CE 503 Homework #2 – 13-Sep-06

Oblique Image Rectification

omega = 0.951440586 rad
phi = 0.446715097 rad
kappa = -1.304004832
XL = 914817.85 m
YL = 574314.65 m
ZL = 468.99 m
x0 (l0) = 591.0 pix
y0 (s0) = 896.0 pix
f = 2620.0 pix

- Rectify the image shown at left (filename: postcrd4.tif – in ftp folder and geomatics drive under ce503\oblique)
- Project corners (1183 rows, 1793 columns) into object space for determination of extent
- Select a GSD, use ref. Z=190m.
- Write a matlab program to read image, construct grid, project into image by collinearity, interpolate colors (do NN & BL), populate the new image, and write out new tif file.
- Pick a neutral background color
- Make a .tfw ESRI “world file”
- Import into arcview or arcgis, add a legend, coordinate grid (Ind. State plane west), north arrow, etc.
- Due 2 weeks

Img=imread(‘filename.tif’);

For this assignment img array would be 1183x1793x3 (height x width x rgb)

To access red intensity at line=50, sample=70: img(50,70,1)

To access green intensity at same location: img(50,70,2), etc.

Colors: red=(255,0,0), green=(0,255,0), blue=(0,0,255), white=(255,255,255),

Black=(0,0,0), dark gray=(100,100,100), light gray=(200,200,200), etc.

Newimg=zeros(100,100,3,’uint8’); create new (blank) color image array filled with zeros

Imwrite(img,’filename.tif’); write out image array to a .tif file

Logical operators: &, |, ~, ==, ~=,>,<,>=,<=

If you project grid point into image as (l,s) you can test for being “inside” the image with something like:

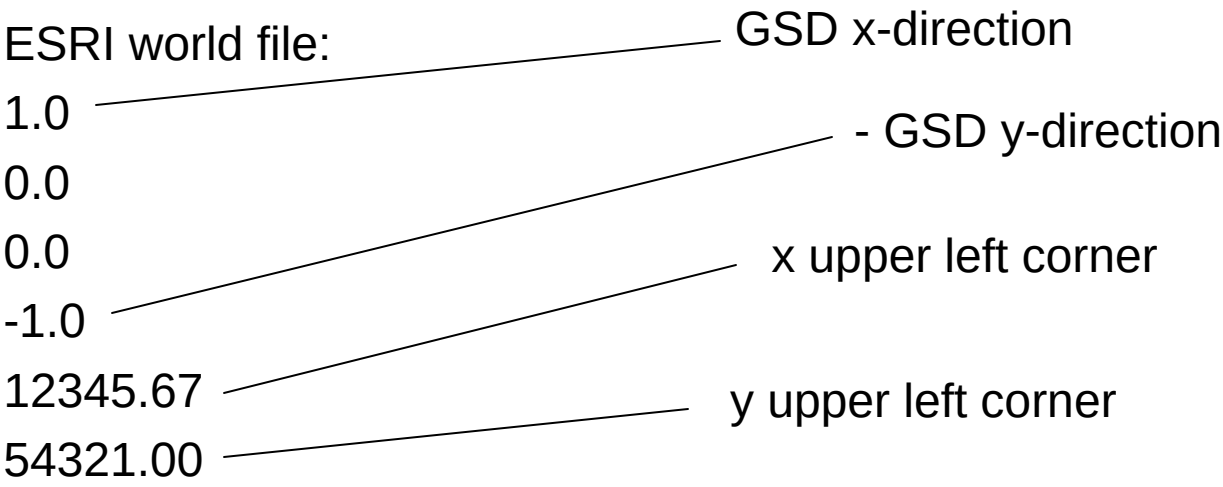
```
If((l >= 1) & (l <= maxl) & (s >= 1) & (s <= maxs))
    % do something
    end
```

mx=[1 0 0; 0 cos(omega) sin(omega); 0 –sin(omega) cos(omega)];

my=[cos(phi) 0 –sin(phi); 0 1 0; sin(phi) 0 cos(phi)];

mz=[cos(kappa) sin(kappa) 0; -sin(kappa) cos(kappa) 0; 0 0 1];

m=mz*my*mx



Those six numbers go into a text file (create with notepad, etc.) filename base has to be the same as image file, but with extension .tfw, for example

Rectify.tif, rectify.tfw – that will allow you to import into arcview or arcgis and have it be registered in case you want to overlay with vectors, etc.

Map Composition & Items to hand in

•Open (ArcGIS v9.x) ArcCatalog

•Open ArcMap and select “new empty map)

•Use the catlog to browse for data files (rectified image & vectors, if any), drag into ArcMap layers (vectors: 503_plan.zip)

•Ignore message about unknown spatial reference (for now)

•Drag layers about to change drawing order

•Select View / Layout view

•Open View / Data frame properties, set units, and coordinate system (Ind. st. plane west, meters, NAD83)

•In Data frame properties open grid / new grid / measured grid / … to select options for coordinate grid overlay & annotation

•Insert title, scale bar, north arrow, title, scale statement (??)

•Hand In

•Hardcopy (8.5 x 11) print of image map

•Digital (email, cd-r, mem-stick, …) 2 image files, .tfw file, .mxd project file (will pathnames work ??)

•Hardcopy of matlab code that produced your images