2 Positioning Images

Preview

In this lesson you will learn how to:

- Set up MicroStation Descartes to Position Images
- Quickly Position an Image with Square
- Quickly Warp an Image with Warp
- Move and Scale an Image

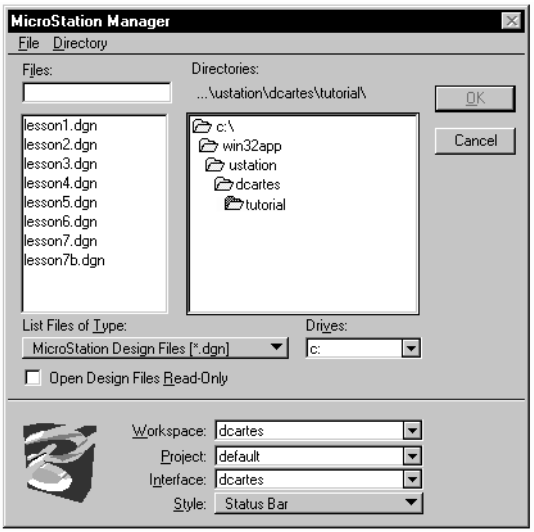
In this lesson, you will also learn basic georeferencing techniques. In this part of the lesson, you will learn how to:

- Set up Register
- Reference an Image
- Save a Model
- Resample an Image
- Add an Image to a Project

Positioning Images

➤ Set up MicroStation Descartes

1. From the MicroStation Manager dialog box, select Workspace > dcartes.



2. Open the design file LESSON2.DGN that is supplied with the tutorial. The file is in the …\dcartes\tutorial directory.

3. From the MicroStation Tools menu, select Image > Image Control and dock it under the MicroStation Main tool box.

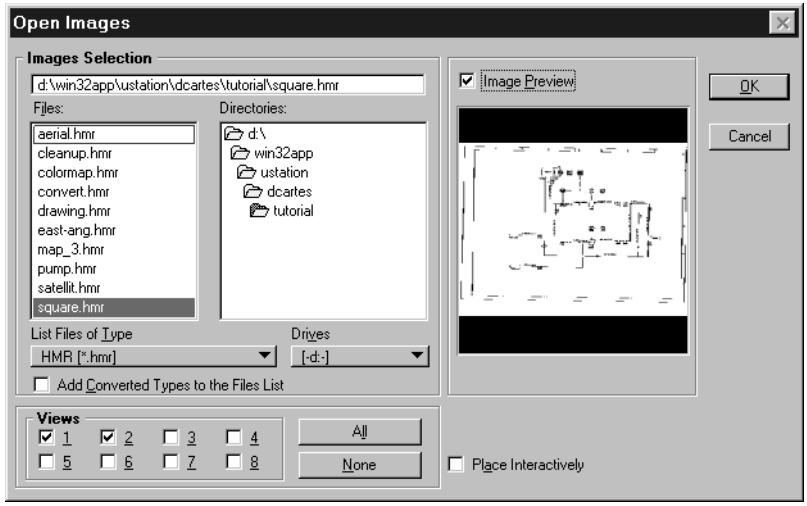
➤ Open an image

1. From the MicroStation File menu, select Open > Image.

   The Open Images dialog box opens.

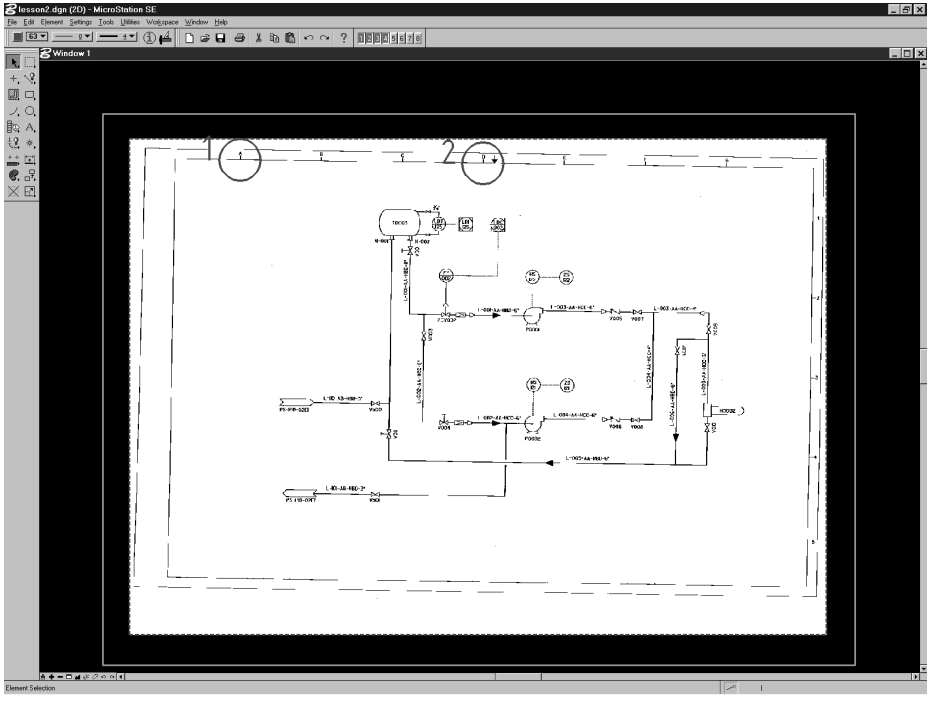
2. Find the SQUARE.HMR image that is supplied with the Tutorial. The file is in the …\dcartes\tutorial directory. Highlight the image.

