pattern and color of your choice: right-click on the track and choose Edit, then make your selections under **Loop Interior**.

Finding Length and Area

Right-click on a track line and choose **Information**. The Track Information window gives the track's exact length and the option to view an elevation profile. If the track forms an enclosure, Track Information will also give the exact area of the enclosure.

Editing Tracks
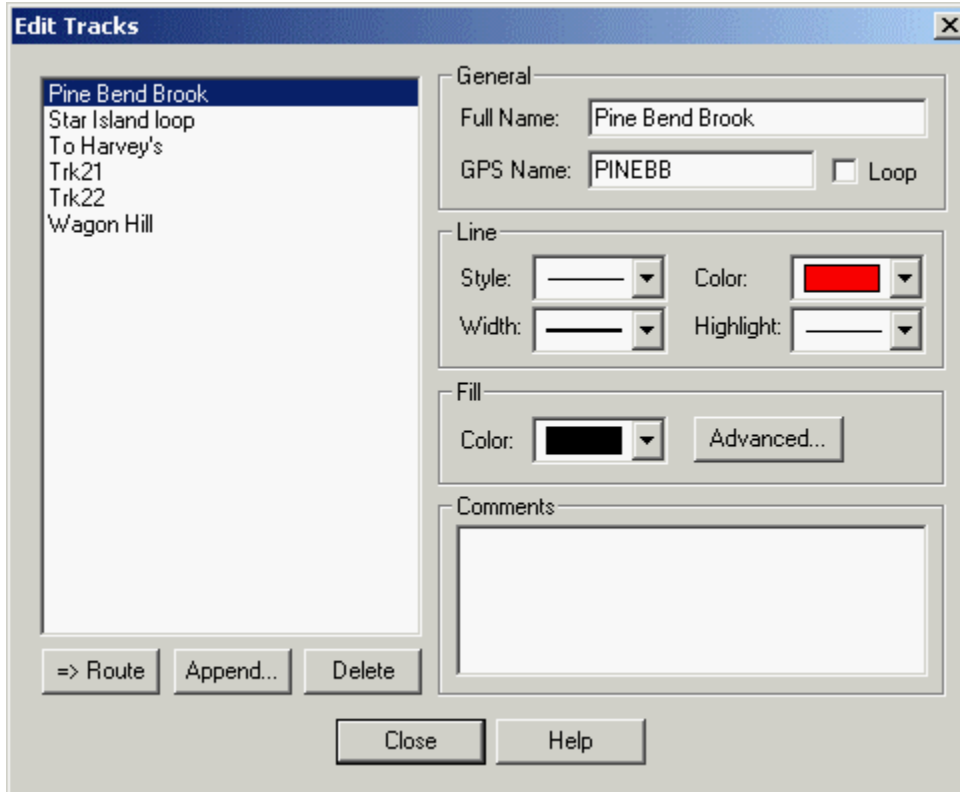
Click **Layers > Tracks** to view a list of all your tracks. Highlight a track to view and edit its characteristics.

Full Name/GPS Name

The GPS Name is automatically created from the Full Name. The GPS Name is limited to six characters, since most GPS units have a limited number of characters available for track log names.

Loop, Fill
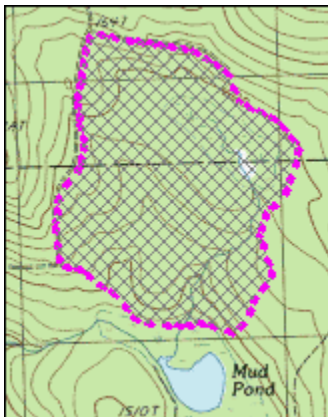
Loop: Check here to join the end of the track to the beginning, forming an enclosure.

Fill: If looped, the track's enclosure can be filled with a Pattern and Color of your choice. Press the **Advanced** button to modify the pattern. For details, see Fill Options (page 79).

Line

Choose a line **style** (dotted, dashed, or symbols spaced at regular intervals), line **color**, and line **width**. If you like, you can **highlight** your track line in one of nine colors.

Comments

Space is provided for notes about this track.

Appending Tracks

To join one track to another, highlight a track and press **Append**, then select the track you'd like to merge it with. The end of the first track you selected will be joined to the start of the second track. (The first track will be extended to follow the path of the second track. The second track will remain unchanged. So, you will still have two tracks, with the same two names, but the first track will be longer than it was.)

Deleting Tracks

You can also **Delete** the highlighted track. To create a route based on the highlighted track, press the "**= > Route**" button (see next page).

Appending to a Track
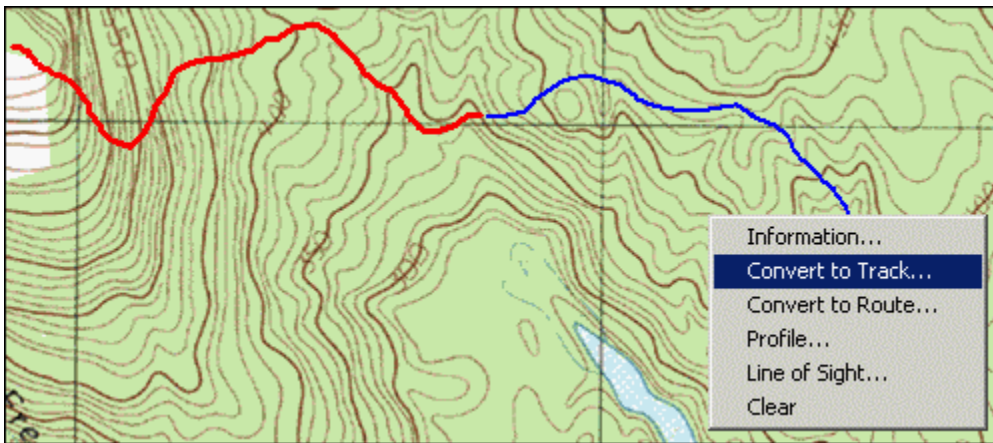
As mentioned above, the shape of a track line cannot be changed once the track is saved on the map. However, you can add on to the END of a track line later, by using the Distance tool.

Select either Distance tool from the toolbar, and draw a Distance line where your track left off. When you are done adding to the line, right-click on the distance line and choose **Convert to Track**. In the window that appears, select **Append**. From the **Name** drop-down list, select the name of this track. (If you don't know the track's name, hold the cursor over the track line and choose **Information**.) Press **OK**. The distance line will be added to the end of your track.

Creating a Route Based on a Track
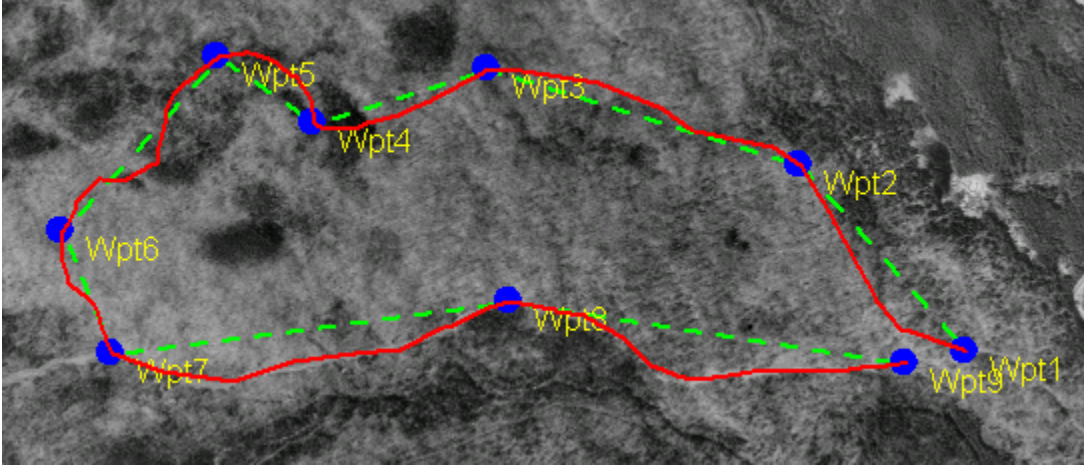
Tracks are great visual tools for showing a trail's location on a map, but if you want something to follow with your GPS, you will need to create a route based on the track. Terrain Navigator Pro provides several options for instantly converting tracks into routes. The track line will remain on the map, plus you'll have a route to follow in the field.

The procedure for creating a route from a track is the same as creating a route from the distance line: see page 83 for instructions.

Track Preferences

Click **File > Preferences > Tracks** to adjust the default settings that Terrain Navigator Pro will use for any new tracks that you create.

Default Name

The Default Name is what Terrain Navigator Pro will automatically fill in for the starting text of your track names. You have three choices.

Text: Lets you assign a standard name prefix in the spaces at right.

When you first start using Terrain Navigator Pro, the Default Name is set to Text, with "Trk" to be used as the prefix for all new tracks. You can change (or remove) this prefix as you wish.

Date, Time: You may choose to automatically start your track names with either Date or Time. (Since Date or Time serves as a prefix, no additional prefix space is available.)

Reset Numbering

Tracks are automatically numbered, to ensure that all track names are unique. If you like, you can **Reset** the numbering to start again at 1, but keep in mind that this may result in duplicate track names. For example, if you already have a "Trk8," and you reset numbering, you could end up with two tracks that are both named "Trk8."

Line

Color: Sixteen colors are available.
Style: Choose from a variety of dotted, dashed, or solid lines. You may also opt to use a symbol. Several symbols are available. The symbol you choose will be placed at intervals along the track line.
Width: Width of the track line.
Highlight: If you like, you may apply highlighting to your rack lines. Choose from nine colors.

Fill

When a track is looped, the enclosure that it forms will be filled with the **Pattern** and **Color** that you specify here.

