

The CEDRA Corporation's COMMAND OF THE MONTH

A monthly information bulletin

August 2005

FEATURED COMMAND
Print Data Frame



Application Description

ArcGIS® users who have tried to print a map from within ArcMap have come to realize that there are a few steps which need to be performed in order to perform this task. That is to say, printing a map is not as easy as clicking {File} [Print]. In addition, if the document file contains more than 1 Data Frame, then the number of steps, which need to be performed, increases dramatically.

From the ArcMap perspective, the user in printing a map needs to:

1. Configure the printer to accommodate the desired map size.
2. Go to Layout View, from which, the Data Frame to be printed, can be sized and positioned. If the document file contains more than one Data Frame, and if the user desires to print only one specific Data Frame, then all Data Frames that are not to appear in the print will need

to be repositioned away from the printable area.

3. Add any additional graphics to enhance the map, and finally,
4. Send the map to the desired printer.

In performing the above, there are a number of commands which need to be selected and numerous “clicks” which need to be made.

Command Of The Month bulletin

This month's issue addresses how to print the contents of an ArcMap Data Frame at a user-defined scale.

The CEDRA Solution

To ease the printing of a map from within ArcMap, the Print Data Frame command, located within the CEDRA-



Figure 1 ArcGIS®
CEDRA-DataFrame-Tools Toolbar

DataFrame-Tools toolbar, can be utilized. Shown in Figure 1 is the CEDRA-DataFrame-Tools toolbar, which contains a single combo-box. The Print Data Frame command is the last command in the menu item list of this toolbar.

The Print Data Frame command can be used to print a map from within Data View or Layout View, at any user desired scale, with the least amount of effort.

Map Printing Basics

Before describing the Print Data Frame command let's spend a little time in describing the theory behind generating a print. Figure 2 will be used to help describe the concepts presented below.

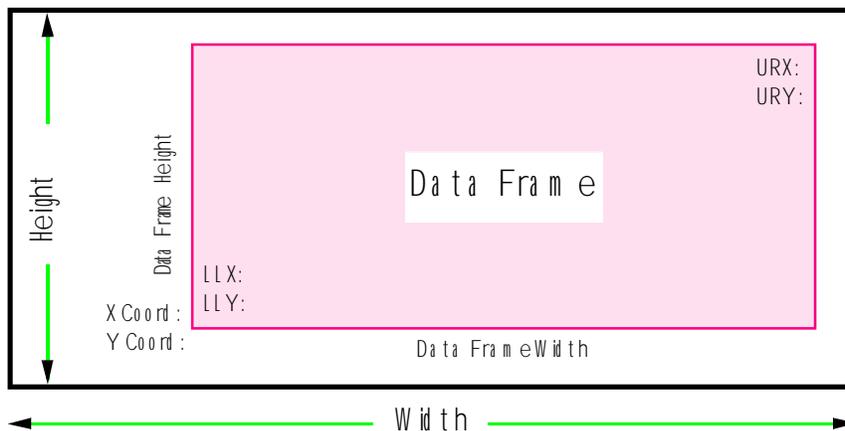
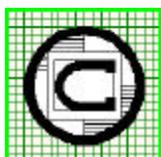


Figure 2 Paper and Data Frame Concepts

First, there is the Paper on which the map is to appear. The Paper has two user controlled properties, its Width and Height. Shown in Figure 2, the bold black line represents the Paper, which is to contain the map. The units of the paper's *Width* and *Height* properties are in inches (millimeters).

Within the Paper, the user positions the Data Frame to be printed. In positioning a Data Frame the user can control the coordinates of the low left corner of the Data Frame, and its width and height. Shown in Figure 2, the *X Coord*:



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Phone: 585-232-6998

Fax: 585-262-2042

65 West Broad Street
Rochester, New York 14614

E-mail: cedra@cedra.com

URL: <http://www.cedra.com>

and *Y Coord*: labels denote the low left corner of the Data Frame with respect to the low left corner of the paper, while the *Data Frame Height* and *Data Frame Width* labels represent the height and width of the Data Frame. Each of these four parameters is expressed in inches (millimeters).

It is important to remember that an ArcMap document file (.mxd) can contain several Data Frames. However, a document file contains only one Layout View. Thus, all Data Frames in an ArcMap document file share the exact same Paper.