3. Set the Image Preview setting to on. Notice the display of a thumbnail of the image in the Preview window.



4. Check that the setting for View 1 and 2 are set to on.

5. Click OK to open the image.
The screen should appear as follows.



Positioning Images with Square

➤ **Position an image with Square**

1. Using the *Select Images/Active Image* tool, double-click on SQUARE.HMR to make it the active image.
2. From the MicroStation Tools menu, select Image > Image Transform.
3. From Image Transform tool box, select the *Square Image* tool.

The Image Transform Image Square settings tool box opens.

4. In the tool settings window, set Axis to Horizontal and ensure that Create A New Image is turned OFF.
5. Notice that the cursor in Window **1** changes to a cross. Use the *Square* tool to adjust the image to a horizontal position just as you would arrange a drawing on a drafting table.
6. Enter a data point in the target image.
7. To enter the first horizontal point, snap at location **1** and enter a data point.
8. To enter the second horizontal point, snap at location **2** and enter a data point.

   The image then adjusts to be square to your view.

Warping Images Quickly With Warp

➤ **Position an image with Warp**

1. Bring Window **2** to front. Notice that the shape of the design block element is similar but not identical to the shape of the image. The objective of this exercise is to warp the image to fit exactly within the space and shape defined by the design block.

2. From the Image Control tool box, select *Select Images/Active Image* and double-click on the image at location **5**.

3. From the Image Transform tool box, select the *Warp Image* tool.

The Image Transform Warp settings tool box opens.

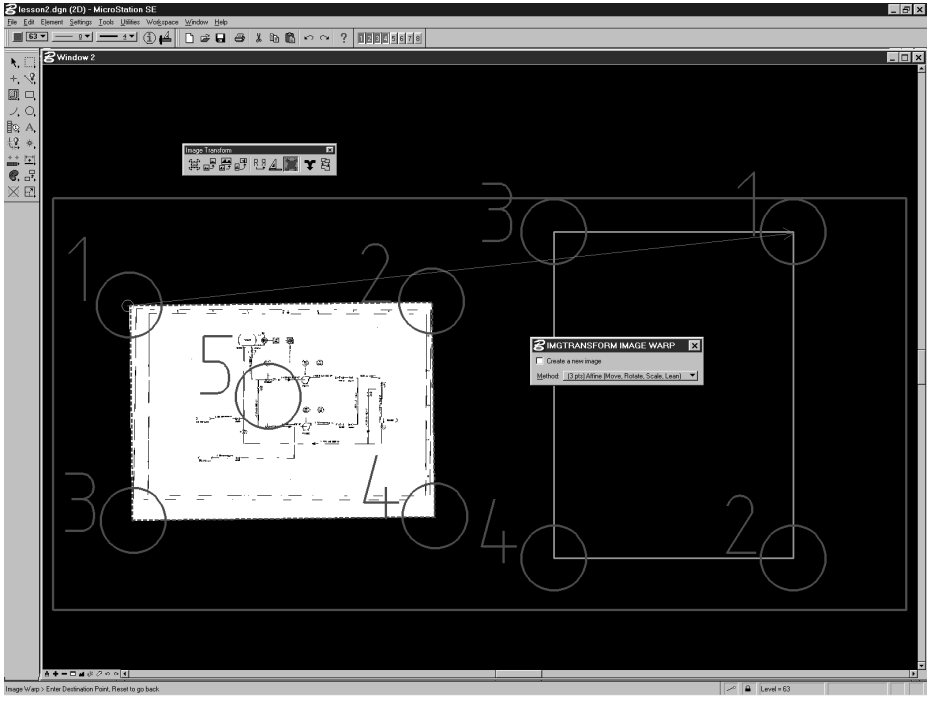
4. From the tool settings window, set Method to 3 (pts) Affine (Move, Rotate, Scale, Lean) and ensure that Create A New Image is turned OFF.

Notice that the pointer changes to a crosshair. You will use the crosshair to identify points on the image that correspond to points on the design block element.

5. Enter a data point in the target image.

6. Select the first point on the image at location **1**.

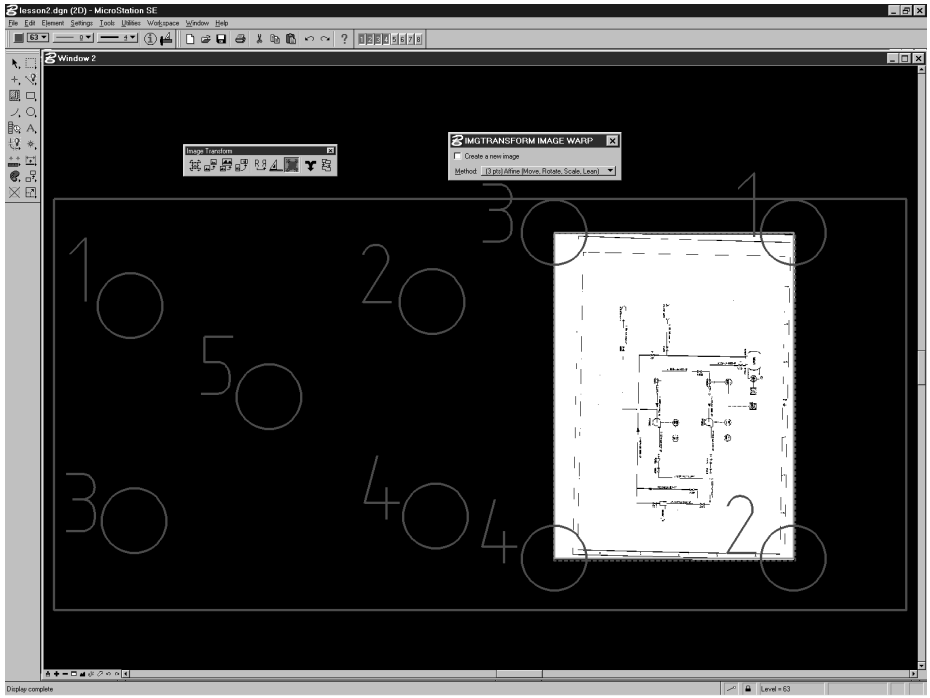
7. Select the corresponding point at location **1** on the design block element.