Printing Maps

Print
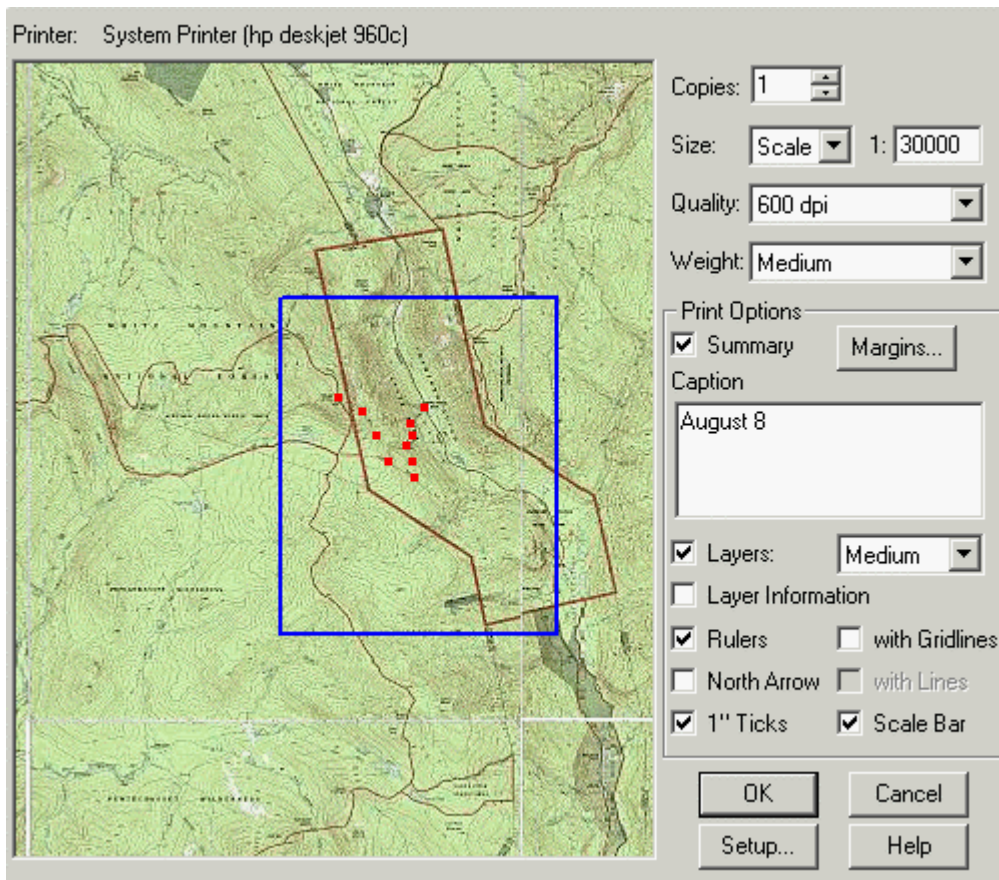
To print some or all of the map you're viewing, click **File > Print** (or press the Print button). When used in Seamless View, the Print command will allow you to include multiple maps in a printout. (The example image above shows the Print window in Seamless View. In Single-Map View, the Print window looks much the same but shows a single map, complete with collar.)

Blue Outline Shows Area to be Printed

On the left side of the Print window is an overview of the map that you're viewing. (If you have two map windows open, the Print dialog shows the map from the active window.) A blue box outlines the area to be printed. This blue outline is centered on the same point that your screen was centered on when you gave the Print command. So, whatever was at the center of your screen will also be at the center of your printout—unless you move the blue outline. You can move the blue outline by dragging it with your cursor.

Copies

The number of copies (pages) to be printed. Each page will be the same.

Size

For Size, you can choose to define a **Scale** or a **Percentage** (%).

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By default, the Size control is set to Percentage. When the Print window appears, the percentage is set to match whatever zoom level you had been using to view the map: 1:1 zoom level corresponds to a 100% size, 1:2 zoom level corresponds to a 50% size, and so on. You can type a specific percentage. When the percentage is increased, a smaller section of the map will be printed, but zoomed in at a larger scale. When the percentage is decreased, a larger area will be printed, but zoomed out at a smaller scale. Scales below 25% or above 1000% are not recognized.

Printing at 100% will produce a map at "actual size:" the same scale as the original paper map (for 1:24,000-series map, 1 inch = 2,000 feet). To include a "1 inch = n feet" note on your printout, check **Summary**.

If you prefer, you may instead set Size to Scale to type a specific scale (such as 1:30,000, as shown here).

When the print size is adjusted, the size of the blue box will change. This is because more (or less) of the map can now fit on the printed page. (Remember, the area indicated by the blue box is the full printed paper. The size of the page does not change; just the amount of map that will be fit onto the paper.)

Quality

Each printer determines its own quality setting. This is usually expressed in DPI (dots per inch), and the higher the number, the better the print quality.

Since printing a full-page graphic can be very taxing on a laser printer's memory, high quality prints may exceed the printer's capabilities. If this occurs, try printing at a low DPI setting or use Quick Print to print a less-than-full-page map.
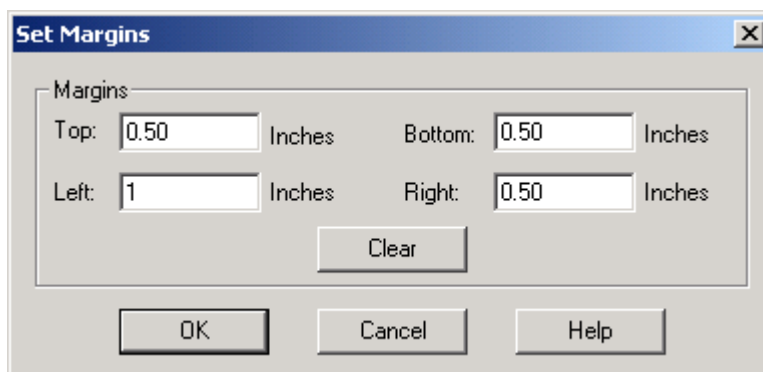
Weight

Set the ink density (or *weight*) to Light, Medium, or Dark. Depending on the printer and paper, changing the weight may result in better-looking prints. Some experimentation with your printer will determine the most effective weight setting.

Summary

When Summary is checked, the bottom portion of the page will include the USGS map name this was printed from, the date of printing, the scale being printed (1-inch = *n* feet), the coordinates of the center of the map, and a caption (if one has been typed).

Margins

Press **Margins** to assign top, bottom, left and right margins to your printout. The margins determine the amount of unprinted space between the edges of the map area and the edges of the paper. Margins are measured in inches. Type the values you want for each edge (press **Clear** to reset all four margins to zero).

Note: With most printers, the printed page cannot be filled all the way to the paper's edge. This is due to the printer's internal

mechanics. This is why, even if you set all four margins to zero, the resulting printout may still have a thin frame of unprinted area around the map image. Any margin widths that you set here in the Set Margins window will be applied in addition to this thin unprinted area. Experiment to determine what settings will produce the desired printed results.

Caption

Type a few comments here, and check **Summary** to include them in your printout.

Layers, Layer Information

Check here to include layers (markers, routes, tracks, range rings, etc.) on your printout. Choose Small, Medium or Large to control the printed size of the layers' symbols. Check **Layer Information** and a separate sheet will be printed after your map, containing data about any layers included in the printout.

This will include any layers that are visible (on the map image itself, NOT the map overview here in the Print window). Only markers, waypoints and other symbol-based layers will show up in the Print overview. Despite being visible in the Overview, they will only be included in your printout if you check the Layers checkbox.

Rulers/Gridlines

Checking **Print Rulers** to include coordinate rulers along the borders of the printed map. (The coordinate system may be specified General Preferences.) If you also check **With Gridlines**, the intervals specified by your rulers will be joined by gridlines across the map printout.

Note: The Print Rulers/Gridlines option is unavailable for use with maps whose orientation is different from the standard "North-Up" orientation. (Some such maps are found in coverage for Isle Royale and Shenandoah National Parks.)

North Arrow/Lines

Check **North Arrow** and a small arrow symbol will appear in the bottom left corner of the printout, in a 1½" X 2" rectangle. The arrow indicates True North, with another line at an angle to indicate the location of Magnetic North for the area you're printing. This magnetic declination figure will also be given in degrees. If you also check **With Lines**, additional lines, slanting in the same direction as the magnetic north arrow, will be printed within the 1½ " X 2" rectangle in the corner of the printout. (This is useful for aligning a handheld compass with the printed map.)

Note: The Print North Arrow/Lines option is unavailable for use with maps whose orientation is different from the standard 'North Up' orientation. (Some such maps are found in coverage for Isle Royale and Shenandoah National Parks.)

1" Ticks

Includes small tick marks at one-inch intervals across the map, vertically and horizontally. This is a useful reference for gauging distance, and is especially handy for use with the "1 inch = *n* feet" notation, available by checking Print Summary.

Scale Bar

Check **Scale Bar** to include a 3 1/2-inch rectangular scale bar graphic (similar to the scale bar found on printed USGS topos). The scale bar will be printed in the lower right corner of the page. The units shown will be based on the scale of printout (feet/yards/miles for English units, meters/kilometers for

metric scale). The scale bar will also note the effective scale of the printed map (1:10,000 for example).

Notes:
1. The map image fills the printed page to its maximum extents. If a larger paper size is available, larger areas can be printed. Large-format plotters can be used to print full-size USGS quads, at the same scale as the originals.
2. Some laser printers may have difficulty printing a full map at their highest quality setting. This is because printing a full-page graphic is very taxing on a printer's memory. If this should occur, print at a lesser quality setting, or use Quick Print. If necessary, contact your printer's manufacturer to find out how much memory your particular printer model requires in order to print a full-page graphic.
4. In order to be consistent between 1:24,000- and 1:25,000-series maps, and to ensure that adjacent maps align properly, all 1:25,000-series maps are printed at 1:24,000 scale (when Scale is set to 100%).

Quick Print

Quick Print is a screen print. The Quick Print command prints the exact map area displayed on your computer screen: no more, no less. It is a one-step process.

There are three ways to perform a Quick Print:
1. Press the Quick Print button on the toolbar;
2. Click **File > Quick Print**, or
3. Press <CTRL > Q.

The amount of map area printed during a Quick Print is exactly the area shown on the screen. Since most printers are capable of printing areas larger than the screen is able to display, a Quick Print tends not to fill a printed page. However, increasing your computer's Desktop area (e.g. running at a higher display resolution), will let you view, and therefore Quick Print, a greater map area. For example, if your computer's display resolution is set to 640x480, you might want to try setting it to 1024x768 (or greater).

Increasing your Display Resolution
Depending on your version of Windows, you can find this setting in one of two ways:

1. Click **My Computer > Control Panel > Display**.
   - or-
   Click **Start > Settings > Control Panel > Display**.
   - or -
   Right-click directly on your desktop display and choose **Properties**.
2. Select the **Settings** tab.
3. Drag the lever to increase the **Desktop Area** (or **Screen Area**).
4. Press **Apply**.

Note: The maximum desktop area depends on the capabilities of your monitor and your video card.

