Process for Georeferencing Air Photos in QGIS

QGIS User Manual – Georeferencer Plugin description
http://docs.qgis.org/2.0/en/docs/user_manual/plugins/plugins_georeferencer.html

1 CREATE BACKGROUND/BASE MAP

This will be used as a reference for “real world” locations.

Choose datasets with the same projection that will be used for the air photos. For London, the coordinate system used is NAD83 UTM Zone 17N.

Example datasets to use:
  - DMTI ONrds layer
  - London rdpoly layer
  - SWOOP 2010 orthoimagery
  - London 2012 orthoimagery

To add these layers to the map window choose the Layer menu and Add Vector (or Raster) Layer.

Save map.

2 PROCEDURE

The general georeferencing procedure involves selecting a number of points on the air photo and their corresponding “real world” locations on a map. These are called Ground Control Points (GCPs). Rule of thumb - the more GCPs, the better.

There are two methods that can be used to create Ground Control Points:

1. Enter known coordinates for locations on the air photos.
2. Click a location on the air photo and its corresponding location on the map.

The following steps outline the procedure in further details.
3  OPEN THE GEOREFERENCER PLUGIN TOOL AND IMPORT AIR PHOTOS

Under the Raster menu, choose Georeferencer -> Georeferencer.

Choose the image you are georeferencing File -> Open Raster.

Confirm coordinate system (NAD83 UTM Zone 17N).
Coordinate systems can be searched by CRS name (NAD83/UTM Zone 17N) or Authority ID/EPSG code (26917).
4 ADD GROUND CONTROL POINTS (GCPs)

Zoom into the same area of the map in both the georeferencing and map windows.

Select the Add Point tool.

Click on the air photo where you would like to place a Ground Control Point (GCP). At this point you have the option of entering the known coordinates for that location or clicking the corresponding location in the map window.
If you are choosing to click the same location on the map, choose “From map canvas” and click the corresponding “real world” location on the map. Otherwise enter the coordinates in the spaces provided.

Points can be adjusted by selecting the Move GCP Point icon and clicking on the point(s) that need adjusting.

Repeat this step a minimum of 4 additional times for a total of 5 GCPs. For polynomial 3 transformations, a minimum of 10 points are required.

5 **TRANSFORMATION SETTINGS**

Once you have entered all the Ground Control Points, choose Transformation Settings from the Settings menu. You will be presented with the following dialog box.
Your transformation type will depend in part on the number of Ground Control Points you have on your image. Polynomial 3 transformations will require a minimum of 10 points, while Polynomial 1 has no minimum; however, 5 is a suggested minimum.

For more information on transformation types, please see the QGIS documentation at: http://docs.qgis.org/2.0/en/docs/user_manual/plugins/plugins_georeferencer.html

By checking the box “Use 0 for transparency when needed”, the resulting geotif will not have a black bounding box.

6 RUN TRANSFORMATION

Once the transformation settings have been established, click start georeferencing. Check the positioning of the resulting Geotif and re-adjust the GCPs where necessary using the Move GCP Point tool.