8. Repeat the procedure for locations 2 and 3 only.

9. Accept the points by entering a data point.

The image will then be warped to fit the target geometric space.



Modifying Images

➤ **Moving an image**

1. From the MicroStation Tools menu, select Image > Undo/ Redo.

2. Undo the Warp you have done previously by selecting the *Undo Image* tool.

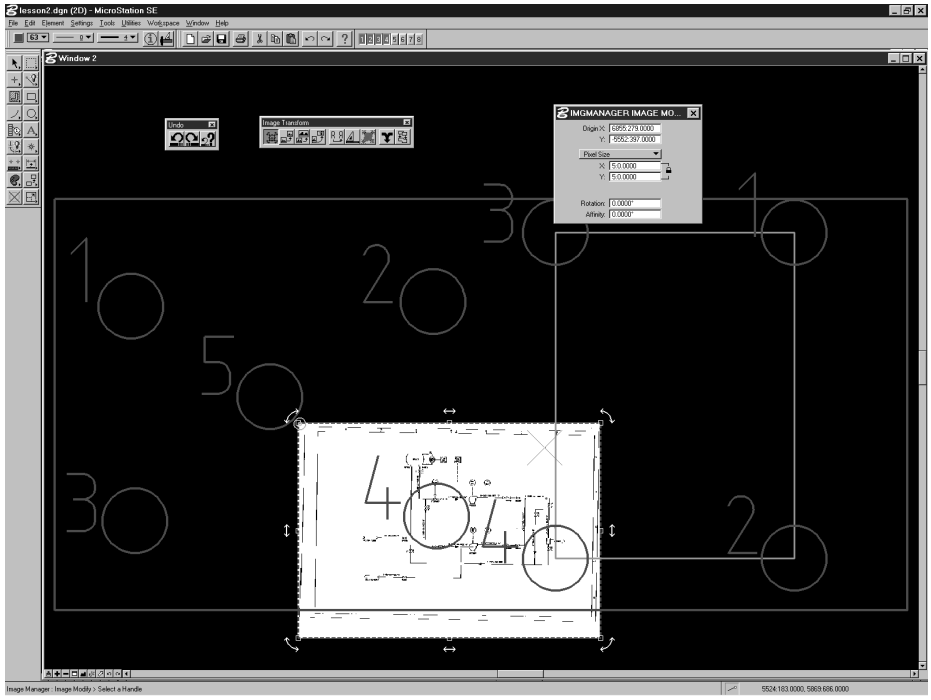
3. From the Image Transform tool box, select *Modify Image.*

Notice that the pointer changes to a cross with a “bull’s-eye” in the center.

4. Enter a data point in the target image at location 1.

   Be sure to be on the image, tentative on the marker.

5. Tentative/Accept at location **5**. Move the pointer and notice that the image travels with your pointer movements. Snap/confirm to location **4** and notice that the image is fixed in a new location.



6. Click the *Undo* tool to return the image to its original position.

➤ Scaling an image

1. From the Image Transform tool box, select *Modify Image*.
2. Enter a data point in the target image a location **4**.

   This point identifies the image and also positions the Origin Handle. This handle acts like an “Anchor Point.” Operations like rotate and affine are done about that point.

3. Snap/data point to location **1**.

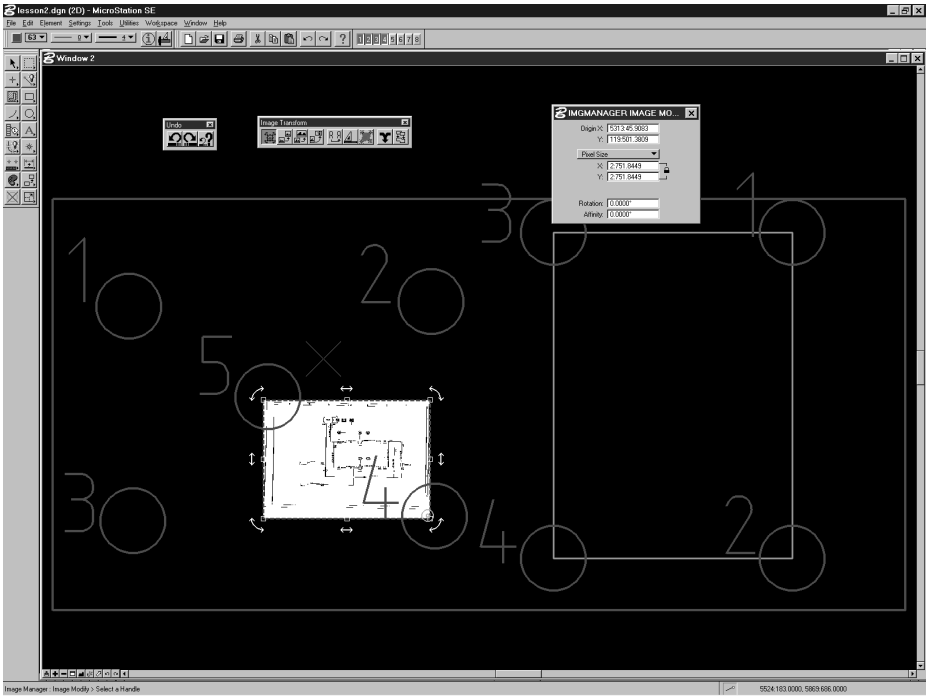
   Notice that the pointer now changes to an X shape.

