The CEDRA Corporation's

COMMAND OF THE MONTH

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FEATURED COMMAND

Exporting ArcMap
Symbols via DXF

Application Description

A short while ago we were asked if it was possible to export ArcMap symbols to a DXF file. Those users who had used our DXF export capability knew that when it came to exporting point features, the symbology that was assigned to them did not come across in the DXF file.

The reason for this is that ArcMap symbols are actually characters in a True Type Font. That is to say, a tree or manhole symbol is stored as a character, such as A, B, C, etc. So that to be able to export the symbol, the software needs the ability to extract the geometry that is associated with the character in a specific font.

This had been a long time issue but we decided that we would take the time to incorporate the ability to export symbology. As a matter of fact, it was a two week effort to create and fully implement this capability.

The CEDRA Solution

To address the application described above, the [Create DXF File] command within the {CEDRA-ArcMap2DXF-Tools} toolbar, shown in Figure 1, was modified.

In addition to the ability to export ArcMap symbology, a number of other modifications have been incorporated into the [Create DXF File] command. Presented below is a full description of the command and its operation.

Create DXF File Overview

The [Create DXF File] command enables the user to create a DXF file from within ArcMap. Unlike other DXF export utilities, which process only one theme at a time, the [Create DXF File] command processes all visible themes (shapefiles, personal geodatabases, enterprise geodatabases and coverages) in the current map.

In addition, the [Create DXF File] command can process annotation features and graphic text elements, including multi-line graphic text elements. As such, a DXF file created by this command can include features and text.

> **Command Of The Month bulletin**
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> *This month's issue discusses how to split multiple polygon features using polyline or polygon features in another layer.*

Furthermore, this menu command can maintain the color of the various features that are being exported. Regarding the processing of the visible layers in the map, note the following:
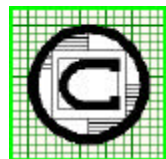
1. The terms theme and layer are used interchangeably and they mean the same. The former is a term of ArcView GIS, while the latter is a term of ArcGIS.

2. If a layer has selected features, then only the selected features are processed. If there are no

**Figure 1
CEDRA-ArcMap2DXF-Tools
Combo Box**

selected features, then all features in the layer are processed, this includes point, polyline, polygon and annotation features. If the check box labeled *Export Features displayed in the Current Extent* is (see Figure 2) is checked, then all visible features in the current map display are exported regardless of any feature's selection state.

3. If there are selected MARKER, PEN, FILL and/or TEXT graphic elements, then these graphic elements will be processed (if the user desires). If the view does not contain any selected graphic elements then no graphic elements will be processed. In exporting graphic elements note the following:
   • All of the selected Marker elements will be placed in a layer called GrapMrkr,
   • All of the selected Pen elements will be placed in a layer called GrapPen,
   • All of the selected Fill elements will be placed in a layer called GrapFill, and
   • All of the selected Graphic Text elements will be placed in a layer called GrapText.

4. If a layer has labels that should be exported, the labels will need to be converted into annotation features using the ArcMap *Convert Labels to Annotation...* command prior to being exported. The *Convert Labels to Annotation...* command can be invoked by "right-clicking" on the name of the layer in the ArcMap table of contents. The annotation which is created by the *Convert Labels to Annotation...* command can be stored either in: (a) the document as graphic text elements, or (b) a feature class as annotation features within a geodatabase depending upon the user's preference. If the annotation is stored in the document, an Annotation Group layer will be created containing the newly created graphic text elements. The name of the Annotation Group layer will be used as the name of the layer in the DXF file.

5. The name of the ArcGIS layer serves as the name of a layer in the DXF file. For maximum compatibility, the maximum number of characters in a layer name (as it appears in the DXF file) is 31. So that, only the first 31 characters in a layer name are used in the DXF file.

6. In dealing with colors, the CEDRA-DxfExport software will try to find the closest AutoCAD color that matches the ArcView or ArcMap color. This is accomplished by finding the colors which have the closest Red, Green, Blue (RGB) color values. In so doing when the DXF file is imported it will resemble as close as possible its appearance in ArcView or ArcMap. Regarding colors, the user can define a specific color mapping scheme by modifying the *rgbmap.txt* file, which is located in the \cedra\avprjs folder.

7. When processing features, which have Z information associated with their geometry, that is 3D features, the Z value will appear in the DXF file.

