

## Lesson 1.4: Geo-referencing a Google Map Image

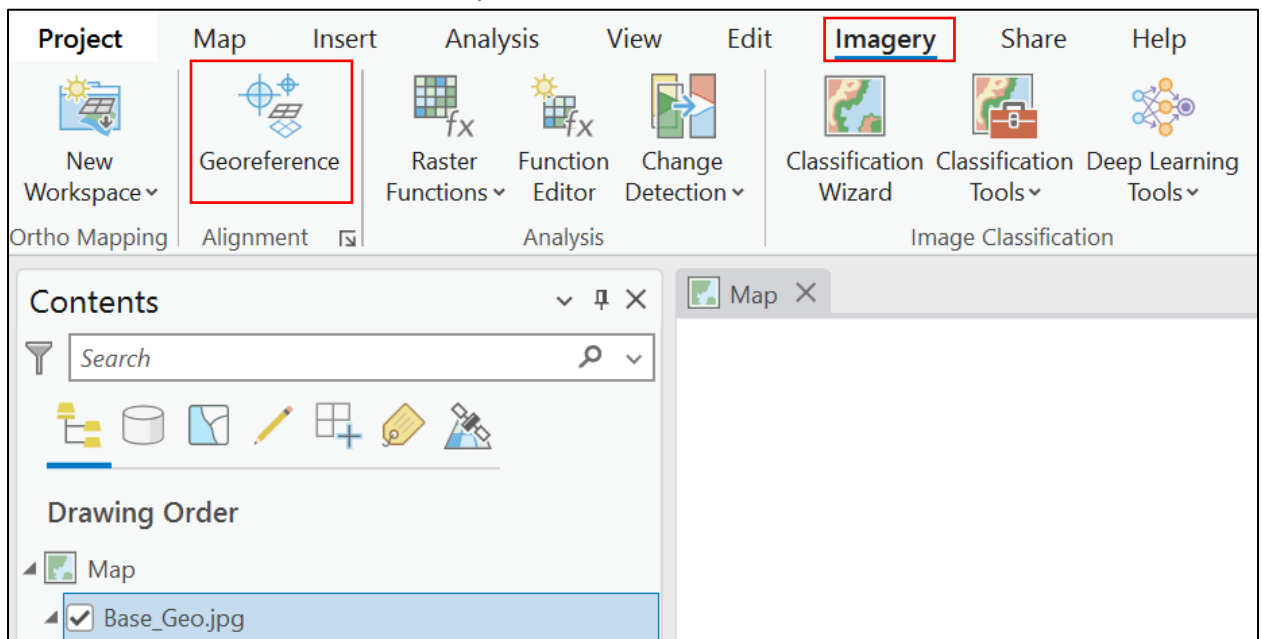
**Data Source:** *dataset1.zip*

**Part 1 :** Preparing the data.

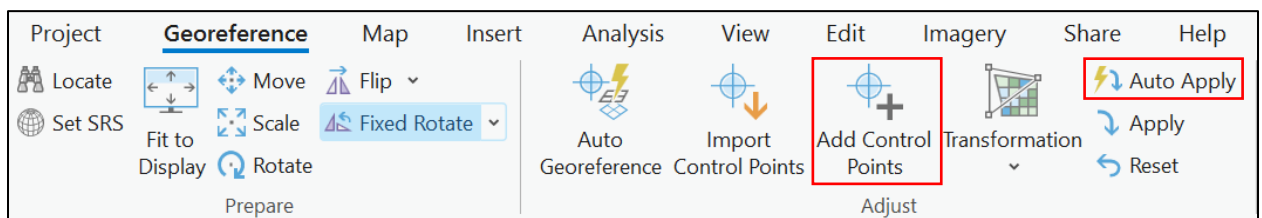
1. In the *Dataset1* file folder **make a copy** of *Base\_Ori.jpg*. **Rename** this copy to *Base\_Geo.jpg*. This is the image that will be georeferenced, so an original copy of the image will be saved in case it is needed.
2. Launch ArcGIS Pro.
3. Add *Base\_Geo.jpg* and *Field20\_boundary.shp* to a new map. You can ignore any pop-ups.
4. **Right click** on *Base\_Geo.jpg* and select **Zoom to Layer**.

**Part 2:** Georeferencing the image.

1. Under the **Imagery** tab, you will find the **Georeference** tab. **Double Click** on the **Georeference** tab, and it should open its own tab.