4. Notice also that an outline shape appears. Without clicking, move the pointer towards location **5**. Notice that the shape or

scale of the outline changes to adjust to your movements. Snap/data point at location **5**.

Note that the location of the Origin handle stays "fixed." All other pixels of the image are repositioned for the exception of this point.

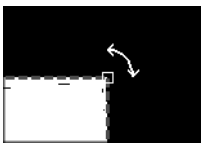
The image immediately scales to fit the outline scale.



➤ Modifying the geometry of an image (Rotation and Affinity)

1. From the Image Transform tool box, select *Modify Image.*
2. Enter a data point in the target image a location **5**.

   This sets the target image as well as the Origin handle.



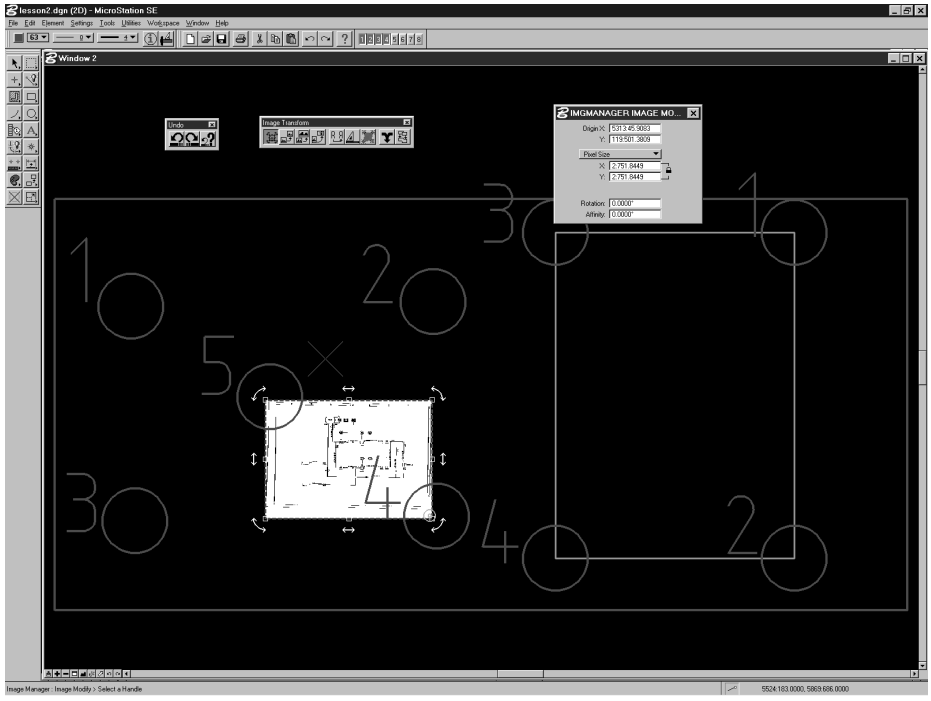
Rotation Handle at location 5

3. Enter a data point on the "arc double-headed arrow" located at the top-right corner of the image, just above the scaling handle.

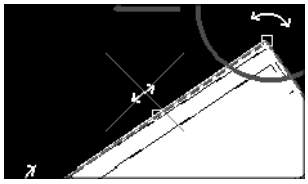
   Notice that the pointer now changes to an X shape. You have selected the Rotation handle. The rotation handles allow you to rotate the image about the Origin handle.
4. Notice also that an outline shape appears. Without clicking, move the pointer towards location **2**. Notice that the

orientation of the outline changes to adjust to your movements. Snap/data point at location **2**.

The image immediately displays to fit the outline orientation.



Note that the location of the Origin handle stays "fixed." All other pixels of the image are repositioned for the exception of this point.



