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Program Description

Geo3D is a tool for viewing geographical elevation data through topographic maps and 3D drawings. A variety of maps are provided with the software, covering several areas with interesting topography. You can also import data from US Geological Survey DEM (Digital Elevation Model) files.

The program interface has been designed to give you complete control over how the data is displayed. Following is a feature summary:

- topographic maps
- 3D drawings, black-and-white and color
- adjustable viewing angle, view direction and vertical scale
- user-selectable elevation color palette
- color editor for creating new elevation palettes
- zoom-in, zoom-out controls
- overlays: boundaries, rivers, cities and latitude/longitude lines
- save-as-bmp-file option
- "drift" mode: set picture in motion
- bookmarks to save favorite locations

Data Background

The topographical data used in this software were obtained from two federal agencies: the National Geophysical Data Center (NOAA - Dept. of Commerce) and the US Geological Survey (Dept. of Interior). The precision of the data (that is, the number of data points per square mile) depends on which map you have loaded. Select the "Location | Display map info" menu to see the data resolution for the current map.

In general, elevation values are accurate to the nearest 100 feet. However, Salt Creek Software does not guarantee the integrity of the data presented here. Errors may have occurred in the data collection process, either in the original surveying or the transmission / processing of the data by the federal government or SCS. This software is intended for general reference and entertainment. If you need precise, up-to-date topographical data, we recommend that you contact your state's Geological Survey or the USGS.

Selecting a Location

Several maps are provided with the Geo3D product. The area each map covers can be as small as the island of Kauai, or as large as the entire mainland U.S., but all maps have the same amount of data. This means that some maps show a lot of detail (as small as one-tenth of a mile resolution) while others provide only a rough view of the terrain.

To load a map, run "Location | Load new map" from the menu, or pull down the Map listbox on the control bar. The list will show all maps currently present in the Geo3D directory. Once you have selected an entry on this list, that map will be loaded into memory.

(If you are importing data from a DEM file, select the "Import DEM file" button from the "Load new map" menu. See Importing DEM Files for more information).

The Topo / 3D / 3D Color views are representations of a section of the map, the "focus area". When a new map has been loaded, the initial focus area is the entire map. It is represented by the red square on the control bar's miniature map. You can narrow this region to a smaller area in several ways:
- drawing a focus rectangle with the mouse
- using the zoom buttons
- specifying a city
- specifying latitude and longitude

Selecting a Focus Region with the Mouse

You can specify a new focus region by drawing the rectangle directly on the Topo or 3D / 3D Color Views. To do this, just press the mouse button down at the point on the display where you want the new focus area to start. Hold the mouse button down as you drag the mouse to the opposite corner of the desired focus area. Release the mouse button and the view will immediately be updated for the new focus.

Repeat this as often as you like to zoom down to areas of interest. To zoom back out at any time, select the **zoom out** or **full map** button.

To re-center the focus rectangle on a different part of the map, just click on the miniature map on the control bar, or anywhere in the main display area. The focus rectangle will remain the same size, but will be redrawn around the selected point.

Zoom Controls

The zoom buttons allow you to reduce and increase the focus areas with one click of the mouse. The **zoom in** button will reduce the focus area dimensions about 50%; **zoom out** will double the dimensions. Selecting the **full map** button will reset the focus area to the entire map.

The zoom functions can also be invoked from the keyboard: PageDown to zoom in, PageUp to zoom out, and Home to return to a full map.

In general, the Topo Views work best with large focus areas, while the 3D / 3D Color Views work better in small areas (more detail of the terrain can be seen).

Selecting a City

If cities are available for a map, you can focus in on a city's location by selecting it from the City List ("Location | City List" menu). The focus area will be reduced to cover the area immediately surrounding the city you have chosen. The city itself will NOT be labeled unless you have turned on the "Cities, Landmarks" overlay option.

Specifying Latitude / Longitude Coordinates

If you would like to focus in on a specific latitude / longitude position (for example, an exact reading from a GPS receiver), select the "Location | Specify lat/long" menu.

Enter the degrees, minutes and seconds for the location you want (latitude values are assumed to be North, longitude values are West). When you click ok, the focus area will be changed to the vicinity of the position you have specified, if it is within the current map. A small "x" will mark the spot. The x will be displayed regardless of which view mode you are in, but will be removed as soon as you move the focus elsewhere.

View Modes

Three view modes are available: the Topo View, the 3D View and the Color 3D View. Switch between these modes by selecting the tabs at the top of the window, or by using the "View" pulldown menu.

The **Topo View** is a 2-dimensional map similar to what you would see in a paper atlas. Elevations are represented by colors corresponding to different ranges. These ranges and colors are shown in the palette bar on the right side of the Geo3D window. A special case is when you have selected the "shading-only" palette. In this instance, the map is shown with west-facing slopes as dark gray and east-facing slopes in white, giving a relief map of the selected area.

