Rectification of Oblique Image -- due Tuesday, 9 Nov.

Make a simple rectification of the oblique image that we used for resection in HW3. So that we all use the same values for exterior orientation, use:
Omega = 0.859278455, phi=0.064982673, kappa=0.051001973 (Radians)
XL=506499.554, YL=4472522.661, ZL=1521.522 (m)
(Note that since we did resection in a tangent plane system, ZL is in tangent plane system)

Use GSD of 0.5m, for the limits use Xmin=504840, Xmax=507640, Ymin=4473350, Ymax=4475640. For debug you should probably test your code with a much smaller area so you don't waste time waiting for the whole thing to finish only to find that you had a programming or algorithm error. When it seems to work for smaller area, then do the whole thing. do initial debug with nearest neighbor interpolation, for final image to submit, use bilinear interpolation. Again do all debug on smaller area.

Recall that l0=1624, s0=2436, f=5524.28 pixels. Use line & sample to access the image arrays, but use x and y for the collinearity. They are related by
$x=s - s0$, $y=-(l - l0)$ $s=x + s0$, $l=-y + l0$

Use constant Z=155.0 m for the terrain elevation everywhere (all Z's are tangent plane)
See notes from lecture 18 for program structure & Matlab template.

As a reminder, here are some useful Matlab statements at the beginning,

iimg = imread('input.jpg'); We will use only the original image, i.e. level 0 of the pryamid

[inrow,incol,inband=size(iimg);

oimg=zeros(outrow,outcol,3,'uint8');

When you are done, make a ESRI world file, which is just a text file which has the same filename base as your output image file (file.jpg) but with the extension '.jgw'. You can then bring up your image in ArcGIS and check the planimetric coordinates of some of the control points. That is how I will check the geometry!

The ESRI world file has entries:

GSD (m)

0

0

-GSD (m)

X-upper left (m)

Y-upper left (m)

So you will submit 2 files by email: a rectified image file and an ESRI world file. I am giving you more time than is really needed for this, I will likely post HW5: camera calibration before the due date for this homework. Advice: don't put off starting this. I am happy to provide consulting service, but not the day before it is due.