
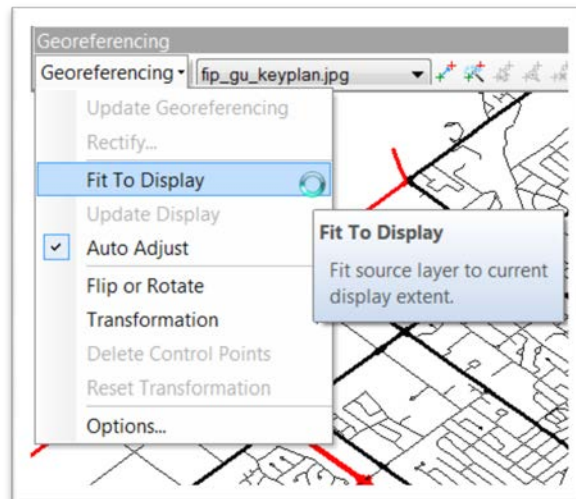


This procedure outlines the steps necessary to georeference an image, such as air photos or raster copies of scanned paper maps. In this example we will be using a scanned Fire Insurance Plan Index Map.

Note: If the files are going to be used in future projects it is imperative to use a high-quality resolution image. If the images will simply be used to vectorize the information, the resolution is less important.

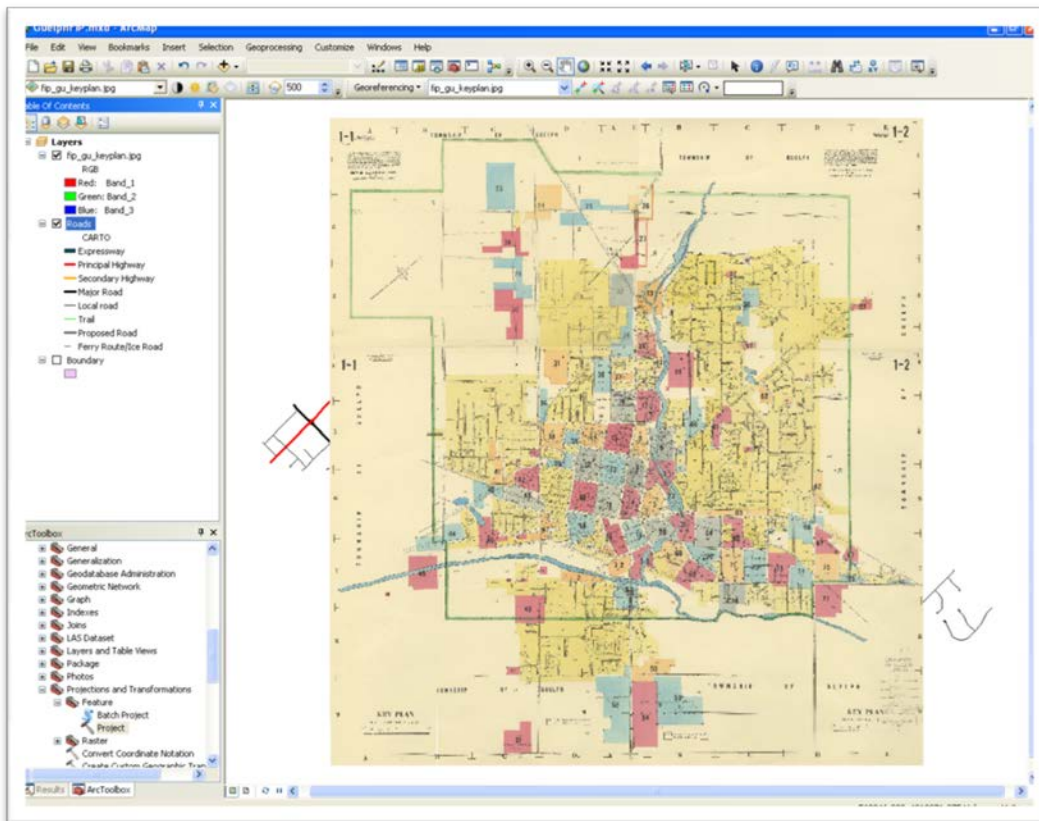
1. Open **ArcMap**. Use **Add Data**  or the **Catalog** window to add the layers (roads, air photos, etc.) you will be using to georeference your images. Load the image to be georeferenced like you would any other layer using **Add data** or the **Catalog** window.
2. You will notice that your layer does not overlay on top of your GIS layers. In order to georeference the image, you need to overlay it on top of your GIS data:
 - a. Turn on the **Georeferencing** toolbar and the **Effects** toolbar. Click on the **Customize** menu > **Toolbars** > check the **Georeferencing** and **Effects** options.
 - b. Using the **Georeferencing** toolbar select the image you would like to georeference from the drop-down box.





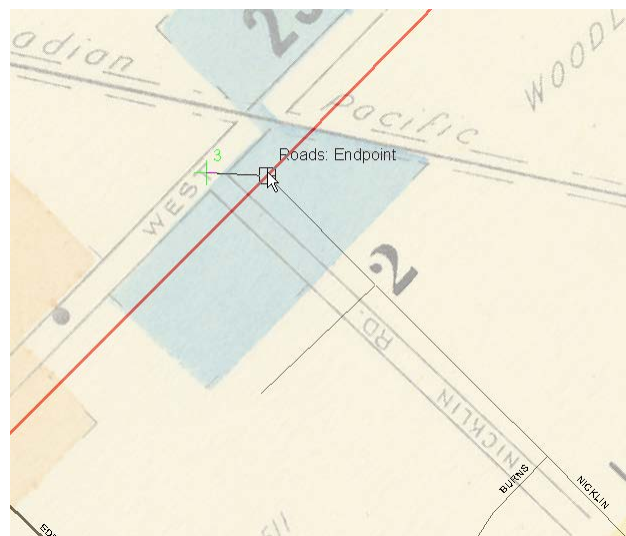
- c. Select **Auto Adjust** and **Fit to Display**.
 - d. Your image should now appear above your GIS data.