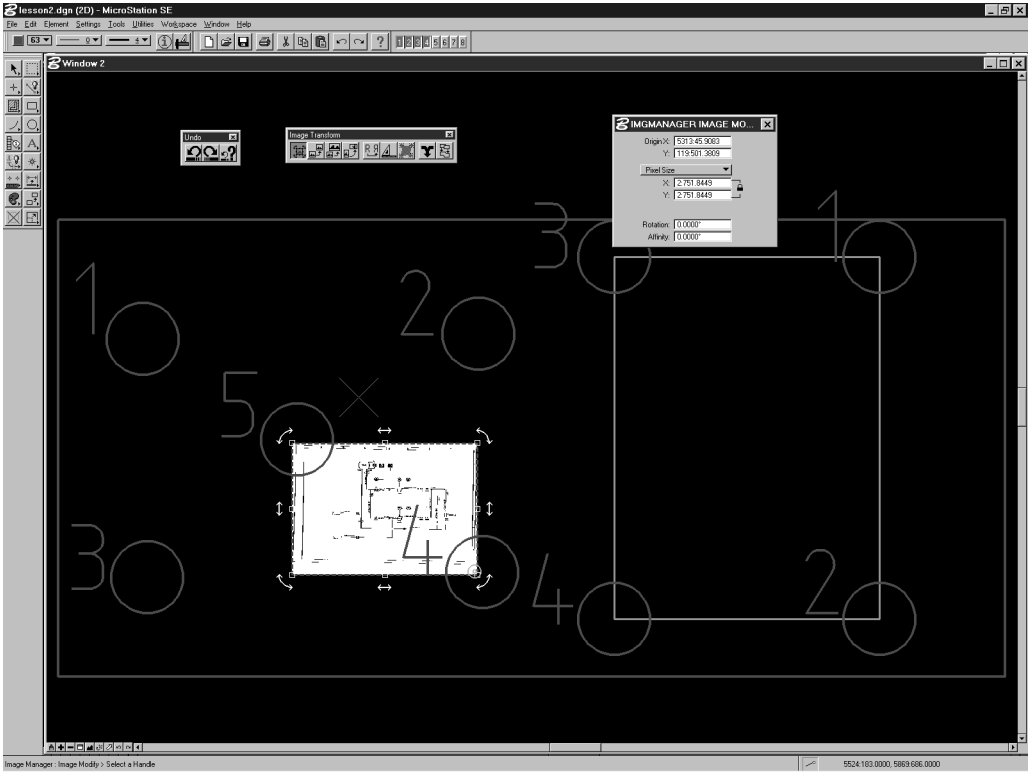
Location of the Affinity Handle

5. Next, you will modify the affinity of the image. Enter a data point on the Affinity handle (double headed straight arrow) located between locations **2** and **5**.

6. Notice that an outline shape appears. Without clicking, move the pointer towards location **5**. Notice that the geometry of

the outline changes to adjust to your movements. Snap/data point at location **2**.

The image immediately displays to fit the outline affinity.



Note that the location of the Origin handle stays “fixed.” All other pixels of the image are repositioned for the exception of this point.

Basic Warping with Register

Complete this section to learn how to warp with geometric precision.

➤ Set up MicroStation Descartes for Register

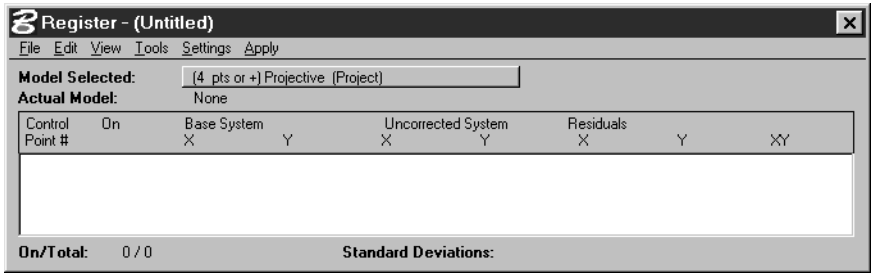
1. Close Window **1** and **2**. Make sure Windows **3** and **4** are opened.

2. From the MicroStation Tools menu, select Image > Register.

   The Register tool box opens.

3. From the Register tool box, select the *Register Dialog* tool.

   The Register dialog box opens.



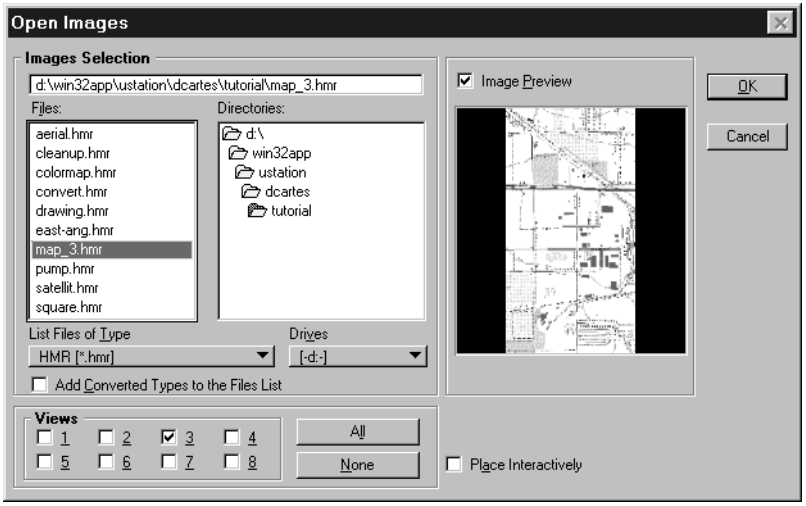
4. From the MicroStation File menu, select Open > Image.

   The Open Images dialog box opens.