The **3D View** is a 3-dimensional line rendering of the current focus area. Oceans are marked in light blue, but the display is otherwise simply black lines on a gray background, regardless of the current elevation color palette. You can manipulate the viewing angle, viewing direction, and vertical scale using the 3D controls on the control bar.

The **Color 3D View** is a 3-dimensional rendering similar to the 3D View, except the display is "colored-in" with the current elevation palette. In general, this view will take longer to update than the 3D View, but results in more interesting pictures. As in the 3D View, the 3D controls specify how the picture is drawn.

Using the Control Bar

The control bar at the left side of the Geo3D window is your primary interface for changing the focus area and controlling the way Topo and 3D Views are constructed. Using the buttons, checkboxes, and listboxes on this bar you can move around the map, zoom in and out, add/remove overlays, and experiment with the 3D parameters.

Note: If you would like to free up more window space for the picture itself, un-check the "Window | Control Bar" menu item to remove the control bar. You will still have access to the controls' functionality through the "Location", "Overlays" and "View" menus.

Control bar features:
- zoom controls
- overlays
- 3D view controls
- drift buttons
- bookmark list

Map Overlays

The overlays display non-topographic information on top of the Topo / 3D / 3D Color views. Four overlay types are available - each can be turned on and off separately using the checkboxes on the control bar or the "Overlays" menu. For any given map, one or more may be inactive because the overlay information is either unavailable or not applicable for that map.

Boundaries
This may refer to state or country borders, or minor boundaries such as county lines or national park limits.

Rivers, Lakes
Major rivers and/or lakes will be marked in dark blue.

Cities, Landmarks
Cities, mountain peaks, and other points of interest will be labeled on the picture. For large focus areas, only the major cities will be shown: more labels will be provided as you zoom in to a smaller focus area. Use the City Editor to modify the city list.

Lat/Long lines
Latitude and longitude lines will be drawn and labeled. Depending on the map and focus area sizes, these lines may be at 5-degree, 1-degree, or 10-minute intervals.

City Editor

The City Editor feature allows you to add, delete and modify the city entries for a map. To pop up the editor window, select the "Overlays | City Editor" menu.

The editor shows a section of the city list: a highlighted entry and the 3 cities preceding it and following it. For each city, the name, latitude and longitude, and "Visible" status flag will be shown. If "Visible" is **Y** the city will always be displayed when the cities overlay is active, otherwise it will only be displayed when the you are zoomed to that part of the map.

Use the scroll bar to highlight the city you want to change. Then use the mouse or tab key to select the field to be modified, or click the "Delete" button to remove the city from the list.

Selecting the "Insert" button will create a blank entry at that position in the list. Fill in the name and latitude/longitude coordinates, using data from an atlas, GPS receiver, etc. A name is not necessary if you want to just show a dot on the map, but latitude and longitude coordinates must be entered and must be within the range of the current map.

Click "Save" to make the changes permanent, or "Cancel" to abort all changes.

3D View Controls

The scale, angle, and direction settings control the appearance of the 3D View and Color 3D View.

The **vertical scale** value is the vertical exaggeration ratio. A 1:1 ratio gives you the most realistic 3D drawings, but for large focus areas you won't see much detail in the terrain. In most cases, you will want to exaggerate the vertical dimension to emphasize the elevation contours. If you activate auto-scale, Geo3D will scan the current focus area and estimate a scaling factor that will best illustrate the terrain. Values can vary from 1:1 to 20:1 ratios.

The **view angle** is the angle between the viewer line of sight and the horizon. Lower values simulate looking at the terrain almost from the ground level; values near 90 degrees simulate looking from above. You will get the best overall terrain detail using values somewhere in the middle (30 to 60 degrees).

You can face any of the four compass **directions** for the 3D views. The direction you choose will also be the drift direction when drift is activated. Please note that the view direction only applies to the 3D View and Color 3D View: for Topo displays, north is always "up".

Setting the Picture in Motion

The drift feature simulates moving across the 3D landscape. The drift direction is always in the direction you are facing (that is, you are always moving "forward"). You can adjust the view direction while you're drifting to change course on the fly. Set the picture in motion by clicking the "Go" button on the control bar (or View | Drift Go menu). The picture will update about once every 5 seconds until you click the Stop button (View | Drift Stop menu), or the focus area reaches the edge of the map.

You may want to set auto-scale to Off to maintain the same vertical scale while you are drifting.

Bookmarks

The bookmark feature gives you the ability to "save your place" in Geo3D, so you can return to a location and the 3D / palette / overlay settings whenever you want.

To save a display as a bookmark entry, click the "Bookmarks" button on the control bar, or select the "Location | Bookmarks" menu. You will see a list of all the current bookmarks. Select the "Add" button, type in a short title for the bookmark, and click OK.