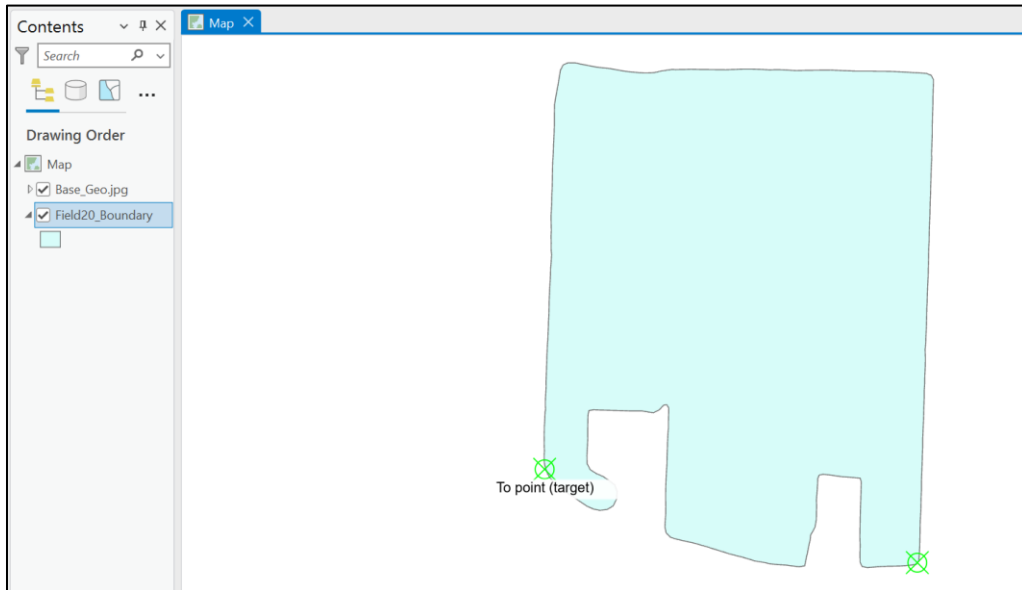
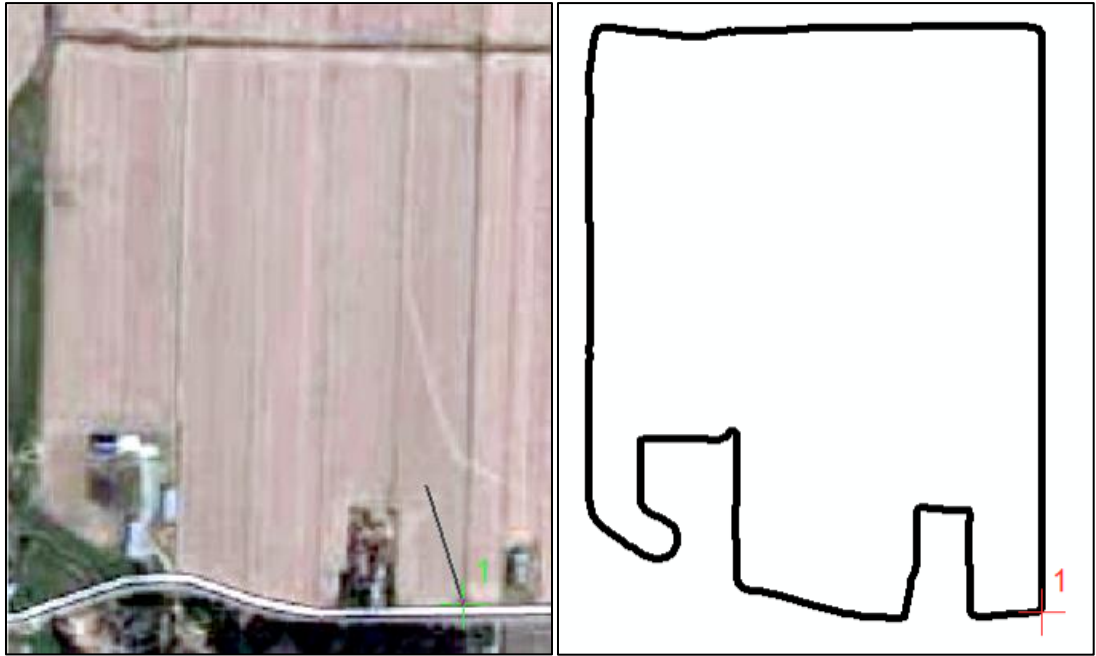


2. In the **Georeference** Tab make sure that **Auto-Apply** is **not selected** and the click **Add Control Points**.



3. For the first control point, follow the steps.

- To get the first control point, single click at the right-bottom corner of the field on the image shown below (*Base\_Geo.jpg*).
- With plus sign and linear cursor, **right click** to select *Field20\_boundary.shp* to select **Zoom to Layer**.
- Once the *Field20\_Boundary.shp* is shown in the view, find same approximate location as previously selected in *Base\_Geo.jpg* and right click on it. The point should turn red and the dotted line connecting the two points should disappear.



4. Once the first point is selected, right-click on *Base\_Geo.jpg* to select your next control point.

- You need to select three more control points at the other corners of the field, as seen in the image below. Follow the same steps as for the first point.
- Once all four points have been selected, click on **Apply** in the **Georeference** bar. Then drag the *Field20\_Boundary.shp* layer above the *Base\_Geo.jpg* layer in the **Contents** tab. The map should now look like the image below.



- To observe the linking information of the four control points, just go to Georeferencing toolbar and then click on **Control Point Table**. In the table, four sets of coordinates are shown. You can manually delete/modify them or choose different transformation method to increase your georeferencing quality.

The screenshot shows the ArcGIS Pro interface. The 'Contents' pane on the left shows the 'Map' layer with 'Field20\_Boundary' and 'Base\_Geo.jpg' layers. The main map area shows the same aerial image with the cyan field boundary and four red 'X' control points. Below the map, the 'Control Point Table' is displayed, showing the following data:

Link	Source X	Source Y	Map X	Map Y	Residual X	Residual Y	Residual
<input checked="" type="checkbox"/>	692.215141	-539.883006	-8,084.505.221572	5,732,054.561776	-1.907689	-1.306571	2.312229
<input checked="" type="checkbox"/>	533.504238	-503.288477	-8,085,106.792946	5,732,205.111063	2.270272	1.554903	2.751701
<input checked="" type="checkbox"/>	696.863152	-336.993166	-8,084,485.945827	5,732,838.307764	1.997521	1.368096	2.421111
<input checked="" type="checkbox"/>	543.479156	-332.961538	-8,085,075.357649	5,732,857.393480	-2.360104	-1.616429	2.860583

- To permanently register the image at the new geo-referenced location, just go to Georeferencing toolbar, and click **Save As New**.
- Save and close the ArcGIS Pro.