GEOREFERENCING IMAGES IN ARCMAP

10.1



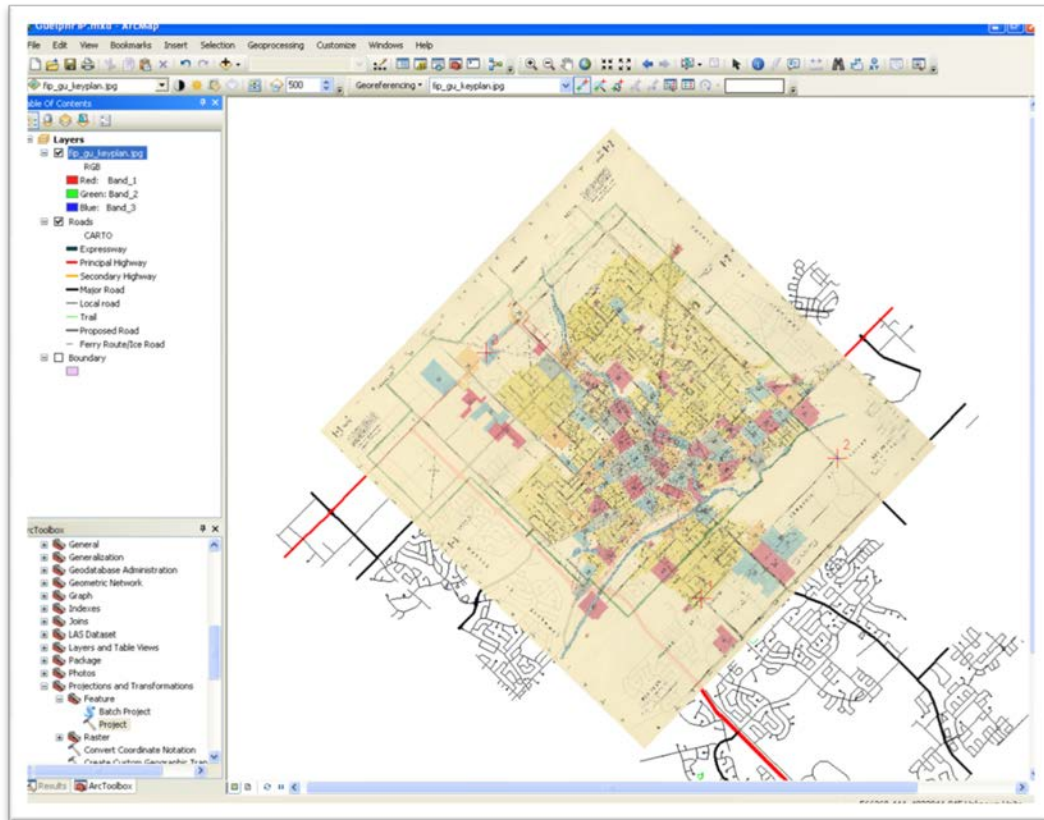
2. Using the **Adjust Transparency** button  in the **Effects** toolbar, select a transparency level that will enable you to view the GIS layer (eg. Roads) beneath your image.
3. Using the **Georeferencing** toolbar, select the **Add Control Points** option .
4. Select a control point on your image by clicking once on it (a green cross will appear). Drag the line from the green cross and find the matching spot on your GIS layer. Click on this point and a red cross will appear.




GEOREFERENCING IMAGES IN ARCMAP

10.1

- Continue to add control points until your image moves into place geographically.
- The image below has moved into place with only three control points, but several more are recommended for better accuracy.



- If you need to view, edit or delete your control points click the **View Link Table** button  on the **Georeferencing** toolbar.

		Total RMS Error: Forward: 1.37252e-009						
	Link	X Source	Y Source	X Map	Y Map	Residual_x	Residual_y	Residual
<input checked="" type="checkbox"/>	1	1881.147233	-5021.830503	561287.065410	4819451.695705	-5.82077e-010	9.31323e-010	1.09826e-009
<input checked="" type="checkbox"/>	2	4373.203251	-5022.939349	563439.039547	4821678.734720	2.32831e-010	9.31323e-010	9.59985e-010
<input checked="" type="checkbox"/>	3	2201.592042	-839.604731	557886.817170	4823344.818973	2.32831e-010	-1.86265e-009	1.87714e-009

Auto Adjust Transformation: 1st Order Polynomial (Affine)

Degrees Minutes Seconds

Each line in the Link Table represents a control point and can be edited by highlighting the desired coordinate. You can also delete a control point by simply selecting the row and clicking the delete key.

8. Once your image has moved to the location where you want it to be, you must rectify... your image to "warp" it permanently into this location. By adding the control points to the original image, we are only temporarily creating this view of it. Warping it creates a duplicate of what you see on the screen and allows you to use that duplicate in any GIS. To warp the image, select **Rectify...** from the **Georeferencing** task bar.
9. In the next dialog you must select a **Resample Type** for your image, All three result in some resolution loss, but the **Cubic Convolution** option seems to lose the least.
10. Click on the folder button to give your image a name, location and format.
11. Once your new images have been created, you can use them the same way you use other GIS data.

Adapted from The University of Toronto Map and Data Library Helpsheets – Georeferencing Images <http://mdl.library.utoronto.ca/geographic-information-systems-gis/geographic-information-systems-helpsheets>