Exporting Maps
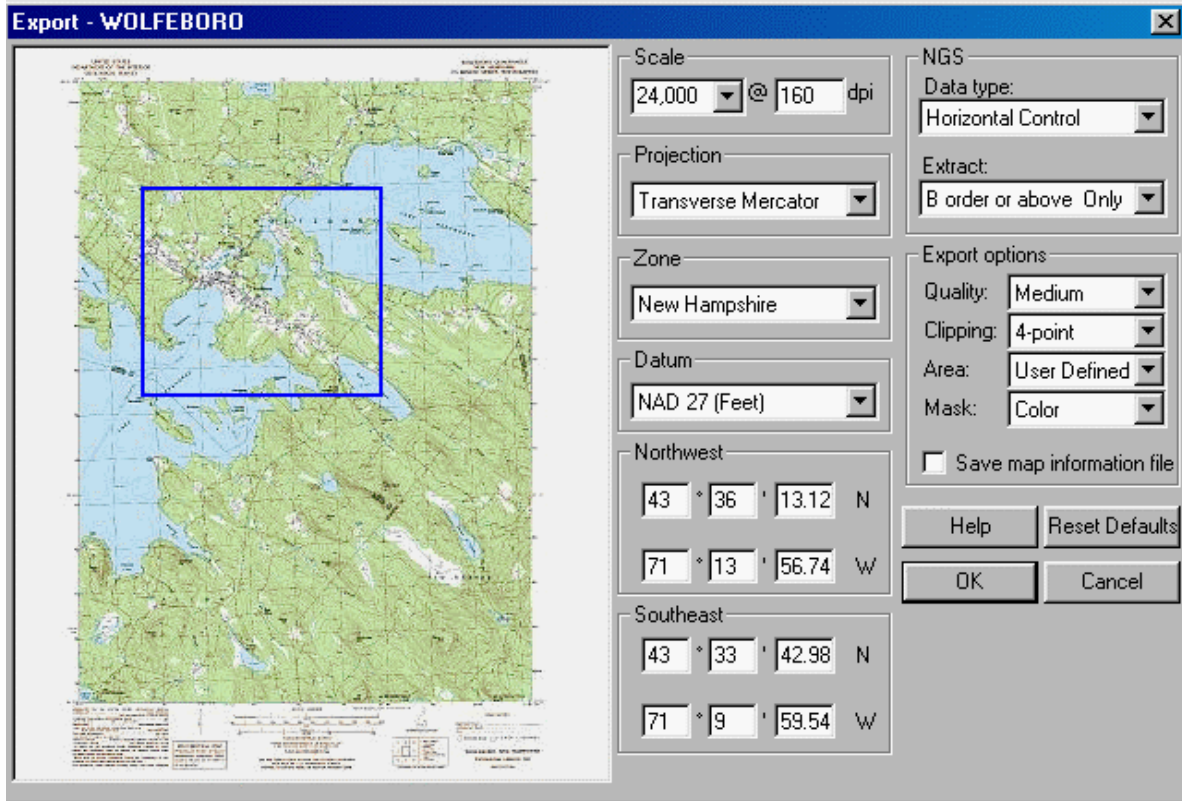
Terrain Navigator Pro lets you export map images for use in other programs, such as GIS (Geographic Information System) applications, desktop publishing, photo imaging, and site presentation. First, open the map that you want to export. Then, click **File > Export > Active Map** to select the area you need, and to specify export options.

Note: Layers are not included on the exported map image. To capture a map image with layers present, click **File > Export > Copy to Clipboard**.

Scale and dpi

The scale and dpi that you specify here will affect the appearance of this exported image. **Scale** refers to how big the map image should be, while **dpi** sets how many pixels should occupy one inch at that scale.

Optimal dpi is 160

Terrain Navigator Pro's map images are presented at 160 dpi. If a dpi higher than 160 is specified, Terrain Navigator Pro will replicate pixels as necessary. The actual resolution of the image will be unaffected. When exporting images at the same scale as the map from which they were taken, but with a dpi higher than 160, the image size in pixels will be increased but the image size in inches will not be affected. *Therefore, it is most efficient to export at 160 dpi, unless you have a specific reason to change this setting.*

Tip: When exporting images for rejoining in another application, always export at a consistent scale

and dpi, to ensure that the images will align properly with each other.

Projection

There are six options for reprojecting exported map images:

Transverse Mercator
Lambert Conformal Conic
Rectify: Due to the curvature of the Earth's surface, the image width of one arc second as depicted on a map (on paper, or in pixels) may vary. This often results in maps whose corners are not 90-degree angles (for example, in the Northern Hemisphere, a map is wider at the bottom than at the top). Checking Rectify will reproduce the terrain so that each pixel of the map image has the same ground distance value. Note: When Rectify is selected: instead of specifying a dpi, you will be prompted to assign the export image's width and height in pixels.
Copy: Checking this box will take the map image as it is presented within Terrain Navigator Pro and export this image exactly, using the same parameters (projection, dpi, scale, etc.). This exported image may be saved as either a Windows BMP or TIF file, and will not retain georeferencing. (Since Copy's export specifications are automatically set, all other fields in this dialog will be grayed out when Copy is selected.)
Universal Transverse Mercator
State Plane: Specify State Plane in this Projection window for access to available choices, which will appear in the Zone window.

Zone

Select from this list of available projection parameters. These will vary depending on what projection has been chosen.

Datum

Select a datum to use in creating this exported image. (For Transverse Mercator, Lambert Conformal Conic, and State Plane, you may specify Feet or Meters.)

NAD27: North American Datum of 1927
NAD83: North American Datum of 1983
WGS84: World Geodetic System of 1984

Northwest Corner

The coordinates of the northwest corner of the map area to be exported. Enter specific coordinates if you like. (This option will appear grayed out unless User-Defined Area has been chosen.)

Southeast Corner

The coordinates of the southeast corner of the map area to be exported. Enter specific coordinates if you like. (This option will appear grayed-out unless User-Defined Area has been chosen.)

NGS (National Geodetic Survey)

If you would like to create a file containing National Geodetic Survey data pertaining to the exported map, specify **Data Type** here. The optional settings under **Extract** filter the data to be included in the NGS data file.

Quality

Three settings are provided for adjusting the quality of the reprojection: **low, medium,** and **high**.

When speed is more important than precise detail, low or medium quality settings are useful for faster export.

Clipping

Original view of map area to be exported.

Two-Point Clipping: The dotted line shows the resulting area of an export done with two-point clipping (at the NW and SE corners of the original map area). Reprojection often produces a rotated image (rotation is emphasized here for demonstrative purposes).

Four-Point Clipping: The resulting area of four-point clipping export. Because of necessary rotation when reprojecting the map image, the X-value of the NW corner of the exported image may differ from the X-value of the original's NW corner.

♦ When projecting into UTM, you may wish to consider using two-point clipping.
♦ Exports produced by four-point clipping are easier to seam together, as two-point clipping may clip off a desired portion of the map image.

Area

Three options are available for determining the map area to export:
Entire Map: Check this to export the entire map image, including collar (white border) with map and legend information.
No Collar: Check this to export the map's entire terrain coverage only (without the map collar).
User Defined: Checking here will let you precisely delineate the boundaries of the map area you wish to export.

Mask

When a map is reprojected, the image is shifted. In order to maintain rectangular dimensions, non-map data (for example, portions of the white map collar) may be included along the edges or corners of the exported image. You can choose to mask, or replace, this non-map data in two ways:

Color: This will replace non-map areas with a magenta color. This color was selected because it is not used in any USGS topographic map, and therefore may safely be deleted in imaging programs without damaging the map image. (The specifications for this color are Red 255, Green 0, Blue 255. In ArcView, it is called Color #253.)
Adjacent Map: Areas not occupied by the selected map image will be filled with map data from the adjacent quad(s). Areas not occupied by the selected map image will be filled with map data from the adjacent quad(s). (If the map you're exporting happens to be on the border of a CD's coverage area, you may want to copy adjacent maps from the bordering CD to your hard drive before exporting the desired map. This will ensure that all adjacent maps are available for use in masking.)
None: If you do not require masking, simply choose **None**. As mentioned above, the resulting image may include non-map data.

Save Map Information File

Check this box to create a text file with data specific to the exported image (including chosen projection, zone, datum, etc.). This file will be saved with the image.

Export DEM, Export BIL

These options allow you to export the elevation data in DEM or BIL format. DEM format is the USGS elevation format standard, and may be used in GIS applications. BIL (Band Interleaf by Line) is another elevation format used in GIS. When choosing BIL format, the resulting exported data will include (in addition to the .BIL file) a projection file (.PRJ), a header file (.HDR) and a statistics file (.STX).

Reset Defaults

Terrain Navigator Pro automatically sets the options in this window to whatever parameters appear most likely, in accordance with the characteristics of the selected map area. You can, of course, change these selections. If you decide you want to cancel your selections and return to the original default settings, press **Reset Defaults**.

Terrain Navigator Pro supports the export of images in a variety of TIF file formats, as well as BMP format (see graphic below). These options are dynamic, and will change depending on what projection method is chosen for an exported image.

In addition to single-map export, Terrain Navigator Pro also provides a batch export feature, letting you export multiple maps at once.

Available File Formats

When you have selected your export options, press **OK** to specify where you would like to save the exported map, and to specify a file type.

TIF – ArcView (TFW): For use with *ArcView* GIS software. This file format creates a TFW (World File) that retains georeferencing information, so that it can be translated from one application to another.

TIF – MapInfo (TAB): For use with *MapInfo* GIS software. This file format creates a TAB file that retains georeferencing information, so that it can be translated from one application to another.

TIF – GeoTIFF (Geographic): This TIFF (Tagged Information File Format) file retains georeferencing information within the GeoTIFF image file itself. Coordinate information is stored in a geographic system (latitude/longitude).

TIF – GeoTIFF (Projected): This TIFF (Tagged Information File Format) file retains georeferencing information within the GeoTIFF image file itself. Coordinate information is stored in a projected system (e.g., meters or feet). **Note:** This option is not available when Rectify is selected as the projection method.

TIF – TIFF 6.0: Nearly identical to the older TIFF 4.0, but able to include more application-specific data along with the image. This format will not retain georeferencing information.

TIF – DRG (FGD): The TIF DRG format creates an FGD metadata information file (similar to those included with USGS Digital Raster Graphic maps). This file format may be imported into applications that support DRGs. **Note:** Because USGS DRGs are always in Universal Transverse Mercator projection, the TIF DRG option is only available when projecting into UTM.

TIF – TIFF 4.0: An early version of the TIFF, this format is read by the vast majority of imaging programs. This format will not retain georeferencing information.

BMP – Windows Bitmap Format: The standard image file for Windows environments. This format will not retain georeferencing information.

JPG – JPEG Format (JGW): For use with ESRI products, such as ArcPAD.

HTM – HTML Format: Produces a georeferenced map, saved as an HTML page. You can insert this page directly into your own website.

HTML Map Export
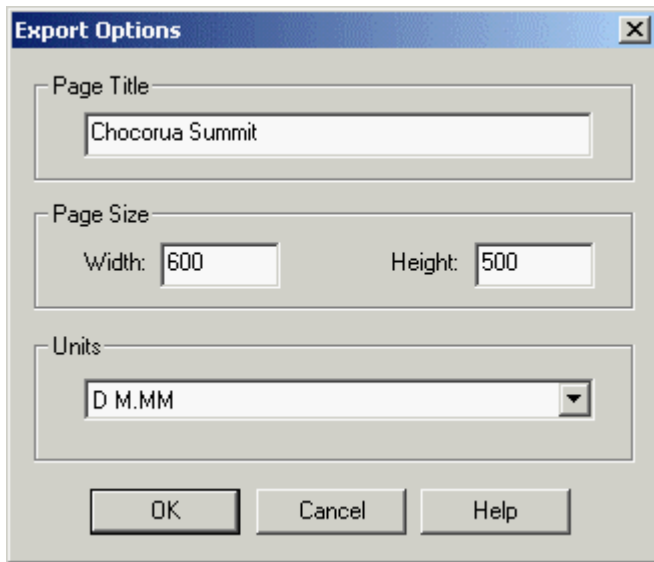
When you export a map, you may choose to save the exported image as an HTML page. This produces a single .HTM file ready for inclusion on websites. The HTML page will show the georeferenced map image, with scroll bars so site visitors can adjust the map view and look around.

When you specify .HTM as your desired export format, you will see an additional Export Options window (above).

Page Title: The text you type here will be displayed beneath the map image.

