
Chapter 3

ArcGIS Data to MicroStation

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3.1 Objectives

Show the process of taking ArcGIS data and utilizing the data in MicroStation. The process will include converting ArcGIS data over into a MicroStation file. Also we will show using ArcGIS data in MicroStation, but viewing the data as a referenced file.

3.2 Plan Geometry on Highway Plans

MoDOT utilizes a “modified” state plan coordinate system when laying out design projects. Since the standard state plan coordinate system is not “on the ground”, the distances between state plan points will not match what is in the field. These coordinates must be “modified” by a certain factor so that they fit what’s on the ground. This factor is called “projection factor” or “grid to ground” factor for a particular project.

The modified state plan coordinate system also allows for a higher degree of accuracy over the length of the project since it applies the “projection factor” to all the surveyed points on the project.

Projects are designed and constructed using the modified state plane coordinates because ground distances are required. The district survey party can provide you the projection factor for a project that you are working on.

Because the average elevation is included in the figuring of the “projection factor” calculation, every project that is created will have a different “projection factor” applied to that project. This creates issues when using MicroStation geometry within other applications like ArcGIS and vice versa.

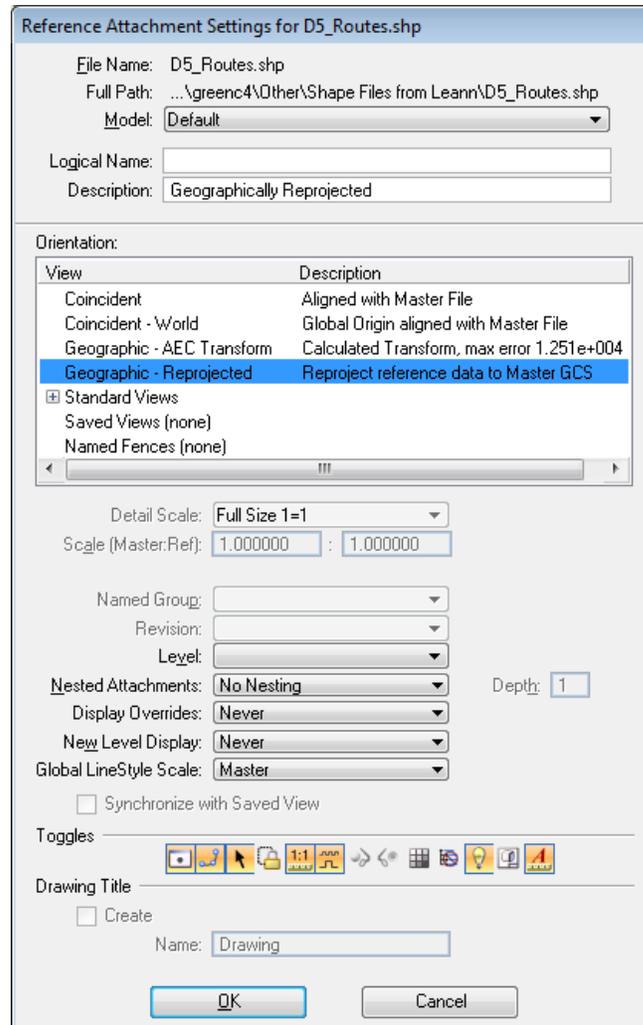
3.3 Referencing ArcGIS data in MicroStation

ArcGIS data can be viewed in a MicroStation file without the need to convert the UTM based ArcGIS data over to a MicroStation file. This can be used when the ArcGIS data doesn’t need to be edited and needs to be just viewed in the dgn file. This is done by using the Reference option in MicroStation.

Basic Steps included:

- Using the Geographic tools to apply a custom state plan coordinate system to the MicroStation file (explained in detail in Chapter 1).
- Opening the Reference option in MicroStation
- Attach the shapefile (*.shp) into the MicroStation file, just like if you were attaching a dgn file to the master file.