Use the Bookmark List window to retrieve previously-saved bookmarks and delete unwanted entries. There is no limit to the number of bookmarks you can store, but each must have a unique title.

Creating BMP files

Pictures can also be saved as bitmap files, using the "File | Save picture" menu. After you have saved a picture as a bmp file, you can it as input to Paintbrush, word processors, and other Windows applications which import .bmp-formatted graphics.

Changing Palettes

The palette bar at the right side of the main window shows the current palette colors corresponding to the indicated elevation ranges. Elevation ranges are expressed in feet, starting at 0 - 100, increasing by 100, 500, or 1000 foot increments.

Several color palettes are provided with Geo3D. Switch between these palettes using the "Palette | Select palette" menu, or by clicking the **palettes** button on the palette bar. The standard palettes include "contrast", which displays solid, contrasting colors for adjacent elevation ranges. This is useful for emphasizing elevation contours in topographic and 3D maps. The "natural" and "atlas" palettes use a gradual range of greens and browns to give more realistic-looking landscapes. Other palettes use gradual shading of one color ("browns", "dkbrowns", etc). Some palettes are better suited to a given region than others.

If you would like to experiment with the elevation colors, you can create your own palette by clicking the mouse on any of the color buttons on the palette bar. This will put you in the Color Editor, which you can use to specify the red, green, and blue components of the color (see Editing Palette Colors). Once you are finished modifying all the color ranges, the new palette can be added to the palette list via the "Palette | Save current palette" menu.

The **shading-only** palette is a special case: instead of using separate colors for different elevation ranges, elevation changes are emphasized by shading the slopes. West-facing slopes are dark gray, east-facing slopes are white, and flat regions are light gray. This gives a 3D appearance to the Topo View (creating a "relief map").

Editing Palette Colors

If you want to modify the color for a given elevation range, click the mouse on its button on the palette bar. This will pop up the Color Editor dialog. The window shows a sample of the current color. You can modify the color by setting the Red, Green and Blue values manually, or by selecting a color from the sample box at the bottom of the window. Clicking the **Lighter** and **Darker** buttons will gradually change the shade of the selected color.

Press the **Save Color** button when you are satisfied with the new color. The current palette will be changed immediately, and will remain "untitled" until you assign a name using the "Palette | Save current palette" menu.

Welcome, New Users!
Thank you for taking an interest in this software.

The U.S. government has been collecting and providing high-resolution topography data for a long time, but only recently has it become widely available through the Internet. Our goal in creating Geo3D was to compress this data so it fits easily on a hard disk drive, and provide a powerful, user-friendly 3D interface which can run on any Windows PC.

If you spend a few minutes experimenting with the control bar , the palette bar, and the three view modes , you'll quickly get a feel for how the program operates. Check out the bookmark list to see some samples of the kind of pictures you can create, and browse through the rest of the Help topics for a complete summary of Geo3D's features. After that, you're ready to explore on your own, either with the map data we provide or with DEM files you download yourself.

If you haven't already registered your copy of Geo3D, please consider doing so. It's only $ 17, and upon registering you will be sent the latest version of the software plus several new map files (see Registration Info). Your support will enable us to continue improving the program and creating more map data files.

Good luck... have fun!

Tips for Best Results

- [Color Display Mode](#)
- [Speeding Up Drawing Time](#)
- [Auto-Scale](#)
- [Viewing Angle](#)
- [Keyboard Shortcuts](#)

Color Display Mode

This program was designed to operate under all VGA/SVGA graphics modes, but will work best for 256-color graphics. 16-color graphics will not show the palette colors correctly - Windows will produce the "dithered" colors that best match the desired colors.

Graphics displays with more than 256 colors (i.e. 16-bit or 24-bit) will show all the colors correctly. However, the picture will take a little longer to update (when the elevation palette is changed) than it would in 256-color mode.

Speeding Up Draw Time

Geo3D will draw as much data as can fit in the current window. Because of this, you will get the most detailed pictures when the window is maximized. The time it takes to draw the picture, especially for 3D / 3D Color Views, will be longer for larger windows.

If you have a slower system or don't want to wait a long time for updates, a good strategy is to start with the default window size, experiment with the focus area, palette, view direction and other settings until you're happy with the results, and then maximize the window for the fullest detail.

Auto-Scale

The "auto-scale" option for 3D views gives you an estimate for what scale value will look best, but you should treat it as a starting point. For example, if there's a lot of ocean in a focus area, auto-scale will pick a high multiplier to emphasize the land areas. That may not be what looks best - experiment with different scale values to get a feel for what works best for you.

Manually selecting a scale value (via the scale listbox on the control bar or the "View | Set vertical scale" menu) will automatically turn off the auto option.