Therefore, if a document file contains several Data Frames, when the user enters the Layout View all of the Data Frames in the document file will appear in the one single Layout View, and hence on the Paper plot when printed. As such, if only one Data Frame is to be printed, all of the other Data Frames will have to be repositioned outside of the Paper. The Print Data Frame command does this for the user automatically.

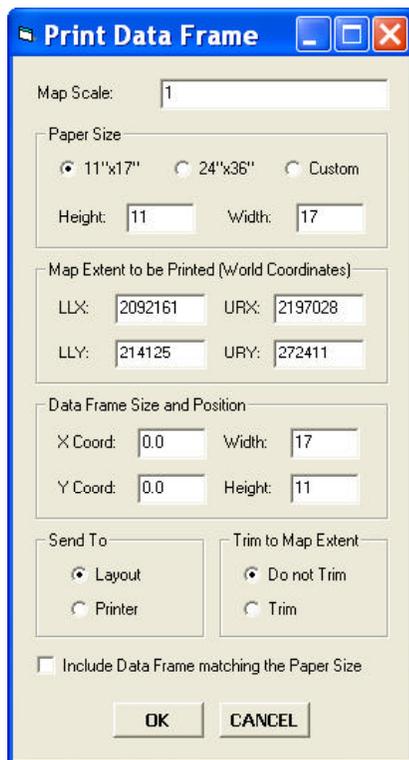


Figure 3
Print Data Frame Dialog Box

When the Layout View is displayed, the contents of the Data View will appear within the Data Frame. The user is able to control the extent of the Data View area shown by specifying the coordinates of the low left and upper right corners of the area to be displayed, and hence printed, as well as, the scale of the Data Frame. The labels *LLX* and *LLY*, shown in Figure 2, represent the low left corner coordinates of the Data View. Likewise, the labels *URX* and *URY* denote the upper right corner coordinates. These coordinates are in world units, not paper units.

Print Data Frame Command

To use the Print Data Frame command, the user can be in either the Data View or the Layout View. If the ArcMap document contains more than one Data Frame, the user must activate the desired Data Frame to be printed prior to invoking the command. Upon invocation of the command, the user is presented with the dialog box shown in Figure 3, which contains a number of properties that the user can specify.

Map Scale Property

If the command has been selected for the first time, the default Map Scale displayed in the *Map Scale*: data field will be 1. If not, the last specified scale will be displayed in this data field.

In specifying the scale the user needs to account for the conversion from world units to paper units. For example,

let us assume we have a Data Frame which is in feet, and we wish to produce a 200 scale drawing (1" = 200'). The scale that should be entered would be 2400 (200 x 12 = 2400). Likewise, if a 100 scale drawing (1" = 100') is desired, the scale that should be specified would be 1200 (100 x 12 = 1200).

Paper Size Property

With this property, the user specifies the Width and Height of the Paper on which the map is to appear. Two predefined sizes are presented, 11"x17" and 24"x36", as well as an option to specify a Custom size. To select a paper size, the user clicks at the radial button to the left of the label denoting the desired paper size option. If a Custom size is desired, the user must enter the desired paper dimensions Height and Width in the corresponding data fields. The units of these dimension values should be in inches (millimeters).

Map Extent Property

When the command is activated, the command determines the low left corner and upper right corner coordinates of the active Data Frame, and displays these values in the *LLX*:, *LLY*:, *URX*: and *URY*: data fields of the dialog box. These values are in world units, and represent the coordinates of the map as displayed in the active Data Frame (the area displayed on the screen).

If the user wishes to print the map as shown on the screen, then the values



Figure 4 Single Data Frame to be Printed

shown in the above said four data fields of this property need not be altered. Otherwise, any other coordinate values may be specified.

Data Frame Size and Position Property

This property enables the user to size and position the Data Frame on the Paper, see Figure 2. In positioning the Data Frame, the user specifies the coordinates of the Data Frame's low left corner, while the size of the Data Frame is specified by entering a width and height. The units of these values should be in inches (millimeters).

Shown in Figure 4 is the conceptual representation of a single Data Frame being printed such that it fills the entire drawing sheet or Paper. Under this condition, the *X Coord:* and *Y Coord:* values would be zero, while the *Height:* and *Width:* values would be identical to the Height and Width values for the Paper Size property specified as described above.