Page Size: The dimensions, in pixels, of the window where the map image will be displayed. If necessary, scroll bars will be provided so users can bring other portions of the map into view.

Units: Determines the georeferencing information. These options will vary, depending on what projection settings you specified in the Export Map window. If you chose to Rectify the map image, you will be prompted to choose a coordinate system (DMS, D M.MM, D.DDDD). For all other reprojection methods, you may choose Feet or Meters, in which Northing and Easting measurements will be presented. In all cases, you may also choose **User Option**, which will place a control on the web page, letting the site user select his preferred measurement units. You may also choose **None**, which will result in a non-georeferenced map image.

Note: Layers will not be included in the exported image.

Multiple-Map Export

In addition to single-map export, Terrain Navigator Pro also provides multiple map export, which lets you apply the same settings to multiple maps and export them all with a single command. Click **File > Export > Multiple Maps**.

Copy Map to Clipboard

Click **File > Export > Copy to Clipboard** to take the map area that you're viewing and place it on the Windows Clipboard. This image can then be pasted into most other Windows applications, by selecting **Paste** from the application's Edit menu.

Copying to the clipboard is especially useful when you wish to use map images in a program that does not support the image formats available for exporting maps. And unlike an exported map, the map image copied to the clipboard will include any layers presently visible.

Sending Maps to PDA for use in ESRI ArcPad

Terrain Navigator Pro can supply maps for use in ArcPad, a mobile GIS mapping program developed by ESRI that may be run on a handheld computer (PDA). If you own a PDA running Microsoft's PocketPC operating system (2002 or later), equipped with ArcPad 6.0.1 or higher, you can send maps from Terrain Navigator Pro to your PDA for use in the field. Terrain Navigator Pro can also provide additional data, including NGS data sheets and elevation data.

For information on ArcPad, visit www.esri.com. For details on using Terrain Navigator Pro maps in ArcPad, see the Downloads page at www.maptech.com for a downloadable guide in Adobe® PDF format.

Future Updates May Add More PDA Options

Terrain Navigator Pro version 6.04 introduces the PDA interface for ArcPad use only. Future versions of Terrain Navigator Pro may extend the PDA interface to other PDA applications, including programs developed by Maptech. In addition, you may have noted that Terrain Navigator Pro's PDA menu contains options to send and receive marks, waypoints and routes. These options, while unavailable in version 6.04, may be activated in future software updates. Please visit www.maptech.com for the latest news and software updates.

PDA Setup
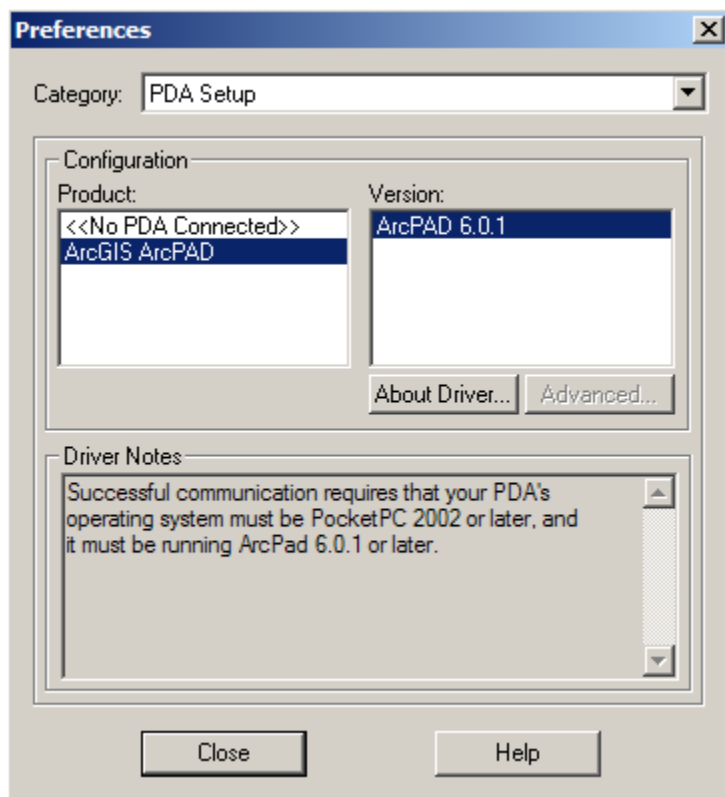
To configure Terrain Navigator Pro for use with your PDA, click **PDA > Setup** (or **File > Preferences >PDA Setup**). Under **Product**, select **ArcGIS ArcPad**. Under **Version**, make sure your version of ArcPad is highlighted. Press **Close** when finished.

Notes:

- Communication between your desktop computer and your PocketPC handheld requires Microsoft® ActiveSync® software. The software is free and may be downloaded from www.microsoft.com. Before using Terrain Navigator Pro's PDA menu, make sure that your ActiveSync connection is valid, allowing your desktop PC to communicate with your mobile device.
- For information on ArcPad, visit www.esri.com. For details on using Terrain Navigator Pro maps in ArcPad, see the Downloads page at www.maptech.com for a downloadable guide in AdobeÒ PDF format.

Sending the Active Map to PDA
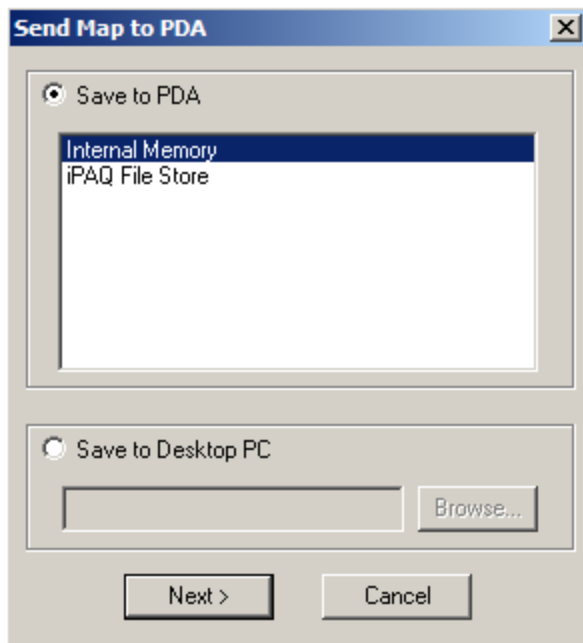
To send the active map to your PDA for use in ESRI's ArcPad program, click **PDA > Send to PDA > Send Active Map**.

You will be prompted for a location to save the map. **Save to PDA** is preselected, with all available PDA storage locations listed: highlight the location where you want to save the map. If you prefer, you may save the map to a location on your desktop PC instead, and transfer the map to your PDA at a later time: select **Save to Desktop PC** and press **Browse** to specify the folder where you want to store the map. Press **Next**.

The next window offers you the option of including additional data along with the map image. Check any additional data that you would like, and press **Next**. The map, along with any additional data you selected, will be saved in the location that you specified.
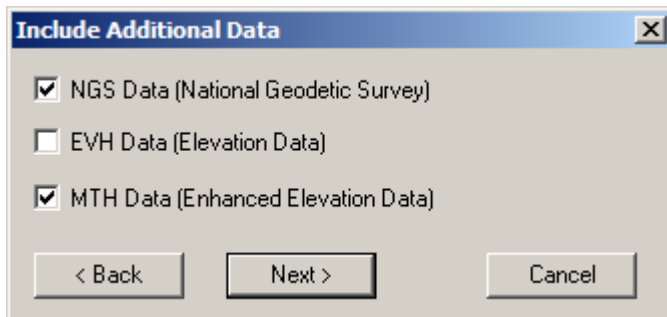
Note: For information on ArcPad, visit www.esri.com. For details on using Terrain Navigator Pro maps in ArcPad, see the Downloads page at www.maptech.com for a downloadable guide in Adobe® PDF format.

You may also send multiple maps at once.

Sending Multiple Maps to PDA

To select multiple maps to send to your PDA, click **PDA > Send to PDA > Send Maps**. The process is the same as sending just the active map (described above), except that after you have specified a save-to location and selected any additional data required, you may then select the map titles you want to send.
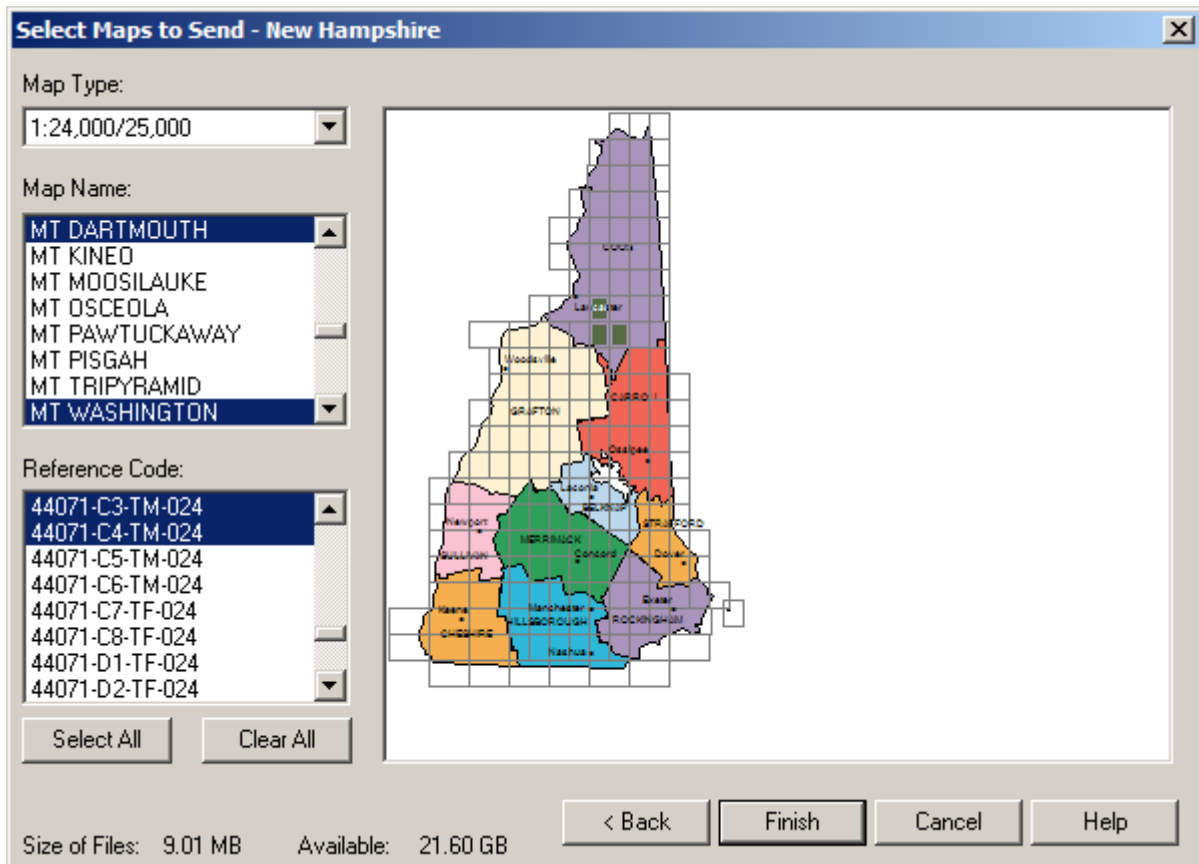
The final window shows an overview of the available area, with a superimposed map grid. Select the maps you want to send. You can click directly on squares in the map grid, or select maps from the **Map Name** or **Reference Code** lists. As each map is selected, it is highlighted in the lists and the grid. At the bottom of the window, you can see how much space the selected maps will require, and how much space is available. Click again on any map to deselect it. **Select All/Clear All** buttons are provided to make the selection process faster.