8. In addition to being able to use the [Create DXF File] menu command in a Data Frame, users are also able to use this command from within the ArcMap Layout View.

9. When exporting Arc/Info coverage annotation, the degree symbol will appear as the typical degree symbol and not as the ^ character in the DXF file.

10. When exporting multi-line graphic text elements, (text which is comprised of more than 1 line of text), the [Create DXF File] menu command will honor the alignment and leading of the text. That is, if the graphic text is right justified, centered, left justified or fully justified, the text in the DXF file will reflect this justification, as well as the spacing between the lines of text.

11. When exporting grouped graphic elements, the [Create DXF File] menu command will export the individual graphic elements comprising the grouped graphic element. The grouped graphic element will remain as a grouped graphic element in the ArcView GIS or ArcMap environment. However, in the DXF file, the grouped graphic element definition is not maintained.

12. When exporting annotation features or graphic text elements, which utilize the <SUB> or <SUP> keycodes for creating subscript and superscript text, the translator will create two individual text strings. The first represents the base text while the other denotes the subscript or superscript text.

13. Non-alphanumeric characters in a layer name are converted to the underscore character (_).

14. SDC data, an ESRI compressed data format, can not be exported directly. It must be first converted into a shapefile or geodatabase feature class prior to being exported.

15. If the check box labeled *Export using same Coordinate System as the Data Frame* is checked (see Figure 2), then all of the data to be exported is in the coordinate system current active data frame. If this check box is not checked, then each layer is exported in the coordinate system of the layer's source data, thus making it possible for the layers to not overlay upon each other as may be expected. This condition occurs when the coordinate systems of the data source of the layers are not all the same.

16. The user has the ability to select one or more attributes, from a choice list box that appears in the [Create DXF File] dialog box (see Figure 2), for inclusion in the DXF file, if so desired. Regarding the exporting of feature attributes, the following are noted:

• When exporting attributes, the selected attributes appear as blocks in the DXF file.

• These blocks will appear at the midpoint of the feature, and the name of the block will be **Blk**xxxx, where xxxx denotes the name of the layer in which the feature resides.

• All attributes associated with the block are listed vertically, one under the other.

• The ability to export attributes is important because: (a) it enables the user to transfer non-

```
2,55.80760000000,397577.673955253,5448467.73137267
62.80140000000,40.80760000000,396537.056044746,5447770.38362733
```

Table 1 - Sample World File which maps Upper Left and Lower Right Sheet Coordinates to World Coordinates

graphic information (attributes) into the DXF file, maintaining the association of the non-graphic information with the feature, and (b) provides a mechanism for the user to maintain symbology and line styles.

• Regarding symbology and line styles, in the ArcGIS environment, classifications are based upon attributes. By exporting the attributes upon which the ArcGIS classifications are based, the user has the ability to regenerate the classifications in the system into which the DXF file is to be read. This, of course, is dependent upon the software which is reading said DXF file. That is, the software to use said DXF file has to have the ability to change symbology and line style using information which is stored in a "block".

17. Canadian users using PCs with the French language will need to modify the CONFIG.TXT file located in the \cedra\avprjs folder by changing the decimal point (.) in all numbers, which appear to the left of the /* characters, with a comma (,). For example, the number 5.0 will need to be changed to 5,0 in order for the CONFIG.TXT file to be read properly.

18. Canadian users when exporting from Layout View should define the Paper Size in terms of millimeters, not centimeters.

19. When performing an export from ArcMap Layout View, the [Create DXF File] menu command will create a world file for the active data frame. The name of the world file will be the root name of the

DXF file being created with the .wld extension. The World File contains georeferencing information in the form of two lines. These two lines contain four items of information on each line. A comma is used to delineate the items. The first line represents the NW corner of the data frame in terms of its sheet and world coordinates for the NW (upper left) corner. Likewise, the second line denotes the sheet and world coordinates for the SE (low right) corner of the data frame. Shown in Table 1 is a sample world file, which could have a name such as Layers.wld.

20. Regarding ArcGIS symbols, if the symbol is represented by a character in a True Type Font, the [Create DXF File] menu command will export the symbol as a hatch in the DXF file. In so doing, the DXF file will contain a representation of the ArcGIS symbol.

Create DXF File Operation

To use this tool command, the user should:

➤ 1 **Scroll** down in the ArcMap table of contents, and **make certain** that all layers to be exported are the only visible all layers.