It is important to note that a printer reserves a *non-printable* border strip area around the perimeter of the paper so that it can hold on to the paper. The width of this strip depends on the printer being used. Therefore, under the scenario of the preceding paragraph, the contents of the Data View that fall within the non-printable area will be clipped (lost). If that is not desirable, then appropriate values should be entered in the *X Coord:*, *Y Coord:*, *Height:* and *Width:* data fields.

When printing a map for final presentation, it is common practice to supplement the map display with a border, title block, and certain other information. Such line and text work can be:

- Introduced by the user on an as need basis, and the map printed on a blank piece of paper. In this case the drawing sheet border, title block and the like would have to appear in the Data View or in the Layout View. This Data View approach is discussed later on.

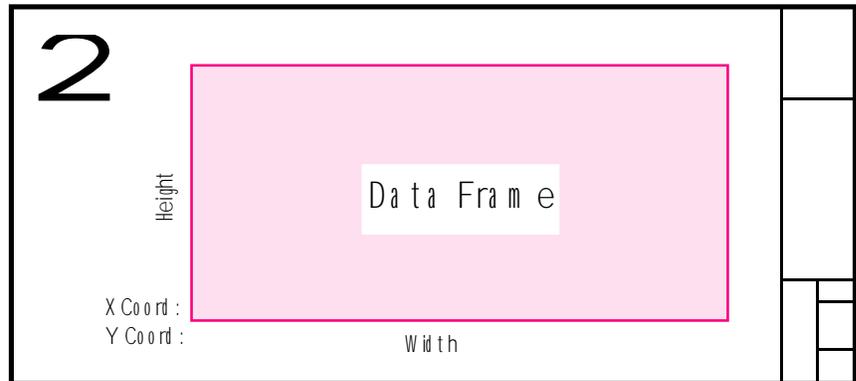


Figure 5 Positioning the Data Frame so as not to Overlap the Sheet Border

- Contained on preprinted drawing sheets. In this case, the user should specify values for the *X Coord:*, *Y Coord:*, *Width* and *Height* parameters in the corresponding data fields of this property. These values should be such so that the Data Frame contents would not overlap the title block or any other drawing sheet information, see Figure 5.
- sired property settings, peruse the new display, and modify it or send it to the printer.

Trim to Map Extent Property

This property enables the user to trim (clip) the map to the map extent values as specified above under the Map Extent property. If the user selects the:

Send To Property

The user has the option to send the map directly to the printer, or to the Layout View, where it can be previewed. It was stated earlier that the Print Data Frame command may be invoked from either the Data View or Layout View. In either case, the command will prepare the map using the above said property settings. If the command is invoked from:

- 1 The Data View, then if the:
 - *Printer* option is selected, the map will be printed using the properties specified by the user.

- *Layout* option is selected, the command will place ArcMap in Layout View where the map can be viewed. The Print Data Frame command can then be re-invoked, and the property settings can be altered before sending the map to the printer.

- 2 The Layout View, what will be displayed depends on the last defined settings. The user may set the de-

- *Do not Trim* option, the command will fill the Data Frame in Figure 5 with as much of the Data View as will fit at the specified scale.

- *Trim* option, the command will clip the Data View using a polygon shape whose low left and upper right corner coordinates match those set above under the Map Extent property.

In order to carry out this option, the program automatically sets the Data Frame property *Clip to Shape* to *Enabled*.

When the *Clip to Shape* property is set to *Enabled*, the user will see only the area that falls within the Map Extent coordinate range. To display all of the map area within a specified extent, the user can either:

- Invoke the Print Data Frame command, and then select the *Do not Trim* option for the program to automatically disable the Data Frame property *Clip to Shape*.



Figure 6
Data Frame Property Dialog Box

- Manually disable the Data Frame property *Clip to Shape* using conventional ArcMap functionality as follows:

- Right-click at the name of the frame being printed, and select the *Properties...* command to display the Data Frame Properties dialog box of Figure 6.

If the Data View property *Clip to Shape* had been previously enabled, a check mark will be displayed at the small square to the left of the *Enable* label.

- Click at said small square to the left of the *Enable* label to remove the check mark, and thus disable the last said property.
- Click at the *Apply* and then at the *OK* button to terminate and close the dialog box.

While we are in the subject of map trimming, it is important to address the relationship of the Data Frame size, map extent and scale. When placing the map extent onto the Data Frame, the program places the center point of the map extent at the center point of the Data Frame. Thus, if the scale and map extent are such as to produce an area:

- Smaller than the width and/or height of the Data Frame, a blank

space will be introduced beyond the limit(s) of the map extent.