Selecting Different Scales/Aerial Photos

Use the **Map Type** dropdown menu at the top of the window to specify the map scale that you want. *For aerial photos, set Map Type to 1:12,000.*

When you have made your selections, press **Finish**. The maps, along with any additional data you selected, will be saved in the location that you specified.

Notes:
For information on ArcPad, visit www.esri.com. For details on using Terrain Navigator Pro maps in ArcPad, see the Downloads page at www.maptech.com for a downloadable guide in Adobe® PDF format.
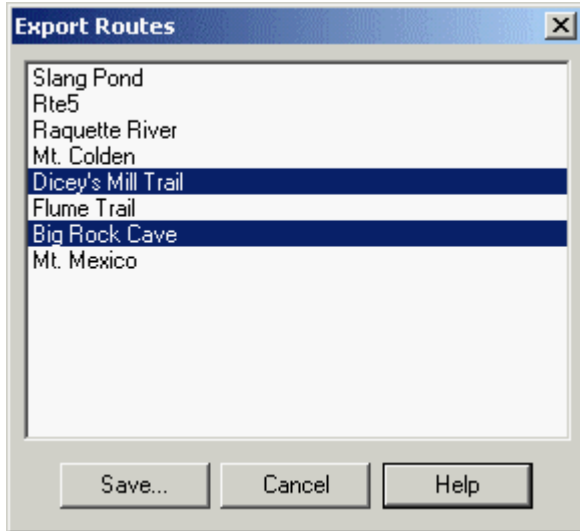
Importing/Exporting Data in Text File Format

Routes

Exporting Routes

Export Routes

Slang Pond
Rte5
Raquette River
Mt. Colden
Dicey's Mill Trail
Flume Trail
Big Rock Cave
Mt. Mexico

Save...   Cancel   Help

You can export selected routes and save them in text file format elsewhere on your computer system. This is handy for sharing your routes with other users of Maptech software, for keeping backup copies of your data, and for using your data in other applications.

To export routes, click **File > Export > Routes**. Terrain Navigator Pro will display a list of all your routes. Highlight the route(s) you want to export. You can select as many as you want (use your Control and Shift keys to highlight multiple routes). When you have made your selections, press **Save**.

The next window will prompt you to name the file(s) containing your exported routes, specify the directory location where you want to save your routes, and choose an export format.

Available Formats
RXF: Maptech's proprietary file format for route import/export. RXF files may be shared among users of Maptech products. A single .RXF file will contain all the routes you have selected for this export. See Route Text File Format (.RXF) for complete details (page 106).
SHP: ESRI's "Shapefile" format, for use in a variety of GIS products supporting this format. Exporting data in this format will result in multiple files. For details, see ESRI Shapefile Format (page 113).
GEN: UnGenerate file format, for use with ESRI ARC/INFO.
GPX: An XML-based format used by some websites for coordinate sharing.

♦   Your routes will be retained in Terrain Navigator Pro. Exporting routes does not delete them from Terrain Navigator Pro. It simply creates another version of your route data, in a text file format.
♦   You can share your RXF data with other Maptech software users. To import routes into Terrain Navigator Pro, just click **File > Import > Routes** and browse to the location of the RXF file. The imported routes will be added to your route list and will appear on the maps.
♦   Routes exported from Terrain Navigator Pro may be imported into various Maptech programs, including Terrain Navigator Pro (recreational version), Terrain Navigator Pro for GIS/CAD, Offshore Navigator (marine navigation software), Chart Navigator (marine software for trip-planning), and Pocket Navigator (for use on Windows PocketPC devices).
♦   Terrain Navigator Pro can import RXF files from any previous version of any of the Terrain Navigator Pro family of programs.

Importing Routes
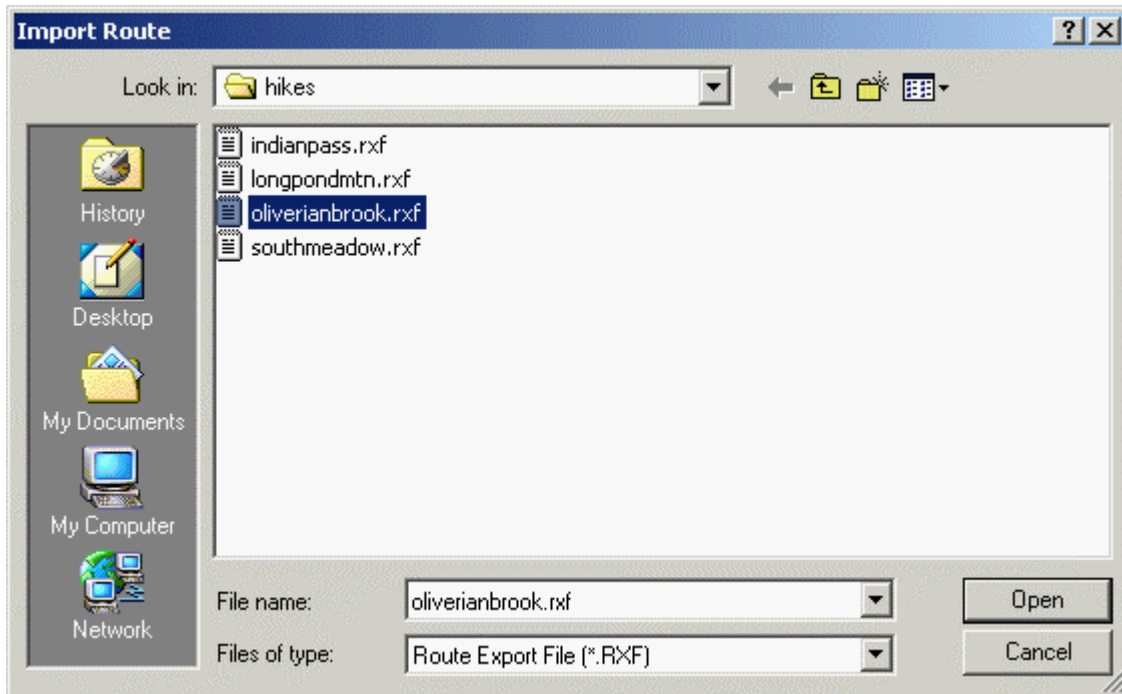
To import an RXF route file, click **File > Import > Routes**. In the window that appears, browse to the location of the RXF file you wish to import. You may only import one RXF file at a time. Once the file is selected, press **Open**. A message will appear on the screen, telling you how many routes were imported, along with the total number of waypoints.

♦ You cannot import route data if it already exists in Terrain Navigator Pro. If you try to import an RXF file that contains route data that already exists in Terrain Navigator Pro, you will receive an error message explaining that that route could not be imported. (This may happen if you created the RXF file as backup, but never deleted the original route from Terrain Navigator Pro.)
♦ A single RXF file may contain data for more than one route.
♦ Route import is *backwards-compatible*, which means that you may import RXF files from any previous version of any program in the Terrain Navigator Pro family of programs.

Route Text File Format (.RXF)

The text file format for route import/export ends in the file extension .RXF.

Terrain Navigator Pro handles internal data conversions in WGS84 datum, and then presents the coordinate information in whatever datum you have selected in the Preferences window. When you export route data from Terrain Navigator Pro, the coordinate data in the resulting RXF file is given in WGS84 datum. Please bear this in mind when working with data from RXF files.

Below is an example of the .RXF file format, showing the waypoints of a route named Brook Trail:

43.7721633, -071.2655753, "Lodge", "Lodge", "Lock door", "Brook Trail", 800000, ff0000, 11
43.7711296, -071.2749506, "Pick up trail", "Pckptr", "", "Brook Trail", 800000, ff0000, 0
43.7685800, -071.2792148, "Water stop", "Wtrstp", "", "Brook Trail", 800000, ff00ff, 11
43.7669951, -071.2849459, "Lunch", "Lunch", "", "Brook Trail", 800000, ff0000, 11
43.7655480, -071.2871729, "Good view", "Gdvw", "", "Brook Trail", 800000, ff0000, 11
43.7638597, -071.2940883, "Switchback", "Swtchb", "", "Brook Trail", ffff, ff0000, 11

43.7577270, -071.2985914, "Cabin", "Cabin", "", "Brook Trail", 800000, ff0000, 11

The route "Brook Trail" contains seven waypoints. The first waypoint is named "Lodge" and is located at latitude 43.7721633 N, longitude 071.2655753 W. The coordinates are given in decimal degrees. For latitude, North is a positive value and South is a negative; for longitude East is positive and West is negative. You can convert from degrees/minutes/seconds with the following formula:

Conversion Formula:
Degrees + (Minutes divided by 60) + (Seconds divided by 3600) = Decimal Degrees
Express this as a formula, and you get:

$$D + (M/60) + (S/3600) = \text{decimal degrees}$$

Example:
For example, a latitude of 43 degrees 30 minutes 50 seconds would translate to:

$$43 + (30/60) + (50/3600) = 43.5138888 \text{ decimal degrees}$$

Here's the math:

$$30/60 = 0.5$$
$$50/3600 = 0.0138889$$

$$
\begin{array}{r}
00.0138889 \\
00.5000000 \\
+\ 43.0000000 \\
\hline
43.5138888
\end{array}
$$

The next two values in the line are the full name and the GPS Name of this waypoint. Following is a space for the waypoint comment, if any (in this case, "Lock door"). The next value gives the route name.

The field after the route name contains a number specifying the color of this first waypoint. The next number tells the color of the first leg of the route, and the final number refers to the symbol selected for this waypoint within Terrain Navigator Pro. The symbols are numbered in the same order they appear in the Symbols drop-down menu from the Edit Routes window, starting with 0 for "none," the first option in the list. The numeric codes for the available colors are listed below:

light green	ff00	forest green	808000
yellow	ffff	light gray	c0c0c0
royal blue	ff0000	purple	800080
light purple	ff00ff	navy blue	800000
aqua	ffff00	light olive	8080
white	ffffff	green	8000
dark gray	808080	brown	80
black	0	red	ff

Once you have created your routes, choose Export from the Routes menu, and highlight the route that you want to export. Be sure to set the file location settings to where you want the file to be saved. (You may wish to change the default settings.) If you choose to export several routes at once, the resulting file will contain data for all waypoints in all routes, grouped by route.

When route data is exported, the original route will still be retained on the map. All the characteristics of the route will be preserved throughout the export process, so that when the route is imported into Terrain Navigator Pro, it will appear exactly as it did when it was exported. Any waypoint comments will also be retained.

