

Georeferencing Guide

Spring 2015 – Spatial Analysis Lab

Preparing Map to-be-Georeferenced

- If you have historic maps, scan them at a high resolution (300 dpi or greater) in a format compatible with ArcGIS such as JPEG or TIFF

Preparing Primary Sources for Referencing

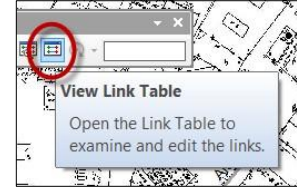
- Recommended primary sources to use for georeferencing:
 - a. GIS roads data from local municipalities, counties, states, or Esri
 - b. Digital/georeferenced aerial photography
 - c. Digital raster graphics (DRGs) of USGS topographic quadrangle maps

Georeferencing Your Map Image

- Choosing Control Points:
 - Some good control points might include road or stream intersections, rock outcrops, the end of a jetty of land, the corner of an established field, street corners, or the intersection of two hedgerows
 - Permanent, non-moving features are more reliable as control points
 - Additionally, right angle intersections are more accurate than acute angle
 - It's also a good idea to choose controls points that are located closer to the corners of the image rather than to the center of the image – this will minimize image distortion
 - However, if you have a specific area of the map that is more important, focus your control points around that area, and accept distortion in other areas
- When placing Control Points:
 - Always go from **Unknown to Known**
- Moving in the map while placing Control Points:
 - Scroll with the mouse scroll bar when trying to zoom in/out when the control point is selected
 - Pan by holding down the mouse scroll bar and moving around the map when the control point is selected
- Once Control Points are placed:
 - Check accuracy by using the slider in the effects toolbar or by simply turning the layer on and off



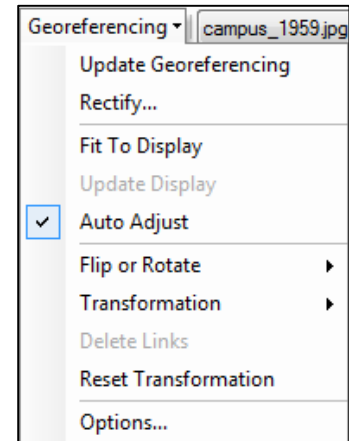
- Open the **View Link Table** to view the transformation data and the residual and RMS (Root Mean Square) data for each link
 - Notice the numbers under the Residual column. If one of these numbers is significantly larger than the others, consider deleting that control point



Link		Total RMS Error:		Forward:5.28211				
	Link	X Source	Y Source	X Map	Y Map	Residual_x	Residual_y	Residual
<input checked="" type="checkbox"/>	1	780.197997	-181.396920	105607.344988	897236.825076	-0.790441	-0.685456	1.04625
<input checked="" type="checkbox"/>	2	245.096298	-541.200406	105951.824750	896749.854719	-2.79763	0.501647	2.84225
<input checked="" type="checkbox"/>	3	819.660915	-1010.503109	106355.428435	897299.485924	-7.78903	-0.711045	7.82142
<input checked="" type="checkbox"/>	4	496.709345	-919.183247	106297.786069	896995.637804	6.88441	-0.319389	6.89182
<input checked="" type="checkbox"/>	5	949.809222	-712.327176	106091.240077	897413.571513	4.4927	1.21424	4.65389

Save Georeferencing

- Update Georeference: This will save the new coordinates with the original image (as seen below)
- Rectify: this will create a new raster dataset that is georeferenced using the map coordinates and the spatial reference
 - You can save this as a BIL, BIP, BMP, BSQ, DAT, GIF, GRID, IMG, JPEG, JPEG 2000, PNG, or TIF



Name	Date	Type	Size
campus_1959.jgwx	3/4/2015 12:51 PM	JGWX File	1 KB
campus_1959	8/25/2009 11:33 AM	JPEG image	346 KB
campus_1959.jpg.aux	3/4/2015 12:51 PM	XML Document	2 KB
campus_1959.jpg.ovr	3/4/2015 11:12 AM	OVR File	364 KB

Resources

Esri: Fundamentals of Georeferencing

http://resources.arcgis.com/en/help/main/10.1/index.html#/Fundamentals_of_georeferencing_a_raster_dataset/009t000000mn000000/

For more assistance:

Visit the SAL during available lab hours, listed here: www.smith.edu/gis

Set up and appointment email: SAL@smith.edu