How do I georeference an image in ArcGIS?

Q: How do I georeference an image in ArcGIS?

Answer

Georeferencing is a process by which a raster dataset (image) without spatial reference can be matched with a layer that does have spatial reference. For example, this process would be helpful in the case of a user finding an aerial photograph in their map.

1. In ArcMap, add a reference layer to your map that would be helpful in matching points from the image (e.g. streets if you have an aerial photograph of a city) or a basemap (click the dropdown arrow next to the Add Data button)
2. Add the image you want to georeference.
3. Open the Georeferencing toolbar (Customize > Toolbars).
4. Zoom to the area you will use for georeferencing your image. Select Fit to Display from the Georeferencing toolbar dropdown menu to move the image closer to where it should be located.
5. Add control points using the button with two crosses connected by a line:
    a. Zoom to your image (right click on the layer > Zoom to Layer). Add a control point to a place that will be easy to find in the reference layer, such as a road intersection, bend in a river, administrative boundary, etc. Zoom in close on the control point site to maximize your precision.
    b. Zoom to the reference layer, and add the second control point in the same geographical location. Zoom in close on the control point site to maximize your precision.
    c. Repeat these steps using points from around your map. Very quickly your image will fit in the map.
6. When you are finished go to Georeferencing > Rectify to save a new raster dataset that retains the spatial reference.

Helpful hints:

- In the Georeferencing dropdown menu, the Transformation options are helpful if your image necessitates more warping.
- The blue lines between control points represent the residual (or, error). The View Link Table button in the toolbar allows you to look at all of the links you have made, see their respective residuals, and delete ones you think may be inaccurate.

Further Resources

- ESRI: Fundamentals of georeferencing a raster dataset
- ESRI: Georeferencing toolbar tools

See Also

- ArcGIS Landing Page

Created by MIT GIS Services. Email gishelp(at)mit.edu for more assistance.