Markers

Exporting Markers

Export Markers

```
milan2
milan1
Milan3
Campsite
12:23 PM
Ferncroft
Camp Shehadi
Camp Rich
Blueberry Ledges
Whiteface True Summit
```

Save...   Cancel   Help
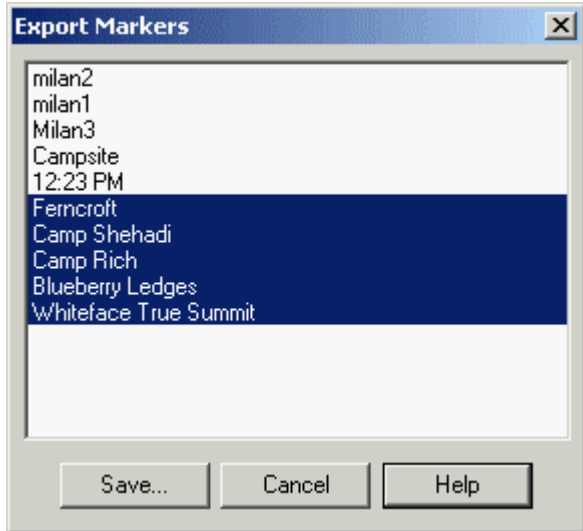
You can export selected markers and save them in text file format elsewhere on your computer system. This is handy for sharing your routes with other users of Maptech software, for keeping backup copies of your data, and for using your data in other applications.

To export markers, click **File > Export > Markers**. Terrain Navigator Pro will display a list of all your markers. Highlight the marker(s) you want to export. You can select as many as you want (use your Control and Shift keys to highlight multiple markers). When you have made your selections, press **Save**.

The next window will prompt you to name the file that contains your exported markers, and specify the directory location where you want to save it.

You will also need to choose a format:

MXF: Maptech's proprietary format for marker import/export.   MXF files may be shared among users of Maptech products. A single .MXF file will contain all the routes you have selected for this export. See Marker Text File Format (.MXF) on page 109 for complete details.
SHP: ESRI's "Shapefile" format, for use in a variety of GIS products supporting this format. Exporting data in this format will result in multiple files. For details, see ESRI Shapefile Format (page 113).
GEN: UnGenerate file format, for use with ESRI ARC/INFO.
GPX: An XML-based format used by some websites for coordinate sharing.

♦   Your markers will be retained in Terrain Navigator Pro. Exporting markers does not delete them from Terrain Navigator Pro. It simply creates another version of your marker data, in a text file format.
♦   You can share your MXF data with other Maptech software users. To import markers into Terrain Navigator Pro, just click **File > Import > Markers** and browse to the location of the MXF file. The imported markers will be added to your marker list and will appear on the maps.
♦   Markers exported from Terrain Navigator Pro may be imported into various Maptech programs, including Terrain Navigator Pro (recreational version), Terrain Navigator Pro for GIS/CAD, Offshore Navigator (marine navigation software), Chart Navigator (marine software for trip-planning), and Pocket Navigator (for use on Windows PocketPC devices).
♦   Terrain Navigator Pro can import MXF files from any previous version of any of the Terrain Navigator Pro family of programs.

Importing Markers

To import an MXF marker file, click **File > Import > Markers**. In the window that appears, browse to the location of the MXF file you wish to import. You may only import one MXF file at a time. Once the file is selected, press **Open**. A message will appear on the screen, telling you how many markers were imported.

- A single MXF file may contain data for more than one marker.
- Marker import is *backwards-compatible*, which means that you may import MXF files from any previous version of any program in the Terrain Navigator Pro family of programs.
- Importing an MXF file that contains markers that are already present in Terrain Navigator Pro will result in duplicate markers.

Marker Text File Format (.MXF)

If you have coordinate data that you would like to transfer to Terrain Navigator Pro for display as markers, you can create MXF files using Windows Notepad, Wordpad, or a word-processing program.

Terrain Navigator Pro handles internal data conversions in WGS84 datum. When you export data from Terrain Navigator Pro, the coordinate data in the resulting MXF file is given in WGS84 datum. Therefore, when importing marker data into Terrain Navigator Pro, be sure to use WGS84 datum when creating your MXF text file. Using a datum other than WGS84 will affect the accuracy of the coordinate locations in Terrain Navigator Pro.

Format

In the .MXF mark text file, each mark is described on a separate line. Each line contains several fields of information about that mark. These fields are separated by commas, and presented in the following order:

Latitude, Longitude, Full Name, GPS Name, Comments, Color (#), Symbol (#)

Sample

43.7601389, -071.2791299, "Cottonwood", "Cttnwd", "A very large tree", 800080, 137
43.7617236, -071.2917695, "Fencepost", "Fncpst", "", 808080, 14
43.7576237, -071.2888850, "Aspen", "Aspen", "", ffff, 137
43.7562457, -071.2777147, "Cache", "Cache", "", ff, 138
43.7576583, -071.2701399, "Tent site", "Tntst", "", ff, 111

Converting Latitude and Longitude to Decimal Degrees

This sample file contains data for five markers. The first marker is named "Cottonwood" and is located at latitude 43.7601389 N, longitude 071.2791299 W. The coordinates are given in decimal degrees. For latitude, North is a positive value and South is a negative; for longitude East is positive and West is negative. You can convert from degrees/minutes/seconds with the following formula:

Conversion Formula:

Degrees + (Minutes divided by 60) + (Seconds divided by 3600) = Decimal Degrees
Express this as a formula, and you get:

D + (M/60) + (S/3600) = decimal degrees

For example, a latitude of 43 degrees 30 minutes 50 seconds would translate to:

43 + (30/60) + (50/3600) = 43.5138888 decimal degrees

Here's the math:

    30/60 = 0.5
    50/3600 = 0.0138889

      00.0138889
      00.5000000
    + 43.0000000

43.5138888

The next two values in the line are the full name and the GPS Name of this marker. Following is a space for the marker comment, if any (in this case, "A very large tree").

The field after the comment contains a number specifying the color of this marker. The next number refers to the symbol selected for this waypoint within Terrain Navigator Pro. The symbols are numbered in the same order they appear under Symbols in Edit Markers window, starting with 0 for "none," the first option in the list. The numeric codes for the available colors are listed below:

light green	ff00	forest green	808000
yellow	ffff	light gray	c0c0c0
royal blue	ff0000	purple	800080
light purple	ff00ff	navy blue	800000
aqua	ffff00	light olive	8080
white	ffffff	green	8000
dark gray	808080	brown	80
black	0	red	ff

Important Notes
♦ Be certain to press **Return** after the final line of your MXF file.
♦ You must supply all latitude and longitude data in decimal degrees, and **WGS84 datum**.
♦ Remember to save your text file with the file extension .**MXF**.
♦ Maptech supplies a free utility, called FormatMXF, which is designed to automatically correct common formatting mistakes in MXF files. To download the FormatMXF utility, visit www.maptech.com.

Tracks

Exporting Tracks

You can export selected tracks and save them in text file format elsewhere on your computer system. This is handy for sharing your tracks with other users of Maptech software, for keeping backup copies of your data, and for using your data in other applications.

To export tracks, click **File > Export > Tracks**. Terrain Navigator Pro will display a list of all your tracks. Highlight the track(s) you want to export. You can select as many as you want (use your Control and Shift keys to highlight multiple tracks). When you have made your selections, press **Save**.

The next window will prompt you to name the file that contains your exported tracks, and specify the directory location where you want to save it. You will also be asked to choose a format:
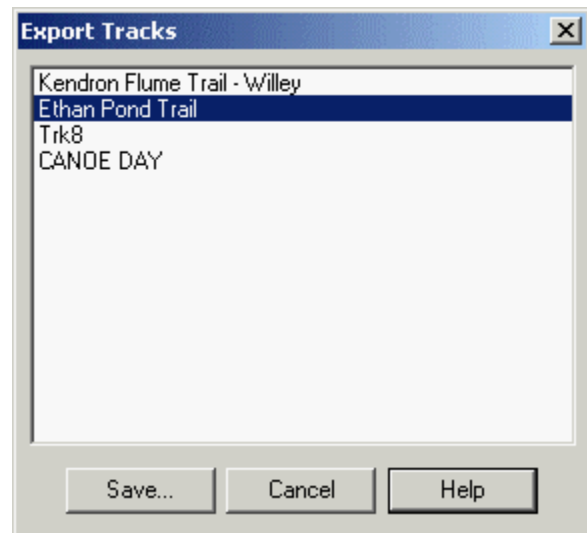
TXF: Maptech's proprietary format for track import/export. TXF files may be shared among users of Maptech products. A single .TXF file will contain all the tracks you have selected for this export. See Track Text File Format (.TXF) for complete details (page 111).

SHP: ESRI's "Shapefile" format, for use in a variety of GIS products supporting this format. Exporting data in this format will result in multiple files. For details, see ESRI Shapefile Format (page 113).

GEN: UnGenerate file format, for use with ESRI ARC/INFO.

GPX: An XML-based format used by some websites for coordinate sharing.

♦ Your tracks will be retained in Terrain Navigator Pro. Exporting tracks does not delete them from Terrain Navigator Pro. It simply creates another version of your track data, in a text file format.

♦ You can share your TXF data with other Maptech software users. To import tracks into Terrain Navigator Pro, just click **File > Import > Tracks** and browse to the location of the TXF file. The imported tracks will be added to your track list and will appear on the maps.

♦ Tracks exported from Terrain Navigator Pro may be imported into various Maptech programs, including Terrain Navigator Pro (recreational version), Terrain Navigator Pro for GIS/CAD, Offshore Navigator (marine navigation software), Chart Navigator (marine software for trip-planning), and Pocket Navigator (for use on Windows PocketPC devices).

♦ Terrain Navigator Pro can import TXF files from any previous version of any of the Terrain Navigator Pro family of programs.

Importing Tracks

To import a TXF track file, click **File > Import > Tracks**. In the window that appears, browse to the location of the TXF file you wish to import. You may only import one TXF file at a time. Once the file is selected, press **Open**. A message will appear on the screen, telling you how many tracks were imported, along with the total number of waypoints.

♦ You cannot import track data if it already exists in Terrain Navigator Pro. If you try to import a TXF file that contains track data that already exists in Terrain Navigator Pro, you will receive an error message explaining that that track could not be imported. (This may happen if you created the TXF file as backup, but never deleted the original track from Terrain Navigator Pro.)

♦ A single TXF file may contain data for more than one track.

♦ Track import is *backwards-compatible*, which means that you may import TXF files from any previous version of any program in the Terrain Navigator Pro family of programs.

Track Text File Format (.TXF)

The text file format for track import/export ends in the file extension .TXF.

To import tracks that were previously exported, or track text files that you created by hand, go to the Tracks menu, choose Import and the select the file where the tracks are saved. Press **Open**. Terrain Navigator Pro imports your tracks, and displays a message telling you how many tracks were imported. The tracks will automatically appear in their proper locations on the map, in their proper color.

If you have coordinate data that you would like to transfer to Terrain Navigator Pro for display as a track, you can create TXF files in Windows Notepad, Wordpad, or a word-processing program.