- Change the Orientation when attaching the shapefile to **Geographic – Reprojected**. This will reproject the ArcGIS data in the shapefile to the geographic coordinate system that is applied to the MicroStation file and fall in the correct location on the file.



3.4 Converting ArcGIS data into MicroStation Data

ArcGIS data can also be easily converted over into MicroStation format. There are certain steps that need to be done in order to convert the data because of the ArcGIS data normally being in UTM coordinates and the MoDOT MicroStation data normally being in a modified state plan coordinates.

Basic Steps included:

- Reprojecting the UTM coordinate based shapefile in ArcGIS to the correct Missouri State Plan Zone coordinate system. The reprojected file is added back into ArcMap.

- In ArcMap, use the Export to CAD tool from within the Arc toolbox. This will create a MicroStation file that will be in the State Plan Coordinate System.
- User can then take the newly converted file and use the Geographic toolbar to set the dgn file coordinate system to the correct Modified State Plan Zone coordinate system.

3.5 Referencing ArcGIS data in MicroStation (From Reference File)

ArcGIS data that is referenced into a MicroStation file can be converted over into MicroStation format. Doing this allows you to edit or use the data as MicroStation geometry. This also eliminates the need to open ArcMap and using the Export to CADD tool to create a separate dgn file of the ArcGIS data.

There are steps that need to be done in order to convert the data because of the ArcGIS data normally being in UTM coordinates and the MoDOT MicroStation data normally being in a modified state plan coordinates.

Basic Steps included:

- Using the Geographic tools to apply a custom state plan coordinate system to the MicroStation file (explained in detail in Chapter 1).
- Opening the Reference option in MicroStation
- Attach the shapefile (*.shp) into the MicroStation file, just like if you were attaching a dgn file to the master file.
- Change the Orientation when attaching the shapefile to **Geographic – Reprojected**. This will reproject the ArcGIS data in the shapefile to the geographic coordinate system that is applied to the MicroStation file and fall in the correct location on the file.
- Select the “Merge to Master” option in the Reference dialog to extract the data out of the shapefile and place it as MicroStation geometry for you to edit or use, if necessary.

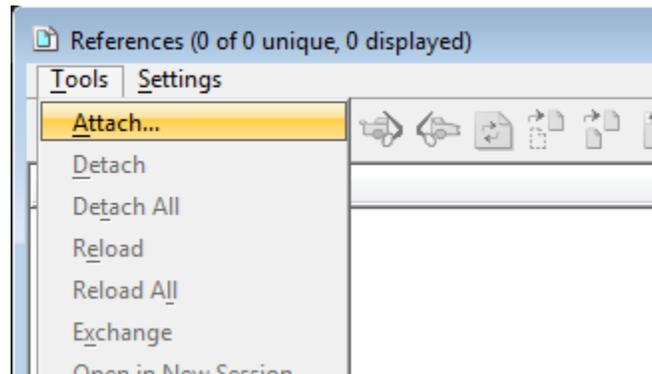
3.6 Example 3-1

This example will demonstrate how to take an ArcGIS shapefile and use it as a reference file in a MicroStation file.

1. In ProjectWise, open the following MicroStation file:

`pwname: \\MoDOT\Documents\District CADD\Design\cadduser##\J5P0887\Plan_J5P0887.dgn`

2. Open the **Reference** dialog. Under the *Tools* menu, select the **Attach** option. This will allow you to navigate to the stored shapefiles.