➤ 2 **Use** conventional ArcMap functionality to **select** any graphic text that should be exported.

➤ 3 **Click** at the **{CEDRA-ArcMap2DXF-Tools} [Create DXF File]** menu command to display the dialog box of Figure 2.

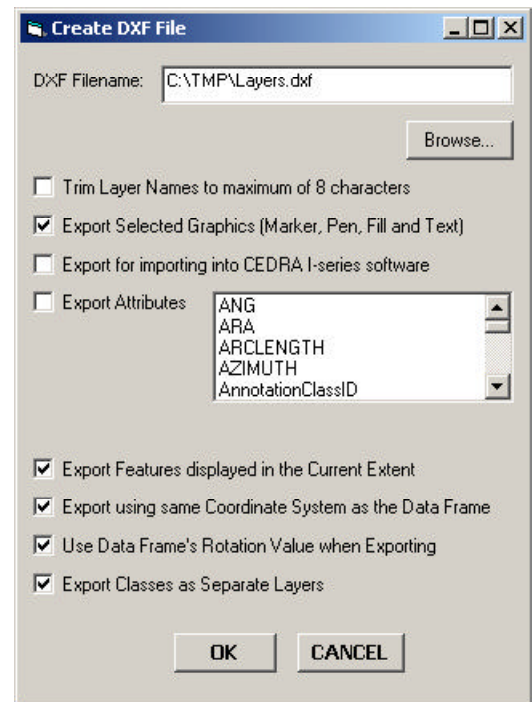➤ 4 **Enter** in the *DXF Filename:* data field the full path name of the DXF file to be created, or

Figure 2
Create DXF File Dialog Box

accept the default **filename**, which should be the name of the current active data frame,
or
click at the **Browse...** button to display a conventional file selection window, **navigate** to the desired directory where the new file to be created is located, **enter** the desired name of the new file, and then **click** at the **Save** button to return to the dialog box of Figure 2.

In each of the steps below, if the small square to the left of the indicated data fields:
• Is not checked, click at it to check it, and perform the indicated operation.
• Is checked, click at it to make it unchecked, and not perform the indicated operation.

➤ **5**   **Click** at the **small square** to the left of the *Trim Layer Name to maximum of 8 characters* data field to check it, and instruct the program to trim the names of the visible layers that are to be processed to a maximum of eight characters, with the first eight left most characters of the layer name being used, **if it is so desired**.

Note that if the above option is chosen, attention should be paid to the names of the various layers in the ArcGIS document to ascertain that no two layer names share the same first eight characters. If that is the case, then aliases should be used to make the proper distinction between the layers.

➤ **6**   **Click** at the **small square** to the left of the *Export Selected Graphics (Marker, Pen, Fill and Text)* data field to check it, and instruct the program to include in the DXF file any selected graphic elements, **if it is so desired**.

➤ **7**   **Click** at the **small square** to the left of the *Export for importing*

into CEDRA I-series software) data field to check it, and instruct the program to create the DXF file in a format that is suited for the CEDRA I-series software, **if it is so desired**.

The basic differences between the AutoCAD and the CEDRA I-series software DXF format are: (a) the symbol for denoting degrees of an angle or direction and (b) how color is assigned to an entity. For AutoCAD the color is assigned BYLAYER, while for the CEDRA I-series it is assigned on an entity by entity basis.

➤ **8**   **Click** at the **small square** to the left of the *Export Attributes* data field to check it, and instruct the program to include in the DXF file a blocks the attributes to be selected in the step below, **if it is so desired**.

➤ **9**   **Scroll** down in the choice list to the right of the above data field, and **click** at each of the names of the **attributes** that should be included in the DXF file. There is no limit to the number of attributes that can be selected.

Regarding the attribute selection list displayed in the CEDRA Export DXF File Dialog Box, it is noted that this list contains, in an alphabetical order, all attribute field names of all layers selected for processing.

➤ **10**   **Click** at the **small square** to the left of the *Export Features displayed in the Current Extent* data field to check it, and instruct the program to process all visible layers regardless of whether any features within any layer has been selected or not, **if it is so desired**.

Regarding the above step, note the following:
• If the above small square is not checked, then the program will

process only the features within each visible layer that is selected.

• If the small square to the left of the *Export Selected Graphics (Marker, Pen, Fill and Text)* data field is checked, all Marker, Pen, Fill and Graphic Text elements in the visible annotation group layers which are within the current extent will be exported, regardless of their selection state. The name of the annotation group layer will serve as the name of the layer in the DXF file.