Terrain Navigator Pro handles internal data conversions in WGS84 datum, and then presents the coordinate information in whatever datum you have selected in the Preferences dialog. When you export track data from Terrain Navigator Pro, the coordinate data in the resulting TXF file is given in WGS84 datum. Therefore, when importing track data into Terrain Navigator Pro, be sure to use WGS84 datum when creating your TXF text file. Using a datum other than WGS84 will affect the accuracy of the coordinate locations in Terrain Navigator Pro.

The degree to which the coordinates' accuracy is affected will vary, depending on the datum you used when creating your TXF file, and the coordinate system that you have specified in Terrain Navigator Pro's General Preferences. For example, NAD83 datum is nearly identical to WGS84

datum, so creating a TXF file using NAD83 datum would probably not affect the coordinates' accuracy as much as using another datum might. If datum change causes a shift in coordinates' location, the shift will be more pronounced if you are using UTM coordinate system, and less noticeable if you are using latitude/longitude. Nevertheless, please bear in mind that creating a TXF file with any datum other than WGS84 will skew the accuracy of the coordinates as they are displayed in Terrain Navigator Pro.

Sample
Below is an example of Terrain Navigator Pro's TXF track file format.

    38.2373733, -107.5542683, "My Hike", ff
    38.2373388, -107.5542248, "My Hike", ff
    38.2373044, -107.5541813, "My Hike", ff

This shows three track points. The first variable is the latitude, then longitude, track name, and color.

First Two Fields: Latitude and Longitude
The latitude/longitude coordinates are given in decimal degrees. For latitude, North is a positive value and South is a negative; for longitude East is positive and West is negative.

Latitude Conversion Formula
The following shows how a latitude may be converted into various formats.

Key:
D = Degrees
M = Minutes
S = Seconds
.d = Decimal Degrees
.m = Decimal Minutes
.s = Decimal Seconds

Abbreviations:

DMS	Degrees/Minutes/Seconds	43° 44' 54.18"
D M.m	Degrees and Decimal Minutes	43° 44.903'
D.d	Decimal Degrees	43.748384°
M.m	Decimal Minutes	2624.90304'

Formula:
Degrees + (Minutes divided by 60) + (Seconds divided by 3600) = Decimal Degrees
Express this as a formula, and you get:

D + (M/60) + (S/3600) = decimal degrees

Example:
For example, a latitude of 43 degrees 30 minutes 50 seconds would translate to:

43 + (30/60) + (50/3600) = 43.5138888 decimal degrees

Here's the math:

30/60 = 0.5
50/3600 = 0.0138889

    00.0138889
    00.5000000
    + 43.0000000

112

43.5138888

Third Field: Track Name
The next item, in double quotes, is the name of the track. This is the same for each line (each point in the track).

Last Field: Track Color
The final field refers to the color used for the track's display in Terrain Navigator Pro. Here are the color codes:

light green	ff00		forest green	808000
yellow	ffff		light gray	c0c0c0
royal blue	ff0000		purple	800080
light purple	ff00ff		navy blue	800000
aqua	ffff00		light olive	8080
white	ffffff		green	8000
dark gray	808080		brown	80
black	0		red	ff

ESRI's Shapefile Format

Terrain Navigator Pro allows you to export markers, routes and tracks in ESRI Shapefile format. This format is used in a variety of GIS applications.

To export layer data from Terrain Navigator Pro, click **File > Export** and select a data type (markers, routes, or tracks). Select the layers you want, and when prompted to specify an export format, choose **Shapefile**.

When you export data to the Shapefile format, you will receive one or more sets of files.

When exporting markers, you will receive one set of files. This file set will include all the markers you selected for export.

When exporting routes, you will receive multiple sets of files for EACH route that you export. One file set will contain the route's waypoints. A second file set will contain data on the route line itself. If you're exporting a route that is looped—that is, one that forms an enclosure—you will also receive a third set of files for that route, describing the polygon formed by the loop.

When exporting tracks, you will receive one set of files for each track line, plus an extra set for any track that is looped.

Examples:
- If you export three routes, one of which is looped, you will receive three sets of point files, three sets of line files, and one set of polygon files (for the route that is looped).
- If you export two tracks, one of which is looped, you will receive two sets of line files, and one set of polygon files (for the looped track).
- All markers selected in a single export will be covered by one set of point files.

For further information, visit www.esri.com.

Bookmarks

In addition to importing/exporting layer data, you may also export bookmarks into text file format. The text files may be imported back into Terrain Navigator Pro. This lets you share your bookmarks with other users of Terrain Navigator Pro, keep different sets of bookmarks, etc.

Exporting Bookmarks

1) Open the map that contains the bookmarks.
2) Click **File > Export > Bookmarks**.
3) Select the bookmarks you wish to export.
4) Specify a location to save the bookmark text file.

If you wish, you may combine multiple .BTX files into a single file. Or, you may create your own .BTX files, according to the Bookmark Text File Format.

Importing Bookmarks

1) Open the map for which the bookmarks are intended.
2) Click **File > Import > Bookmarks**.
3) Browse to the location of the .BTX file you wish to import, and press **Open**.

All bookmarks for the map you're viewing will be imported. If the .BTX file contained any bookmarks that could not be imported (i.e. any bookmarks for other maps), a message window will let you know.

Bookmark Import Results
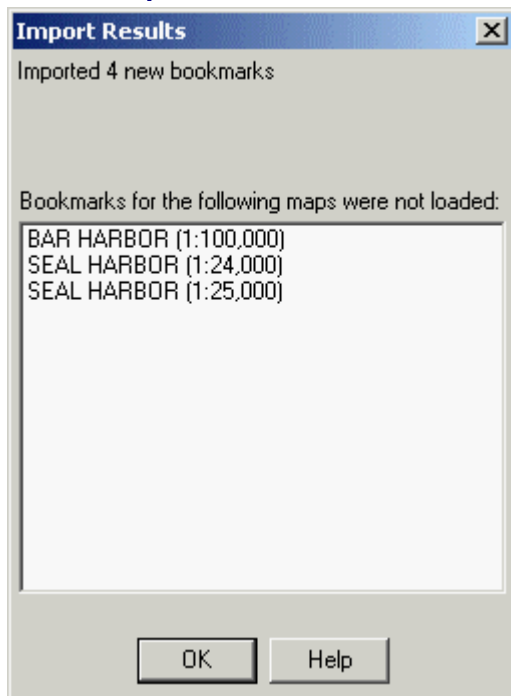
When you're importing bookmarks, you must first open the map that contains the bookmarked locations. (The easiest option is to open a 1:100,000-scale map, in order to cover a wide area.)

If any bookmarks could not be imported, this window lets you know which map(s) they were for. Switch to the specified map to import the related bookmarks.

Bookmark Text File Format

Bookmarks let you save a specific map view, so that in one step, you can quickly return to the same screen later (it will even be displayed at the same zoom level). Bookmark files can be created and edited in the Windows Notepad program, or in a word processing program. They can also be created with Terrain Navigator Pro and exported. A bookmark file has the extension .BTX. The format of these text files (commonly referred to as ASCII files) is shown below.

A bookmark file containing these lines:

043, 30, 50.5, N, 071, 45, 31.7, W, 1, "book1"
043, 30, 49.8, N, 071, 45, 32.1, W, 0, "My House"
043, 30, 48.6, N, 071, 45, 32.5, W, 2, "School"

defines three bookmarks that have the names book1, My House, and School respectively. The first three fields show the Degrees/Minutes/Seconds of the latitude. The "N" indicates direction North, for latitude. The next three fields indicate Degree/Minutes/Seconds longitude, with "W" following to

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indicate West. The number that follows "W" indicates the zoom level at which you want to view the map:

0= 2:1 zoom level (the closest-in viewing level)
1= 1:1 zoom level
2= 1:2 zoom level
3= 1:4 zoom level (the farthest-out viewing level)

Finally, the bookmark's name is given in double quotes at the end of the line. Be sure to press Return after each line of your file (including the last line). When you save a bookmark file, save it as a DOS text file, with the BTX extension.

Importing Layer Text Files into Microsoft Excel

Several Maptech customers have told us that they plan to use Microsoft Excel to manipulate their exported data. For your convenience, we include the following step-by-step procedure for opening mark text files in Excel. (These instructions were written for Excel97; they may need to be modified for use with other Excel versions.)

1. From Excel's File menu, choose "Open."
2. Browse to the location of your .MXF, .RXF, .TXF or .BTX file. (To bring the file into view, you may need to specify "All" or "Text Files" under "Files of Type" at the bottom of Excel's Open window.)
3. The next window that appears will offer you two choices. Choose "Delimited," and press Next.
4. Under "Delimiters," check "Commas." Press Next.
5. In the final window, you may leave the Column Data Format settings as they are (unless you have a preference here), and press Finish.

Your layer data may now be edited and saved in Excel's spreadsheet .xls format.

About Maps

Map Information

To get data about the map you're viewing, click **File > Map Information**. The data provided is taken from the original paper map's collar—the white border where the USGS prints technical information (if you're viewing maps in single-map mode, you can read the collar for yourself). The Map Information window is a quick way to see all this data in one place.

CD Name
The name of the Maptech CD that contains this map.

Map Name
The official name of the USGS map. Each map is named for the most notable or prominent feature contained in its coverage (a city or town, a summit, etc.).

Reference Code
The USGS has assigned each map a unique reference code. This number indicates the quadrant covered by the map. Each element of the reference code has a specific meaning.

Example: The reference code 41077-B3-TF-024 tells you the following:
41	the map's coverage area is found at a latitude of 41 degrees.
077	the map's coverage area is found at a longitude of 77 degrees.
B	the map is in the second grid position north of 41 degrees.
3	the map is in the third grid position west of 77 degrees.
TF	a **t**opographic map with contours measured in **f**eet.
024	the map scale is 1:24,000.

Map Scale
The relationship between the distance on a map, and distances on the ground is known as the map *scale*. Most Maptech CDs provide maps at 1:24,000, 1:25,000, and 1:100,000.

Map Type
Terrain Navigator Pro uses topographic maps, bathymetric topographic maps and orthophotomaps (aerial photos). The unit of elevation measurement (feet or meters) is also given here.

Datum
Because the Earth is not an exact sphere, scientists are calculating improved models for where the center of the Earth lies. The Datum is this calculation.

When latitude/longitude markings are drawn on a map, they are made in reference to a specific datum. It is important to know the datum of a map when making exact measurements. The location of a set of latitude/longitude coordinates under a particular datum may change substantially if the same coordinates are used with a different datum.

Most USGS maps use a Horizontal Datum known as NAD27 (North American Datum of 1927). Other datums you may find are NAD83 (North American Datum of 1983) and WGS84 (World Geodetic System of 1984).

Vertical Datum has the same principles as Horizontal Datum (described above), except that it applies to height calculations.

Contour Interval
The amount of elevation change between adjacent contour lines.

Year Created
The year that the USGS first produced this topographic coverage for this area.

Revised/Inspected
The USGS periodically reviews areas it has mapped, and, if necessary, modifies its original topographic coverage to reflect any new changes in the shape of the terrain. The date of a map's inspection or revision is given here (it can also be found along the bottom of most USGS topos).

