Name: _____

Remote Sensing of the Environment
GEOG/GEOL 4093/5093
Spring Semester 2008

Lab Exercise #6: 10/09/2008
Due: 10/23/2008

Effect of scan angle on pixel size

In this lab you will be investigating the effect of sensor scan angle on the cross-track and along-track pixel dimension. This lab will require intermediate geometry. You may wish to refer to a geometry textbook for additional help.

1. Determine a simple equation for computing cross-track pixel size as a function of scan angle. Refer to the diagram attached (5 pts).

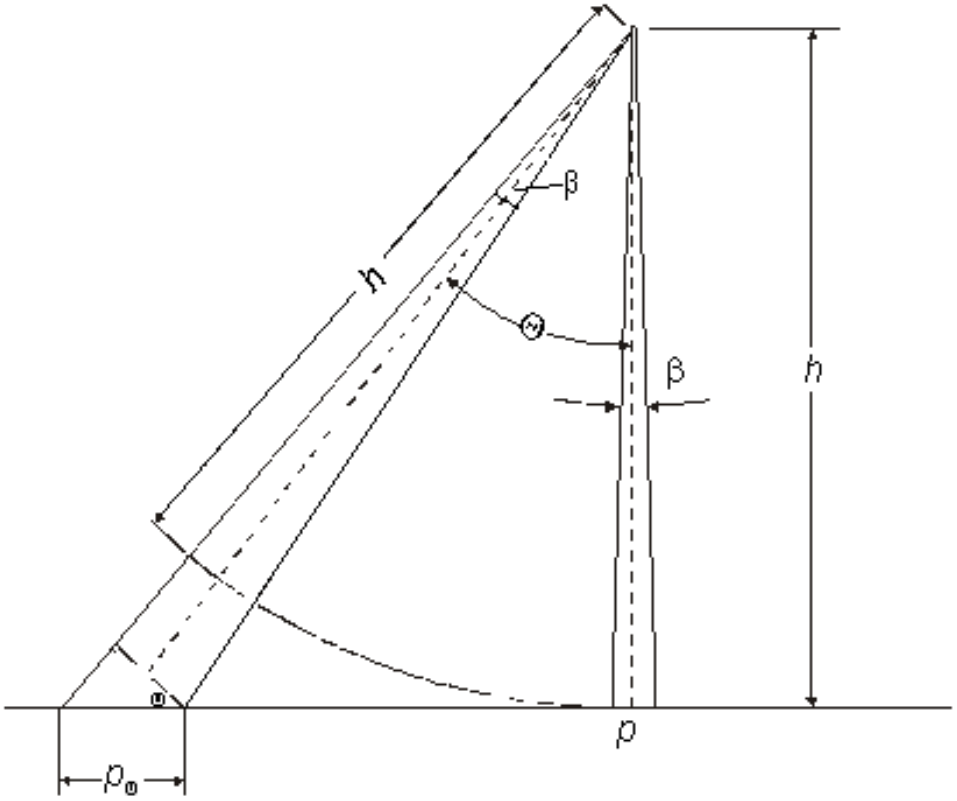
2. Determine a simple equation for computing along-track pixel size as a function of scan angle (5 pts).

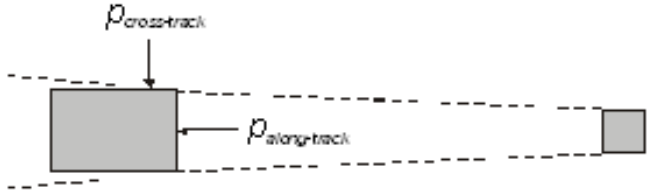
3. Compute the cross-track and along-track pixel sizes for the following sensors with the following scan angles. (Note: Not all information given is necessary.) (4 pts)

	Satellite	Altitude (h)	IFOV angle (β)	Scan angle (Θ)	Pixel size at nadir (p)	Cross-track pixel size at Θ	Along-track pixel size at Θ
a.	Landsat-TM	705 km	0.0024°	43°	30 m		
b.	AVHRR	861 km	0.073°	54°	1.1 km		

4. Plot a graph of cross-track pixel size for the NOAA AVHRR satellite as a function of scan angle from nadir across a swath for the specified angles (0°, 15°, 25°, 43°, 54°). On the same graph, plot the along-track pixel size from nadir across a swath for the specified angles (0°, 15°, 25°, 43°, 54°). The swath of the AVHRR satellite is 2700 km and by plotting the change in pixel size with scan angle you will be able to see that distortion increases with distance from nadir. You may need to plot this using graphing paper or a computer program (10 pts).

5. Does scan angle cause significant distortion in a satellite image? What determines the level of this distortion? What other effects may degrade remote sensing data? (6 pts)


β
h
β
h
ρ
ρ0


ρcross-track
ρalong-track