5. Find the MAP_3.HMR image that is supplied with the Tutorial. This file is in the …\dcartes\tutorial directory.

6. Set the image preview to on. Notice the display of a thumbnail of the image in the Preview window.

7. From the Views group, set View **3** on and all other views off and click OK.

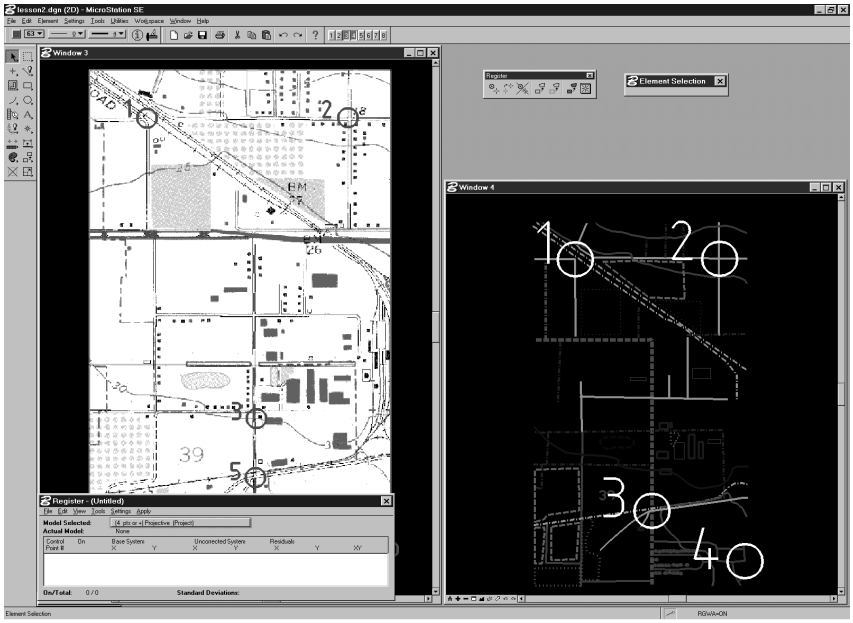


MAP_3.HMR opens and displays in Window **3**.

8. From the Image Control tool box, select *Select Images/Active Image* tool and double-click on MAP_3.HMR to make it the active image.

A dotted border appears around the image meaning that this image is the active image.

9. Arrange the screen as follows.



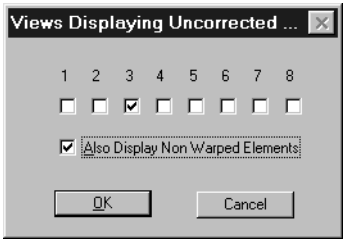
➤ Set up Register

You are now ready to set up the Register dialog box. If necessary, bring the dialog box to the foreground.

1. The first step is to indicate which view contains uncorrected data. In this exercise, View **3** contains an uncorrected image. From the Register dialog box, select View > Views Displaying Uncorrected Data.

The Views Displaying Uncorrected Data dialog box opens.

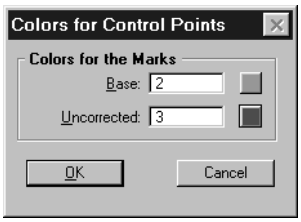
2. Turn on View 3 and Also Display Non Warped Elements.



3. Click OK to close the dialog box.

4. From the View menu, set the Dynamic Warping in Views Displaying Uncorrected Data item to on.
5. From the Settings menu, select Colors for Control Points.

   The Colors for Control Points dialog box opens.

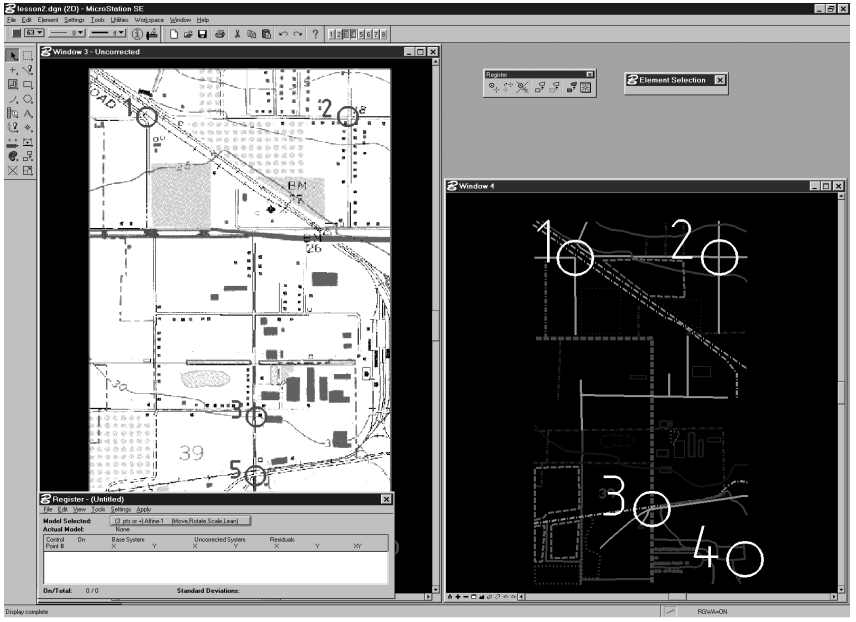


6. Set the colors as follows:

   Base: 2(Green)

   Uncorrected: 3(Red)
7. Click OK.
8. Specify the mathematical model that you will use to correct the image. Set the Model Selected option of the Register dialog box to (3 pts or +) Affine item.

   This choice becomes the model that will be applied.

