

Question: Can I import a US Topo into my geographic information system (GIS)?

Answer: Yes, but with many caveats.

The US Topo was not intended to be a GIS product. It was designed to serve users who need medium-scale topographic and orthoimage maps, but who are not GIS users.

US Topos are derived from GIS data. Almost all these data are from USGS and other government sources, and most are available for free through web services or file download sites. The US Topo represents a repackaging of these data, not new data creation. The primary design objective was to provide these data in a convenient and familiar form to people who need maps but who are not professional cartographers. The traditional 7.5-minute quadrangle layout and PDF format were selected as the best way to accomplish this objective; the GeoPDF extensions were adopted because they added some cartographic value at no cost to the end user.

This repackaging actually degrades the original data, because information must be filtered and generalized to create a readable quadrangle map. This degradation is justified because it makes the map easier to understand and use for the target audience of non-GIS users. The point is that the US Topo is an output of, not an input to, GIS systems.

Nevertheless, displaying a symbolized quadrangle map in a GIS environment can be useful for many things. Below are some partial solutions to the problem of importing a US Topo into GIS software. The USGS expects that more and better solutions will become available as the US Topo program grows and software developers see opportunities in the product. There are historical analogies to this situation in other USGS products. In 1994 the USGS decided to distribute digital raster graphics (DRGs) in GeoTIFF, even though it was a new and unimplemented format. When the first DRGs were created in 1995 hardly any consumer software, including the major commercial GISs, could take advantage of the geospatial tags. By creating over 50,000 public domain GeoTIFF maps, the USGS helped drive the acceptance and widespread implementation of the format.

Currently known methods for importing US Topo images into software other than PDF viewers:

1. Import to ArcGIS® with TerraGo commercial software

GeoPDFs can be imported directly into ArcMap® using TerraGo Publisher®

for ArcGIS software. According to TerraGo (December 2009), this software is the only technology that enables direct import to ArcGIS. GSA price for the software \$2,197.65 plus 20% maintenance (\$439.53) for a total first year price of \$2,637.18.

2. Reformat the GeoPDF as a GeoTIFF using Global Mapper®

[Global Mapper](#) has both a free version and a commercial version (\$350 for one license). The free version does not include data export functions, so the procedure described below will work only with the commercial version.

Global Mapper 11.xx can read TerraGo GeoPDF files and export them as other formats. If exported as a GeoTIFF with JPEG compression, the file size stays about the same, image quality stays about the same, and the result can be read by most geospatial software. Global Mapper will also clip the collar painlessly, and is one of the easiest ways to reproject a spatial dataset.

A significant shortcoming of this procedure is that all GeoPDF layers are exported as one TIFF image. The ability to select individual layers is lost, and all vector layers are rasterized in a single image plane. On the plus side, this does create a background display that is simple to manipulate while being detailed and visually appealing.

The following procedures were tested with Global Mapper 11.0:

a. Open a GeoPDF in Global Mapper

In version 11.xx, GeoPDF is one of the "supported commonly used types."

Loading a US Topo takes longer than loading other files in Global Mapper, but once loaded, pan and zoom operations are fast.

Notice that Global Mapper aligns the UTM/USNG grid with the display coordinate system. A US Topo displays "straight" in Acrobat, like a framed paper map hanging on a wall, but in Global Mapper it displays "tilted," like a DRG. This is not an error; it is software behavior more suitable for a GIS environment.

b. Optional — remove map collar

WARNING: Removing the map collar discards important metadata,

including all coordinate annotation.

Go to Tools / Control Center / Options / Cropping

In the tests I ran, the option to "Automatically Crop Collar" did not work quite right, but the option to "Crop to Manually Specified Lat/Lon Boundary" did, and automatically filled in the correct bounding coordinates. Select this option, click the "Specify Lat/Lon Boundary" button, check the bounding coordinates, and click OK.

c. Change background color

Go to View / Background Color

Select pure white

This eliminates "slivers" along the edges of the exported dataset. The pure white (or any other color) of the map collar can be made transparent in ArcMap®, which is almost as good as clipping the collar, but doesn't discard the information in the collar.

d. Export as a GeoTIFF

Go to File / Export Raster and Elevation Data / Export GeoTIFF

For an output file approximately the same size as the GeoPDF input, select JPEG-in-TIFF as the file type. Not all TIFF readers can read this type, but ArcGIS 9.3 is one that can. 8 Bit Palette and 24 Bit RGB can be read by almost all TIFF readers, but file sizes will be much larger.

The FGDC Metadata file attached to every US Topo is lost in this procedure. Save that file separately from Acrobat or another PDF viewer.