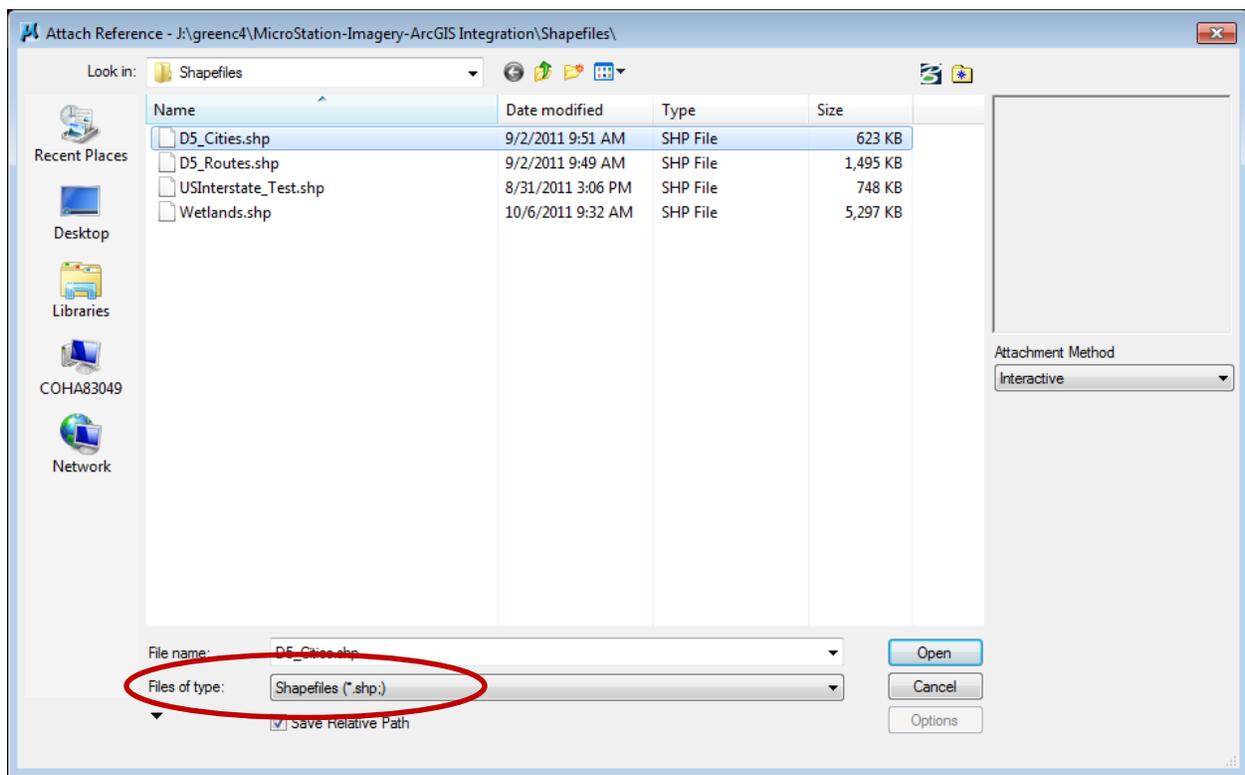
- Once in the *Attach Reference* dialog, click **Cancel**. Now you can navigate to the location on the network where you have the shapefiles at.

For this example, the shapefiles are stored in the following location:

T:\de-proj\ArcGIS-CADD\cadduser##

If the shapefiles don't show up in the list, change the *File of type* filter to **Shapefiles (*.shp)**.

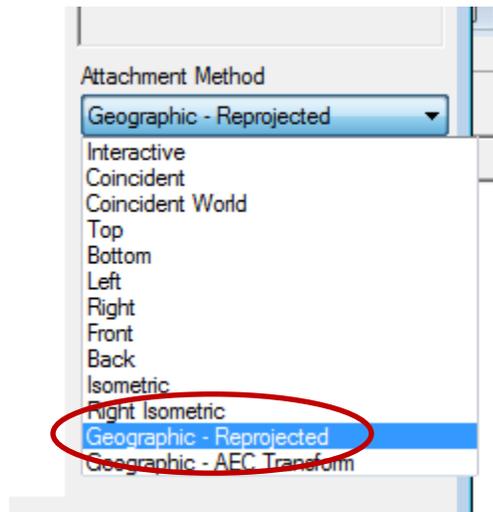
Note: ArcGIS shapefiles need to be stored outside ProjectWise. This is because shapefiles use other associated files with it. When the shapefiles and other associated files are stored in ProjectWise, MicroStation just tries to attach the shapefile and doesn't know how to handle the other files associated to the shapefiles.