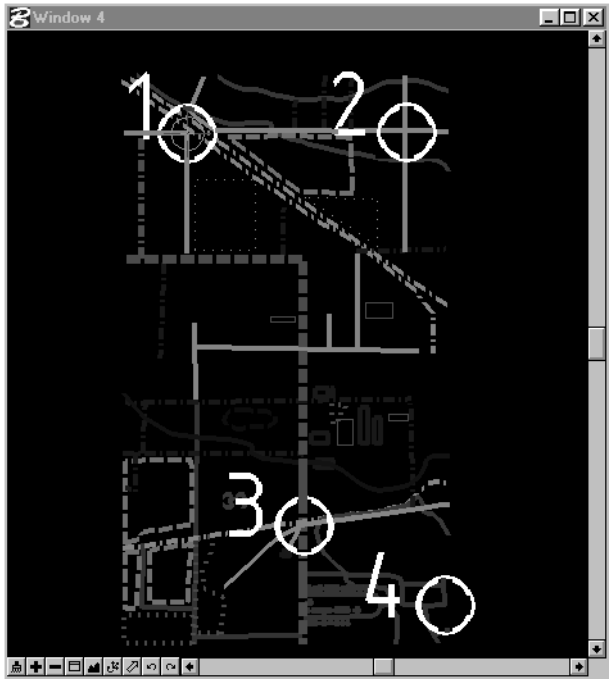


Referencing

➤ Reference an image

You are now ready to begin.

1. From the Register tool box, select the *Place Control Points* tool. Place the base control point mark on the vector data in Window **4** by snapping/data point at location **1** as displayed below.

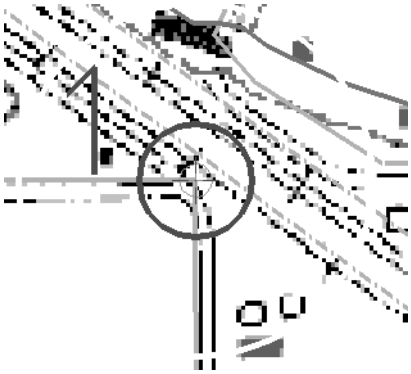


✍ When snapping to location markers in Window **4**, snap to the marker. Do not try to snap on the element. The location of the marker has been precisely positioned for optimal results.

At any time during the referencing process you may use the MicroStation view control and view image control functions to display the image and vector data. Use a scale appropriate for the placement of the control points.

✍ Notice that in the views displaying uncorrected data, the *Fit View* function will not work on the uncorrected vector data. You should use the *Fit Images to View* function to get a fit in the uncorrected data view.

2. Place the uncorrected control point mark on the image in View **3** by snapping/data point at location **1** as displayed below.



When you have placed the uncorrected control point, Register warps and redisplays the vector data on the image displayed in an uncorrected view window. Register also adds the pair of points to the Register dialog box in the list of control points and calculates the residuals when more then four points are placed.

3. Repeat steps 1 and 2 for the remaining pairs of control points as follows.

Window 4 - Vector Base System	**Window 3 - Image Uncorrected System**
Location **2**	Location **2**
Location **3**	Location **3**
Location **4**	Location **4**

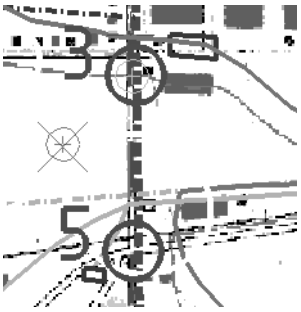
At this point, the Register dialog box displays all four (4) pairs of control points and Residual Values.

4. In this tutorial, the base control points are selected and displayed in Window **4**. This method is not required. After you have selected the first control point, you may select all the other base control points in the same window as the uncorrected image (in this case Window **3**).

The third point was placed in the wrong location to illustrate that you can change your mind about the location of the point. You can now correct the placement of point 3.

5. From the Register tool box, select the *Move Control Points* tool.

6. Select the uncorrected control point 3. When highlighted, the pointer takes the form of the chosen control point. You must select the uncorrected control point. If the selection is not correct, click Reset to be offered the next control point.



Move the highlighted pointer to the position indicated by location **5** and snap/data point.

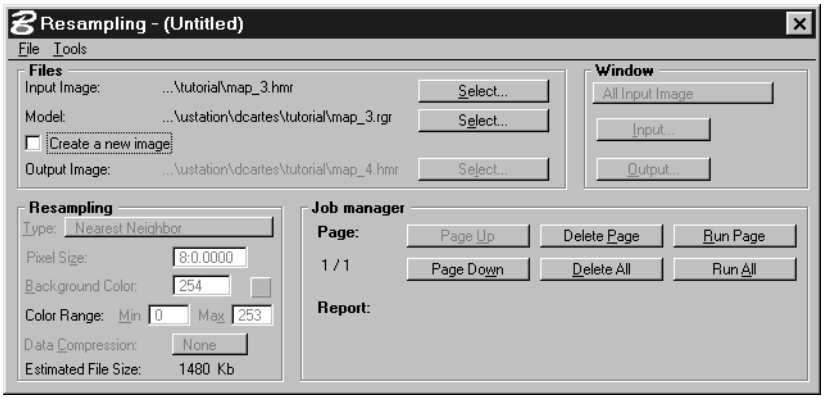
The vectors are now redisplayed. If the other points are also in the correct position, the vectors should now fit much better.

➤ To resample an image

The last step in the process is to resample the image to fit it to the vectors.