Coordinates
The coordinates of the location where you clicked on the map with the Information Tool.
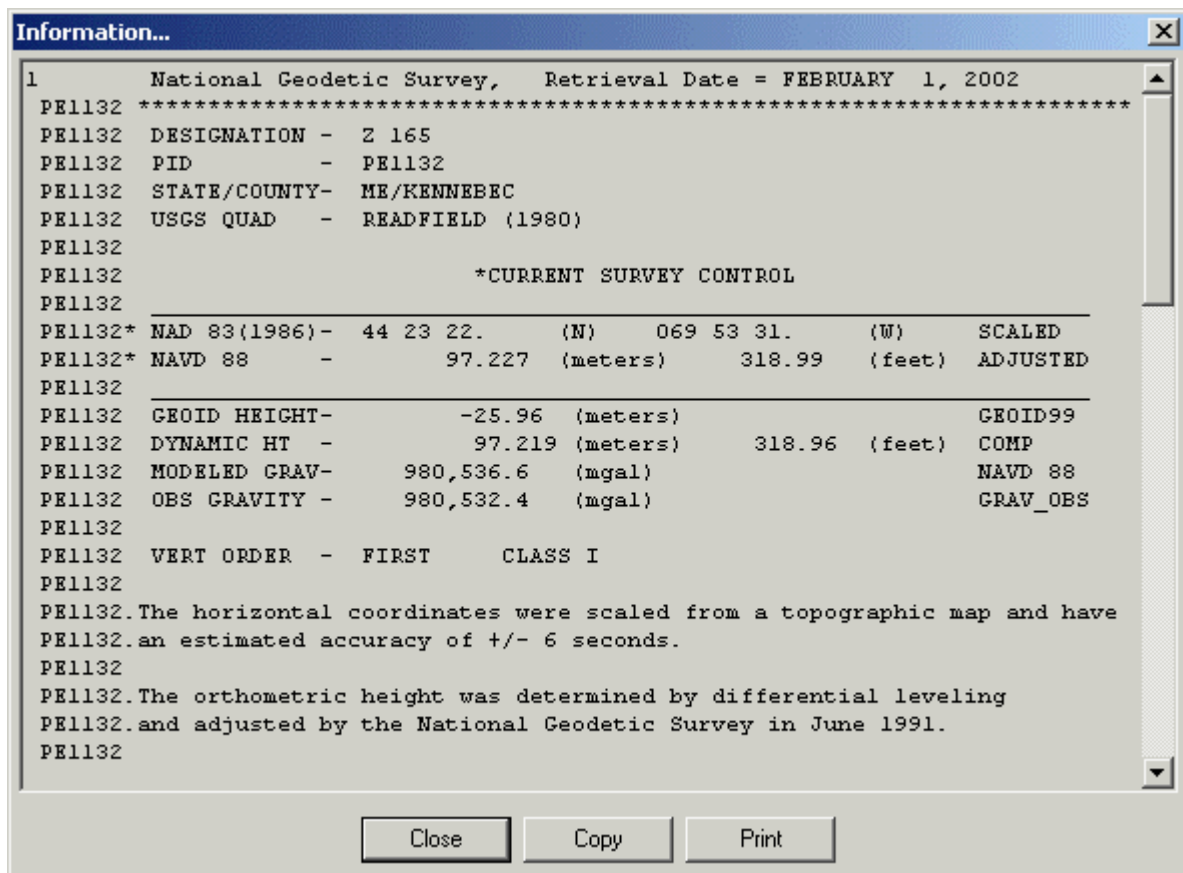
Benchmarks

Terrain Navigator Pro includes a Benchmark layer, with benchmark icons on the maps and National Geodetic Survey (NGS) data sheets for each benchmark. To view the NGS data sheet for any benchmark, click on the benchmark icon using the Information Tool ( ). You can then **Print** the data sheet or **Copy** it to your Windows Clipboard, and paste the data sheet into most Windows applications (for example, open Microsoft Word and click **Edit > Paste** to view the data sheet). NGS data sheets may also be included when exporting maps (see page 97).

To show/hide benchmark icons, use Layer Visibility (page 33).

```
Information...                                                              [X]

1           National Geodetic Survey,   Retrieval Date = FEBRUARY  1, 2002
 PE1132 *************************************************************************
 PE1132  DESIGNATION -  Z 165
 PE1132  PID          -  PE1132
 PE1132  STATE/COUNTY-  ME/KENNEBEC
 PE1132  USGS QUAD   -  READFIELD (1980)
 PE1132
 PE1132                      *CURRENT SURVEY CONTROL
 PE1132  _____
 PE1132* NAD 83(1986)-  44 23 22.      (N)     069 53 31.      (W)     SCALED
 PE1132* NAVD 88     -            97.227 (meters)     318.99   (feet)  ADJUSTED
 PE1132  _____
 PE1132  GEOID HEIGHT-          -25.96  (meters)                       GEOID99
 PE1132  DYNAMIC HT  -           97.219 (meters)     318.96   (feet)   COMP
 PE1132  MODELED GRAV-      980,536.6   (mgal)                         NAVD 88
 PE1132  OBS GRAVITY -      980,532.4   (mgal)                         GRAV_OBS
 PE1132
 PE1132  VERT ORDER  -  FIRST     CLASS I
 PE1132
 PE1132.The horizontal coordinates were scaled from a topographic map and have
 PE1132.an estimated accuracy of +/- 6 seconds.
 PE1132
 PE1132.The orthometric height was determined by differential leveling
 PE1132.and adjusted by the National Geodetic Survey in June 1991.
 PE1132

              Close          Copy          Print
```

Datum

What is datum?

Simply put, datum is a model used for calculating the location of the Earth's center. This center calculation is used as a reference point in establishing coordinate locations, like latitude/longitude, on the Earth's surface.

Why does it matter?

There are many different datums. A coordinate location calculated using one datum may differ by several hundred feet from the same coordinates calculated from another datum. Therefore, before relying on coordinate location information, it is important to know what datum was used in establishing those coordinates.

What do I need to do about it?

This depends.

When you're transferring coordinates between Terrain Navigator Pro and your GPS, all you need to do is make sure your GPS datum is correctly specified in Terrain Navigator Pro's GPS Setup window. Once Terrain Navigator Pro knows what datum your GPS is using, it can convert datum as necessary to ensure that nothing gets "lost in translation."

With some GPS models, Terrain Navigator Pro can detect the GPS datum setting automatically. In such cases, the Datum setting in Terrain Navigator Pro's GPS Setup window will be grayed out. This is because Terrain Navigator Pro already knows what datum your GPS is set to.

When you're transferring coordinates via any other method, you need to be conscious of datum. Such instances include:

- *Typing lat/lon coordinates by hand in Terrain Navigator Pro.* You need to know A) the datum of those coordinates, and B) the datum that Terrain Navigator Pro is using. The two datums must match. (Click **File > Preferences > General** to find out what datum Terrain Navigator Pro is using, and to change the datum if necessary.)
- *Exporting layer data in text file format.* The coordinates in these text files are given in WGS84 datum (World Geodetic System of 1984). Keep this in mind if you plan to use the data in another application.
- *Reading a lat/lon off your computer screen and typing it by hand into your GPS.* Without the benefit of an electronic connection, it is up to you to ensure that the datum of your GPS matches the datum in which Terrain Navigator Pro is presenting the coordinates.

To find out what datum Terrain Navigator Pro is using, or to change Terrain Navigator Pro's datum setting, click **File > Preferences > General**.

Magnetic Declination

As you may know, you can set Terrain Navigator Pro to display bearing data in either True North or Magnetic North: click **File > Preferences > General** to adjust this setting.

Terrain Navigator Pro uses a current computer model to calculate the position of Magnetic North. This has several implications.

- The location of Magnetic North shifts slightly over time. As a result, the listing for Magnetic North

on a very old USGS map may not agree exactly with Terrain Navigator Pro's calculation.

♦ Neither the magnetic declination listed on a USGS map nor the one calculated by Terrain Navigator Pro take into account local variances. You may need to take this into account when making precise readings.

To obtain the magnetic declination calculated by Terrain Navigator Pro, draw a range/bearing line at a 0-degree angle (straight north). Use Preferences to set the Bearing North to Magnetic. Go back to the range/bearing line and get the bearing information. The heading shown will be that of the magnetic declination.

When printing maps, you may choose to include a Magnetic North Arrow and/or magnetic north lines, in the lower left corner of your printout. This can come in handy if you use a handheld compass in conjunction with your printed maps.

Map Accuracy

Raster Images

The map images on Maptech topographic CDs are *raster* images, which means they are pixel-based. A pixel is the smallest building-block of the image on your screen. If you adjust your screen's resolution (this setting is usually found in the Control Panel or under Start > Settings, depending on your version of Windows), you are adjusting the number of pixels it can display at one time. For example, a screen resolution/Desktop area of 800 X 600 means that the screen can display images up to 800 pixels wide and 600 pixels tall.

Coordinate Display is Referenced to Pixels

When you use Terrain Navigator Pro to find the coordinates of a map location, the coordinates are calculated for the pixel nearest to your cursor. The accuracy of these coordinates depends on the scale and accuracy of the map image you're working with.

The popular 7.5-minute topographic quadrangles—usually the most detailed map scale found on Maptech CDs—provides map coverage at a scale of 1:24,000. On the original USGS paper maps in this series, one inch on the map represents 2,000 feet on the ground.

1:24,000 means that 1 inch on paper = 24,000 inches on ground
24,000 inches / 12 = 2,000 feet

Terrain Navigator Pro samples these maps at 160 dpi (dots per inch). This means that the map image uses a row of 160 pixels to represent 2,000 linear feet on the ground. Each pixel therefore represents an area 12.5 feet wide.

2,000 / 160 = 12.5

Because pixels are square, each one represents 156.25 square feet (12.5 X 12.5).

Assuming the original USGS topo were 100% accurate, this means that the coordinates provided by Terrain Navigator Pro would always be within 15 feet of the actual position. However, it is next to impossible to make a 1:24,000-scale map that is accurate within inches on the ground. To ensure maximum practicable accuracy, the USGS has adopted National Map Accuracy Standards.

USGS and National Map Accuracy Standard

According to these standards, cartographers strive to ensure that any point on a 1:24,000-scale paper map is accurate within 1/50th of an inch. On the ground, this translates into a distance of 40 feet.

1 inch = 2,000 feet
2,000 / 50 = 40 feet

See for Yourself

The process of assigning coordinates to specific pixels in a map image is called *georeferencing.* You can observe the accuracy of your digital map images by viewing a map in Single-Map View. Place the cursor over any of the map's four corners, and compare the displayed coordinates with those printed on the map. (You may find it easiest to use the Centering tool and set your General Preferences to Degrees-Minutes-Seconds. You should also ensure that your Datum setting, also found under General Preferences, is set to Local so that Terrain Navigator Pro will display coordinates in the same datum as the printed map.) The two sets of coordinates should always match within five tenths of a second. If you should find any map title that does not meet this requirement, please contact us. If a georeferencing error is found, we will issue a correction.