4. Before attaching the shapefiles, you will need to change the attachment method on how the shapefile gets attached to the dgn file.

Within the *Attach Reference* dialog, change the Attachment Method to **Geographic – Reprojected**.

Using the *Geographic – Reprojected* attachment method allows MicroStation to take the coordinate system applied to the shapefiles being attached and reprojects them to the geographic coordinate system applied to the MicroStation file.



Click **Open** when you are ready to attach the shapefiles.

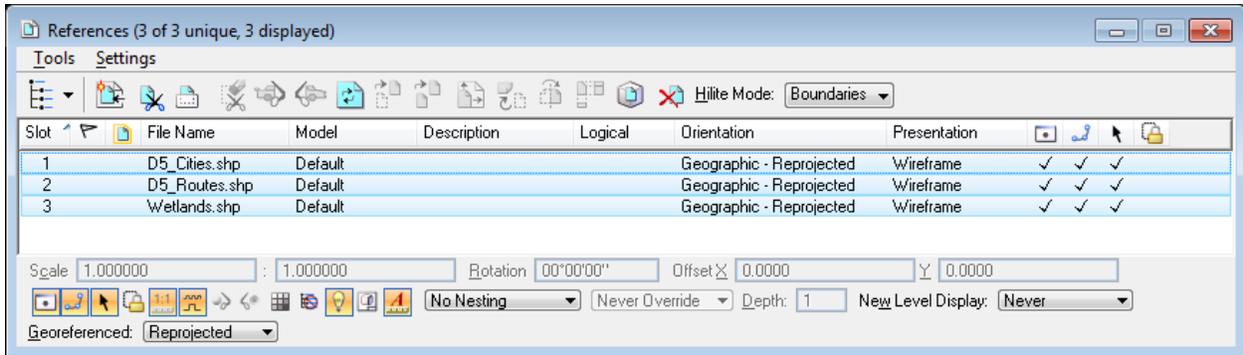
5. You should now see the attached shapefiles in the MicroStation file.

Save the changes to the dgn file.

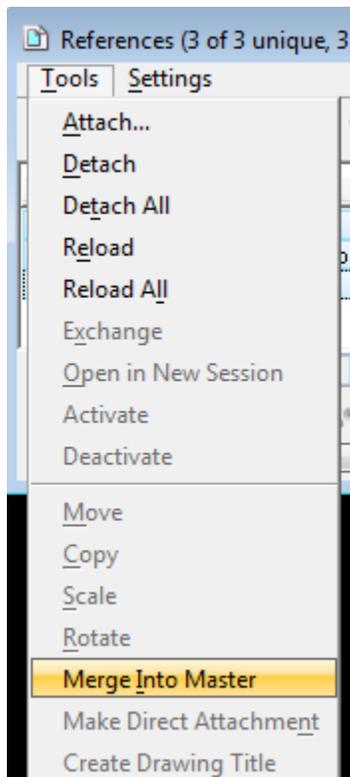
3.7 Example 3-2

This example will demonstrate how to take a referenced ArcGIS shapefile and extract the geometry out of the shapefile and make it into active geometry in the MicroStation file.

1. Activate the **Reference** dialog. Select the shapefiles in the reference dialog you want to “merge” into the active dgn file.