- Larger than the width and/or height of the Data Frame, the excess area will be trimmed (clipped).

Include Data Frame matching the Paper Size Property

As stated earlier, an ArcMap document file can contain several Data Frames. As such, it is possible for the user to create a Data Frame which solely contains the border and title block for a drawing sheet. By activating this property, the user is able to include that Data Frame in the map to be printed. This approach enables the user to keep the map data in one Data Frame, and the title block in another.

In using this property, there are two points which the user needs to be aware of.

- First**, the name of the Data Frame, which is to be included, must be a certain name, that being: (a) 11"x17", (b) 24"x36" or (c) Custom depending upon the Paper Size property setting. If this property is activated, and if the command can not find a Data Frame with the expected name, an appropriate error message will be displayed. Note that it is possible for the document file to contain all three data frames, 11"x17", 24"x36" and Custom.
- Second**, the low left corner coordinates of the Data Frame should be X=0.0 and Y=0.0 and the units of the Data Frame should be set to inches (millimeters). It is assumed that the Data Frame to be included is drawn at a 1" = 1" scale.

As an example, let us assume we have an ArcMap document file which contains two Data Frames. One is called Layers and the other, Custom. Within the Layers Data Frame the user displays parcels, sewer lines and other desired features. In the Custom Data Frame, the user has created a drawing sheet bor-

der with title block and pertinent annotation. The contents of the Layers Data Frame are in state plane coordinates (feet), while the contents of the Custom Data Frame are in paper units (inches).

By activating the *Include Data Frame matching the Paper Size* property, the Print Data Frame command will create a map positioning the Layers Data Frame as specified with the Print Data Frame properties, and include in the map the Custom Data Frame at a 1 to 1 scale. In so doing, the user is able to combine map data and a drawing sheet border.

Note, when the Include Data Frame matching the Paper Size option is selected, the command sets the Data Frame's Extent property to Fixed Scale, see Figure 6, with the scale set to 1. In so doing, a 1 to 1 scale is achieved for the Data Frames called 11"x17", 24"x36" or Custom, and only when this property is enabled.

Printing the Map

Once the properties have been specified, the user can select the OK button to either: (a) send the map directly to the printer, or (b) place ArcMap in Layout View where the map can be reviewed. Selection of the Cancel button aborts the command.

If the OK button is selected, an information message box similar to the one shown in Figure 7 is displayed. This message is displayed:

- The first time a print is generated in an ArcMap session, and
- When a different Page Size has been specified.



Figure 7
Configure Printer Message Box

This message is intended to inform the user that the printer needs to be configured before the map can be sent to the device. The OK button can be selected to dismiss the message box.

Once the information message box has been dismissed, the conventional ArcMap Page Setup dialog box of Figure 8 is displayed. Using this dialog box, the user is able to configure the printer as desired.

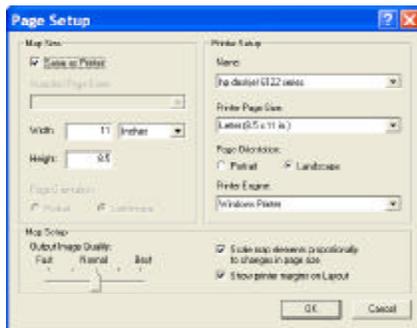


Figure 8
Printer Configuration Dialog Box

After the printer properties have been set, the OK button can be selected to either: (a) send the map to the printer, or (b) place ArcMap in Layout View.

In preparing the map, the Print Data Frame command positions the Data Frame as specified by the user. Any other Data Frames that may exist in the document file are positioned above the Paper. The exception to this occurs when the Include Data Frame matching the Paper Size property is enabled. In this case the Data Frame called 11" x 17", 24" x 36" or Custom will be included in the map that is generated.

Summary

Essentially, the Print Data Frame command can be used in one of two modes. The first is to print a single Data Frame (the current active Data Frame), while the second is to print two Data Frames. The second mode is ideal when the user wishes to include a drawing sheet border in the map, while the first mode is

used when the user simply desires to print the current active Data Frame.

For those users who have printed maps from within ArcMap, the Print Data Frame command provides a more streamlined approach to printing maps. We encourage you to try the Print Data Frame command, and let us know your comments.

If you have a request for Command Of The Month, feel free to phone, fax or e-mail your request to The CEDRA Corporation.