

Homework 3 - Image Rectification

Make a simple rectification of the supplied image of Saint John, New Brunswick, CANADA. First measure image coordinates of the indicated ground control points. Next estimate, via least squares, the parameters of an 8-parameter transformation. Then produce a rectified image with the following extent: Emin=729500, Emax=734200, Nmin=5020900, Nmax=5026300 (meters, UTM zone 19) with a GSD of 2.5m. Do once with nearest neighbor interpolation and then again with bilinear interpolation. Export the results as JPEG files. Also supply an ESRI “world file” as shown below. (For the LS problem use local origin for E & N, for numerical stability)

```
“xxxxxx.jgw” text file
X_GSD
0
0
-Y_GSD
X_upper_left
Y_upper_left
```

ID	East	North
2	733962.8	5020971.9
3	734163.7	5021459.5
4	733940.4	5021734.1
5	733670.9	5021210.4
6	733111.2	5021497.7
7	732144.2	5021478.9
8	733543.1	5022275.8
9	729523.0	5026232.6

Find the image file in folder <ftp://ftp.ecn.purdue.edu/bethel> in file [sjnb.jpg](#). When done confirm that you can import the geo-registered image into ArcGIS. In the ArcGIS environment measure the width, length, and principle axis azimuth/bearing of the grass infield of the oval track shown in the image.

Second (unrelated) task: use a digital camera that you have access to (ask if you need to borrow one) and using a combination of the JPEG EXIF-header reader, the user manual, or a web search try to determine: (1) the focal length in millimeters for any image, (2) the pixel spacing (usually in millimeters or micrometers).