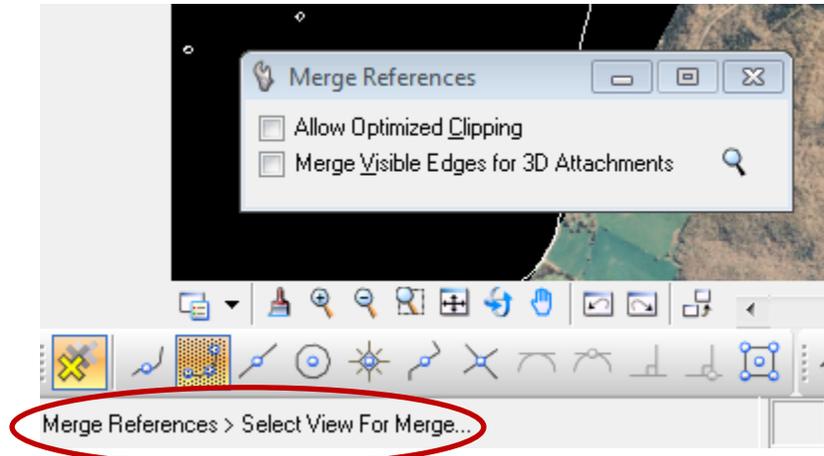


2. Under the *Tools* menu, select the **Merge to Master** option.



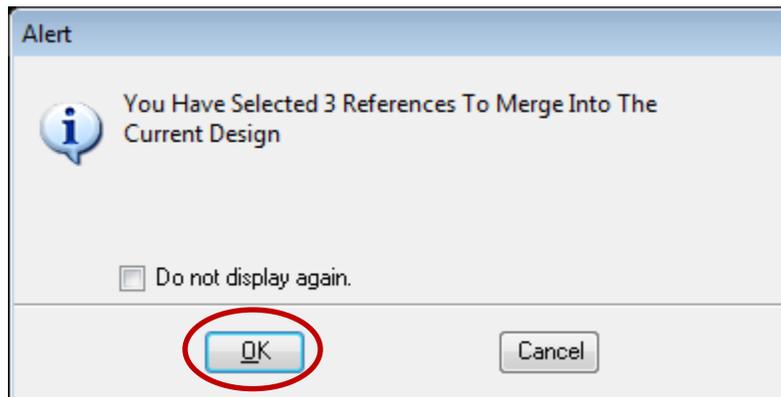
3. You will be prompted in the status bar to *Select View to Merge*.

Left click anywhere in the view window.



4. An *Alert* dialog will appear telling you how many reference files you have selected to merge into the active file.

Click **OK** in the dialog.



5. Once you click OK, it will then take the selected reference files and merge them into the active file. The geometry is now MicroStation geometry that can be edited or modified.

Save the changes to the dgn file.

Tip:

When you merge shapefiles into a MicroStation file, it will automatically put the shapefile geometry on the following geometry attributes:

- Level – Default
- Color – 0
- Style – 0
- Weight – 0

If you need to keep the geometry separated out for each corresponding shapefile, one thing that can be done is to merge one shapefile at a time. After merging one shapefile, use the *Select By Attribute* and select the *Default* level. This will select everything that is on that level. Then you can use the *Change Element Attributes* tool to change the selected geometry to the desired attributes (level, color, style, weight) you wish.

This operation can be done for each shapefile so the geometry on the merged shapefile is still broken out in the file.

3.8 Exercise 3-1

1. In ProjectWise, open the following MicroStation file:

pwname: \\MoDOT\Documents\District CADD\Design\cadduser##\J5P0649\Plan_J5P0649.dgn

2. **Attach** the following shapefiles to the MicroStation file. Make sure you change the attachment method to **Geographic – Reprojected** before attaching the shapefiles.

D5_Cities.shp
D5_Routes.shp
Wetlands.shp

The files are located under: **T:\de-proj\ArcGIS-CADD\cadduser##**

3. Now take each referenced shapefile and merge them into the active dgn file.

Merge each shapefile separately. After merging a shapefile, change the attributes of the merged shapefile geometry to the following:

D5_Cities.shp - Level = Scratch 1, Color = 2
D5_Routes.shp - Level = Scratch 2, Color = 4
Wetlands.shp - Level = Scratch 3, Color = 3

4. **Save the changes to the dgn file.**