MicroStation – Orthophoto to Project Datum

Overview

WSDOT orthophotos are aerial photos that are typically oriented to a State Plane coordinate system. This tech note describes the process required to attach the orthophoto and modify its origin and pixel size so that the orthophoto will be oriented to a Project Datum coordinate system.

This process assumes that the user knows the project datum Combined Factor (CF), the datum shift of the X Y coordinates (typically 100,000 meters), and that the orthophoto has a world file that is in State Plane coordinates (**SID** world files have the same file name as image with ***.SDW** extension, and tiff world files have the same file name as image with ***.TIW** extension).

Workflow

There are three basic steps in this workflow. First, verify the **Raster Manager** preferences, attach the orthophoto, and then modify its properties to edit the origin and X Y scale.

Verify User Preference Raster Manager Settings

Since user preferences are customized in MicroStation, they need to be checked to ensure a consistent behavior.

1. In MicroStation, select the *Workspace* > *Preference* command.
2. Select **Raster Manager** in the *Category* list.
3. Select the **Georeference** tab.
4. Set the world file *Default Units:* **1 Unit = 1.00000**, **US Survey Feet**

Attach Orthophoto with Raster Manager

Similar to referencing other CAD files, raster images such as orthophotos can be attached to the DGN file.

1. Select the *File* > *Raster* Manager command.
2. In the **Raster Manager**, select *File* > *Attach*.

   The Attach Raster Reference dialog box opens.
3. Navigate to the orthophoto file location and select the file.
4. In the *Preview Attachment* area, review the origin X,Y values and verify that they are in the correct location.
5. Disable the **Place Interactively** option.
6. Click **OK**.

The image will be placed in the State Plane position.

7. Close the Raster Manager dialog.

Re-locate the Orthophoto

The origin and pixel size need to be edited to place the orthophoto correctly in the project datum coordinate system.

1. Use the **Element Selection** tool to select the orthophoto.
2. Select *Element > Information* to open the **Element Info** command.
3. Expand the Geometry section
4. Set *Geo Priority* to **Attachment**.
5. Modify the Origin X and Y with the following formula.

Origin X * (1/Combined Factor) + (Project Shift in X) Origin Y * (1/Combined Factor) + (Project Shift in Y)

NOTE: the orthophoto position is updated with each edit to its geometry properties.

6. Modify pixel size X and Y with the following formula.

Pixel Size X * (1/Combine Factor) Pixel Size Y * (1/Combine Factor)

NOTE: the default precision is set to 4 decimal places. After modifying the pixel size the values may not appear to change. To verify the pixel size was modified, note that the Scale X, Y values were modified. The decimal precision may be adjusted via the *Settings > Design File > Working Unit* category.

7. Close the **Element Selection** tool.

NOTE: If an error is made and the orthophoto is not in the correct location, you can reset the original origin and pixel size by repeating steps1-4 and setting the *Geo Priority* to **Sister File**.

Example calculations

The example below uses a fictitious combined factor.

Known Values:

Project Combined Factor = 0.99998777

Project X and Y shift: 100,000 Meters or (39.37/12)*100,000 = 328,083.3333ft

Calculations:

X origin: 566037.48*(1/0.99998777) + (39.37/12)*100000 = 894,127.7361

Y origin: 131905.836*(1/0.99998777) + (39.37/12)*100000 = 459990.7826

X Pixel Size: 0.25*(1/0.99998777) = 0.25000306

Y Pixel Size: 0.25*(1/0.99998777) = 0.25000306

For questions or comments on this tech note, contact your regional CAE Support Coordinator or the WSDOT CAE Help Desk at (360) 709-**8013**.