

Lesson 2:

Acquiring and Converting DLG-O Data

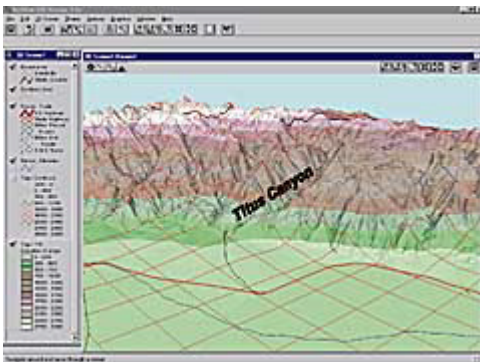
Lesson Goal: Locate and convert DLG files to DXF format for display in ArcView GIS using the CAD Reader extension.

What You Will Need: WinZip or a similar program for unzipping files.

Data and/or Utilities: DLG data for the Saline, California quadrangle, and free-ware DXF Conversion Utility, both downloadable from the *ArcUser Online* Web site.



The data for this exercise describes an area on the California-Nevada border and comes from the Saline Valley, California, quadrangle.



This lesson describes how DLG data can be converted so that it can be displayed in ArcView GIS.

This tutorial summarizes the steps necessary to locate and download USGS topographic 1:100,000-scale digital line graph optional (DLG-O) format from the FTP site and to process this vector data into Drawing Exchange Format (DXF) files. DXF files are easily loaded into ArcView GIS using the CAD reader extension and are used for mapping and modeling.

Other data types such as digital elevation model (DEM), data at scales such as 1:250,000 or 1:24,000, or data in other formats including Spatial Data Transfer Standard (SDTS) are available through EROS and related sites. After you master techniques for downloading and converting DLG-O format data you can explore other formats.

The demonstration model uses data that refers to the north end of Death Valley on the California-Nevada border. However, the techniques presented can be used to create similar models using data from almost anywhere in the continental United States.

What Is Available at EROS

USGS 1:100,000 topographic maps are available in digital form at the from the EROS site. Once at the EROS site, explore down through the different data types to find the 1:100,000-scale DLG page.

Just like paper maps, the 1:100,000 DLG data is divided into 30-by-60 minute sets that are indexed by the USGS quadrangle name. The data is registered using metric UTM values according to the North American Datum of 1927 (NAD 27). Data sets can be accessed by name from the "FTP via State" page at the Geo Data Web site. Open the folder for the desired state, then search for the map name. Data sets in these folders are arranged alphabetically by map name. To find a map when the name is not known or to just explore, look on the "FTP via Graphics" page to use a graphic search tool.

Finding and Downloading DLG Data

Each 30-by-60 minute quadrangle is divided into eight 15-minute tiles, four on the north and four on the south. The northern tier is numbered from one to four, from west to east, beginning with the top left or north-west 15-minute tile. The southern tier is numbered from five to eight, again beginning on the west side. The halves are further divided into west and east, so that each FTP directory contains four 15-minute tiles.

1	2	3	4
5	6	7	8

*Figure 1: Tile Numbering
Each 30 x 60 minute quadrangle is divided into tight 15-minute tiles, numbered as shown here.*

Data for each tile can be located by understanding the numbering scheme shown in Figure 1 for the Saline Valley, California, quadrangle. It helps to have a paper map of the quadrangle handy while you search for the DLG data.

Table 1

FILE	EXTENSION	DESCRIPTION
boundaries	bdf	Political Boundaries
hydrography	hyf	Lakes, Rivers, Streams
hypsography	hpf	Contour Lines, 50 m intervals
public lands	plf	Section Lines
transportaton	mlf,rdf,rrf	Misc. Features, Roads, Railroads

Each 30-by-60 minute quadrangle, 15-minute tile, and data type is coded into each file name using the following convention:

[3 character quad code]. [3 letter data code][2 digit 15 minute code].opt.gz.

The “opt” suffix indicates optional format and “gz” indicates “government zip,” a zip format. The files are automatically unzipped by some browsers, or can be manually unzipped using utility programs such as WinZip.

All five component files boundaries, hydrography, hypsography, public lands, and transportation, should be downloaded into a single directory for all of the 15-minute tiles that you need. By understanding and following the USGS file naming conventions, you can track the data. Data will automatically be kept separated until read into a common DXF file as explained later.

The processing software is a DOS program called DLGLX155.exe. Consequently, files MUST have eight character names, followed by the extension .dlg. Strip unnecessary characters out of the file name when unzipping the file. The unzipping utility will prompt the user for the name of the contained file. For example, the file EO1.BDF03.opt.gz should be unzipped and saved as EO1BDF03.dlg. Following this convention retains the meaningful file name AND is DOS compatible.