➤ **11**   **Click** at the **small square** to the left of the *Export using same Coordinate System as the Data Frame* data field to check it, and instruct the program to export all features in the coordinate system of the current active data frame, **if it is so desired**.

Note that if the small square to the left of the *Export using same Coordinate System as the Data Frame* data field is not checked, the data to be exported is placed in the coordinate system of the layer's source data. If this option is checked, all data that is exported is placed in the coordinate system of the current active data frame.

Furthermore, when using the option *Export using same Coordinate System as the Data Frame* from within Layout View, when this option has been activated (checked), all of the data that is exported will be in the same coordinate system as the last view (data frame) that was processed. Additionally, if the Data Frame has a rotation, the rotation will be used in the exporting so that in the DXF file, north will be point upward. When this option is not activated (not checked), the data exported will be in sheet coordinates, so that the contents of the DXF file will resemble that which

is displayed in Layout View within ArcMap.

➤ **12 Click** at the **small square** to the left of the *Use Data Frame's Rotation Value when Exporting* data field to check it, and instruct the program to export all features by applying the rotation value assigned to the current active data frame, **if it is so desired**. If this parameter is checked, the exported features will be rotated in accord with the data frame's rotation value. If not checked, the exported features will not be rotated and as such will not reflect the rotation of the data frame.

➤ **13 Click** at the **small square** to the left of the *Export Classes as Separate Layers* data field to check it, and instruct the program to export the classes in a layer's classification as separate layers. If the layer has not been classified or if this parameter is unchecked, the name of the layer is used in the exporting processing. When checked, a feature will be assigned the name of the class, which it resides in, within the classification as the feature's assigned layer in the DXF file.

➤ **14 Click** at the **OK** button to close the dialog window, and continue, or **click** at the **Cancel** button to abort the command.

Having clicked at the *OK* button, the program begins to process the layers and graphics, if any. In doing so, a progress bar is displayed in the status bar, as well as captions identifying which layer is being processed. When the DXF file has been completed, a message to that effect is displayed in said status area.

Notes

a. The [Layer RGB Values] command displays the RGB value for each of the classifications assigned to the active layer.

b. Shown in Table 2 is a sample **rgbmap.txt** file which can be used to control the color mapping. Data lines which begin with the /* characters denote a comment line and are ignored. The other data lines contain 2 values with at least one space separating the values. The first value is the ArcMap RGB value to be mapped, while the second value is the AutoCAD color to be used for the RGB value. This number is a value between 0 and 255. There is no limit to the number of color mappings that can be defined. The **rgbmap.txt** file resides in the avprjs folder within the CEDRA distribution folder.

c. Shown in Figure 3 is an example of how ArcMap symbols will be exported. Note that the **rgbmap.txt** file can be used to control the color mapping between the ArcMap RGB value and its corresponding AutoCAD color value.

Summary

A long time item on our development list, the ability to export ArcMap symbols is a major enhancement to the software. We are pleased to have made the enhancement and hope our users find it as useful as we do.

Users with a software support agreement should check with The CEDRA Corporation on how to obtain a software update so as to be able to utilize this new functionality.

As always, users who have a need for functionality that is not presently available in CEDRA software should feel free to forward these requests to CEDRA, as well as, any other comments or suggestion you may have.

Table 2
File rgbmap.txt - ArcMap to AutoCAD Color Map

```
/*
/*  The following contains
/*  the RGB color value
/*  mapping for certain
/*  AutoCAD colors
/*
/*  Each line contains two
/*  values:
/*  Value 1:  ArcMap value
/*  Value 2:  AutoCAD value
/*
/*  BLACK
/*
33554432        7
/*
/*  BLUE
/*
50294784        5
45107456        5
/*
/*  GREEN
/*
33619797        3
/*
/*  YELLOW
/*
33619967        2
/*
/*  CYAN
/*
50316544        4
50323315
/*
/*  RED
/*
33554687        1
/*
/*  MAGENTA
/*
46465279        6
44630246        6
/*
/*  GRAY
/*
46976204        8
/*
/*  LIGHT GRAY
/*
48357857        9
45265586        9
```

Figure 3(a)
ArcMap Symbols

Figure 3(b)
ArcMap Symbols as they appear in the DXF File