1. From the Register tool box, select the *Resample Image* tool.

   The Resampling dialog box opens.



   Register automatically creates the resampling entry by using the following known data:

   Input Image: Uses the Active Image.

   Model: Uses the file prefix of the input image.

   Output Image: Uses the file prefix of the input image plus a number.

2. Ensure that Create A New Image is turned OFF.

   Since Affine model is supported by the Transformation Matrix, there is no need to physically resample the image pixel by pixel. The image will resample dynamically using the Transformation Matrix.

✍ The image can be physically resampled at any time. Simply select File > Save As > Image. From the Save As dialog, select Options button and turn ON the Resample item.

3. Leave all other parameters set to their default values.

   You are now ready to resample the image.

4. Click the Run Page button in the Job Manager group of the Resampling dialog box.

   An alert box asks if you wish to submit this image for resampling.

5. Click OK to confirm.

   The image is instantaneously processed.

6. Fit Image to View in Window 3.

   The image is now resampled.

✍ In the event that the result in not satisfactory, simply undo the resampling (*Image Undo* tool) and add more points, move existing points and try another model.

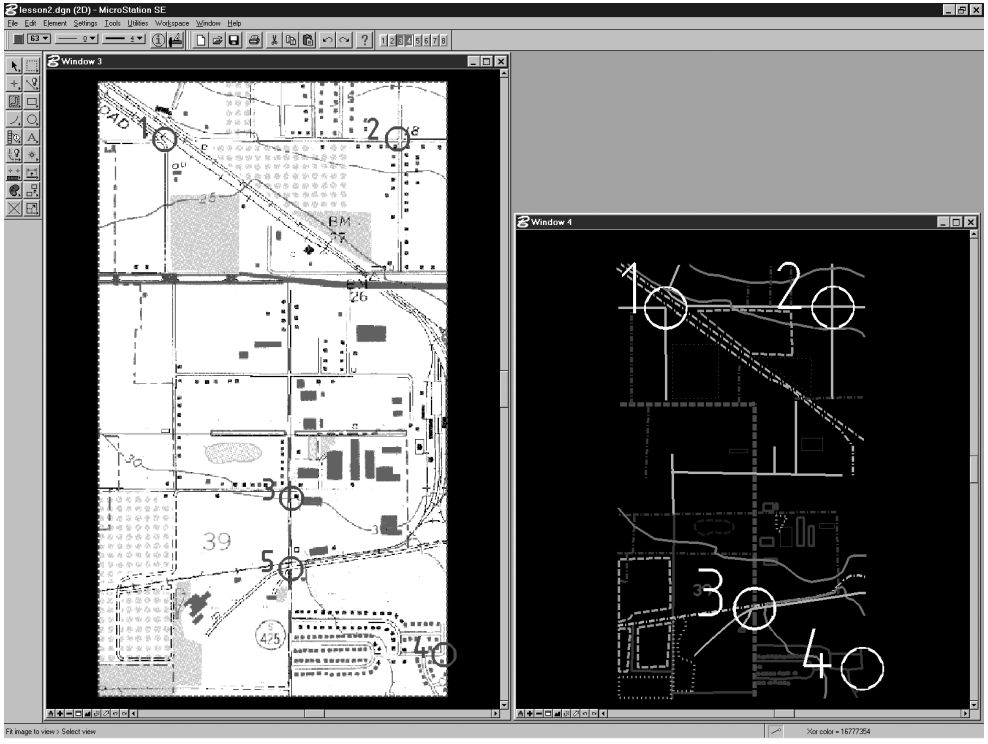
➤ Visualizing the scene

This procedure ensures that Register settings are turned off so that the image and vectors are displayed in their respective geometric space.

1. Close the Resampling dialog box.
2. Bring the Register dialog box to the foreground.
3. From the View menu, select *Views Displaying Uncorrected Data* and turn off all settings.
4. From the File menu, select New.
5. Close the Register dialog box.
6. From the Image Control tool box, select *Fit Images to View*.

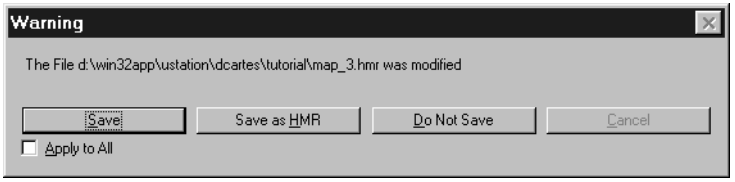
7. Enter a data point in window 3.

The screen should look as follows.



8. From the File menu, select Image Project > Attach.

A Warning dialog box opens informing you that MAP_3.HMR was previously modified and not saved.



9. Since we have only modified one image, you can click either button, Save or Save as HMR.

At this point, a project file is created and attached to Lesson2.dgn. The project file is automatically named after the design file, in this case lesson2.prj.

✍ You can also give a different name to the project by first selecting, Image Project > Save As and then selecting Image Project>Attach from the File menu.

Practice

This lesson does not cover all of the functions related to Positioning Images. You should further explore these other functions by reviewing chapter 7 “Transforming Images: and chapter 8 “Registering Images and Vector Data” of the *MicroStation Descartes User’s Guide*.

Here are a few of the functions you should explore:

- Mirror and Rotate an Image.
- Resample with an Input Window
- Resample with an Output Window
- Resample with the Standard MicroStation Descartes Models
- Batch Resampling
- Warp Vectors
- Thin Plate Spline model.