Using the DLG to DXF Conversion Utility

To load DLG-0 data into ArcView GIS, convert the DLG files to AutoCAD Version 12 compatible DXF. Once loaded, the CAD reader in ArcView GIS will read the DXF files directly. These files can be used “as is” in native DXF format or converted to shapefiles for editing, merging, and clipping. David Bunch, a CADD operator and programmer from Portsmouth, Virginia, has developed a DLG to DXF conversion utility that runs in DOS mode and is available as freeware from his Web site. Go to the “Terrain Modeling with ArcView GIS” page for a link to Bunch’s Web site.

The zipped file, DLGLX155.zip, contains the DLGLX155.exe utility and DLGLX155.doc, a text file that contains detailed information about this program. Bunch’s conversion utility is very stable and highly functional. Comments to the author through his site log are appreciated.

Processing DLG Files into DXF Files

Store a copy of the DLGLX155.exe utility in the same directory as the extracted DLG files. At a DOS prompt or in a DOS command window, invoke the DLGLX155.exe program by typing DLGLX155.

This utility prompts for a series of switches that may be applied as command line parameters that are explained in Table 2 .

Table 2

SWITCH	FUNCTION
"/?	Displays complete documentation without pause or can be redirected
/A=#	Map by major attributes only, # = number to divide by
/ALL=LAYER	All layers of the nuame following the = sign
/2d	Do not generate any 3d contour data, only x & y coordinates
/3d	Make contour data 3d polylines
/G	Convert UTM to Geographic Latitude/Longitude
/H=10, /H=12,	10= ACADr10, 12 = ACADR12
/H=B	B=Binary R12 DXF
/Include=FILE	FILE is a file that contains layers to include
/Ltscale=Number	Number is any positive real number
/Map=FILE	Layer name, color, and line width map file
/No=Lines	Don't display line numbers as they are processed
/No=Comments	Don't output Comments to .DXF file
/S	Convert Standard format to optional format
/Xclude+FILE	Where FILE is a file that contains layers to exclude
/Type=S.O, or G	Standard, Optional, or Graphics format

The following switches work well with AutoCAD 12, 13, and 14. Table 3 explains these switches.

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/3d /h=12 /no=lines /no=comments /type=o
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Table 3

SWITCH	EXPLANATION
DLGLX155	Executable utility
/header	AutoCAD 12 header
/no-lines	Line Line count off
/type=o	optional DLG format
DVIbdf04.dlg	nput DLG file
DVIabdf04.dxf	Output DXF file
0	Line width

You may want to experiment with switches that serve special purposes, such as the /G switch to convert UTM to geographic latitude/longitude coordinates in NAD 27. In automated mode, the program

first prompts for the AutoCAD version. Version 12 is the recommended default. Enter Switches [H=12]: <RTN>. Additional switches may be added here.

Next you are prompted to enter the file names of the input files. Type the path and name of the DLG file you wish to process. If you use wild cards such as *.DLG or DV1*.DLG to process several DLG files into one drawing, make sure the resulting file will not be an unwieldy size.

The program then prompts for the output file name. Enter the first eight characters of the input file name and add the DXF extension. The USGS convention is recommended (e.g., DV104.dxf for multiple data types or DV1hpf04.dxf for single data type).

Finally, the program prompts for line width. A value of zero (0) is recommended. Enter line width [0]: <RTN>. Sit back and watch the program execute.

An alternative to using an interactive DLG to DXF conversion procedure is to use a DOS batch file to automate data conversion. The batch file calls the DLGLX155 program, applies necessary switches and parameters, and specifies input DLG and output DXF files. The batch file is first created in a text editor and should be stored in the same directory as the DLG files and the conversion utility. Each batch file line includes seven items. A separate line is created for each input/output desired.

The batch file automates extraction and permits the user to quickly repeat a conversion step if the first pass does not execute properly. If certain DLG files do not convert properly, simply delete the incorrect resulting DXF file, edit the batch file to fix any errors, and rerun the corrected batch file. Correct DXF files in the project directory will not be rewritten. The batch file can also be copied to a new project area, edited, and used as a template for additional conversions.

Summary

The steps presented in this exercise show how to locate, download, and convert USGS DLG-O format data. Once converted to DXF format, this data may be imported into a number of mapping and

This lesson is based on an article written by Mike Price of ESRI, Charles Cook of CBS Consultants, and Bill Price of Black Rock Resources for the July–September 1998 issue of ArcUser magazine.