Viewing Angle

Viewing angles from 5 to 85 degrees are available, but values between 40 and 70 usually look best. The black-and-white 3D View has more detail than the Color View, especially at lower viewer angles.

Keyboard Shortcuts

If you prefer working from the keyboard, several commands can be executed using single keystrokes:

PgDn - Zoom in 50%

PgUp - Zoom out 100%

Home - Zoom out to the maximum focus

arrow keys - Up, Down, Right and Left will shift the focus area North, South, East and West, respectively

Alt-F4 - Exit application

ESC - Switch display to Full Window mode (hit ESC again to go back to original display)

Ctrl-B - Boundaries overlay on/off

Ctrl-R - Rivers overlay on/off

Ctrl-C - Cities overlay on/off

Ctrl-L - Lat/long overlay on/off

Importing DEM Files

1-degree Digital Elevation Model (DEM) files are compiled by the U.S. Geological Survey for each square degree in the United States. These files can be ordered from the USGS (on magnetic media) or obtained electronically via FTP transfer from the USGS Internet Site. The data must be uncompressed before you attempt to import it into Geo3D (DEM files are typically compressed with the public-domain "gzip" utility).

When you import a DEM file, Geo3D converts the data to the format and size expected by the program. This results in a loss of precision from the original file. Also, since the DEM files contain only elevation data, the boundaries/ rivers / cities overlays will NOT be available. (You can use the City Editor to add your own cities and landmarks.)

Once the DEM file has been successfully imported, Geo3D creates a new .dat file corresponding to that map. This file will be used for all subsequent executions of the program. The original DEM file is no longer needed, and may be deleted from your disk drive if you like. (Removal, or at least compression, is recommended: DEM files are very large, about 10 Mb each.)

USGS FTP Server

If you have access to an Internet service which supports <u>FTP file transfers</u> , you can download 1-degree DEM files directly to your PC. The USGS FTP Server address is:

edcftp.cr.usgs.gov

The files are located under the pub/data/DEM/250/* directories.

Before accessing the FTP site, you will need to know the USGS name for the map you're looking for. These names are **not** self-explanatory (for example, the map for Yellowstone National Park is called "Ashton-E"). Registered users of Geo3D can use the "mapindex" program to determine map names; otherwise you can use an index map USGS provides on the WorldWide Web:

http://edcwww.cr.usgs.gov/glis/hyper/guide/1_dgr_demfig/index1m.html

These Internet paths may change... contact the USGS directly for more information about the DEM files (1-800-USA-MAPS). **Please note:** there is no connection between Salt Creek Software and the USGS - don't call the USGS with questions about Geo3D! (They've probably never heard of this program.)

FTP File Transfers
Most Web browsers and on-line services support FTP transfers.

On CompuServe, GO FTP and select "Access a specific site"

On America Online, select keyword FTP, then "Go to FTP"

Or, from a browser, select URL "ftp://edcftp.cr.usgs.gov"

Be forewarned, these files can be very large, especially for mountainous regions. Transfer may take up to an hour with 14.4K modem, much longer at slower speeds. Once you have downloaded the compressed DEM file, uncompress it by typing "gzip -d [filename]" at the DOS prompt. Then it is ready for use by Geo3D.

Registration Information

If you plan to keep this software, please register with us. The registration fee is $ 17.00 (U.S.).

Upon registering, you will receive 2 high-density 3.5" diskettes containing the latest version of Geo3D, plus additional data files providing 3D data for: Yosemite, Yellowstone, and Grand Teton National Parks; Denver/Boulder; Seattle; Los Angeles; Santa Fe/Taos; Mt. McKinley (Alaska); and Haiti. Also included is the "mapindex" program, which you can use to determine the DEM file name for any location on the mainland U.S.

Registering will also put you on our mailing list for news about program revisions and availability of new maps.

To register, send a check or money order for $ 17.00 to:

Salt Creek Software
810 E. Division St.
Lombard, IL 60148

or, on CompuServe, GO SWREG, ID # 9559

Select "Print Topic" from the File menu to print this form

Name
_____

Address
_____

City, State
_____

Country
_____

U.S. Mainland ⯆ — current map name

— current focus area

zoom in — reduces focus area 50%

zoom out — doubles focus area

full map — sets focus area to full map

overlays
☑ Boundaries — overlay checkboxes
☐ Rivers, lakes
☐ Cities, landmarks
☐ Lat/Long lines

3d view — vertical scaling factor

scale: **3:1** ⯆   ☐ — auto-scale checkbox

auto

angle: **65** ⯆ — view angle

facing: **north** ⯆ — view direction, also determines drift direction

drift: (go) (stop) — drift go / stop buttons

Bookmarks... — bookmark library - use to store and retrieve displays

Color Selection

R: 192
G: 192
B: 0

Lighter
Darker

Save Color
Cancel