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Accuracy of Land Cover Maps Derived From Remotely Sensed Data

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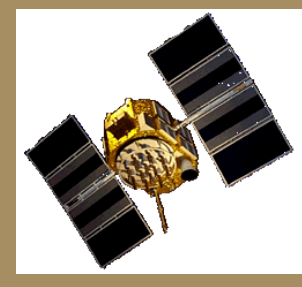
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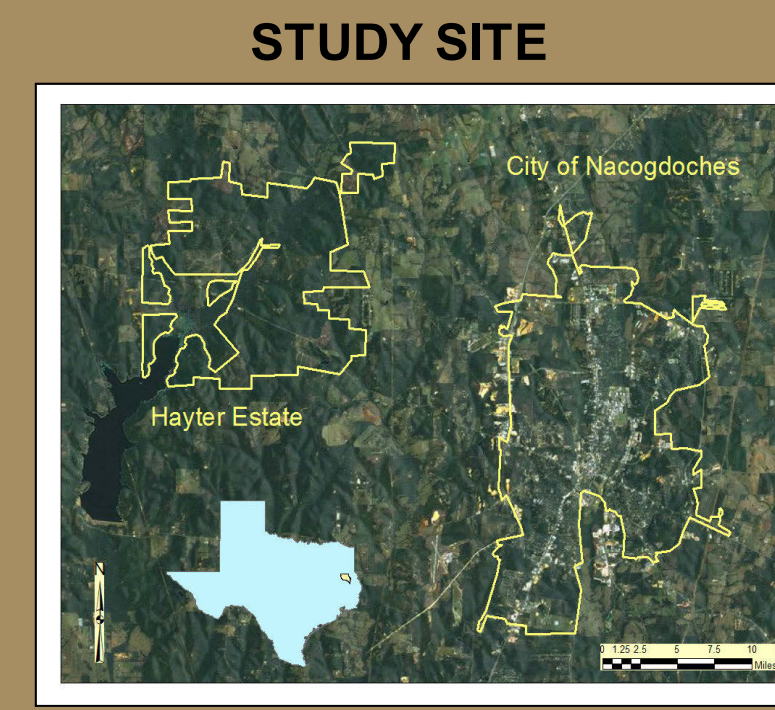
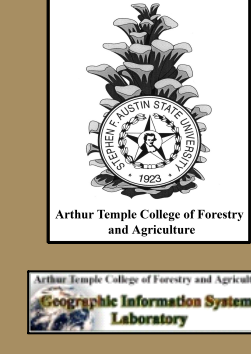
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Accuracy of Land Cover Maps Derived From Remotely Sensed Data

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INTRODUCTION

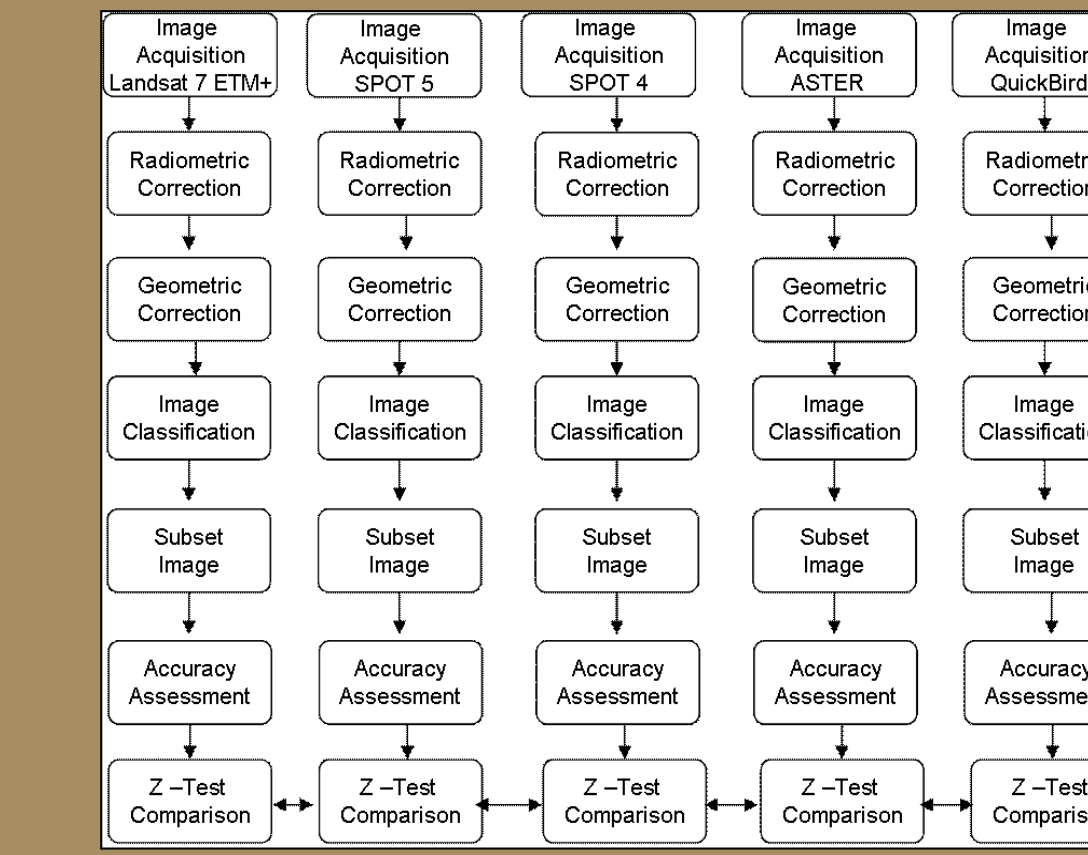
Accurate knowledge of land cover and land cover change is essential for a wide range of objectives. Since the 1970's, remotely sensed data have been used increasingly as a means to classify and characterize the earth's land use and land cover. This project compares the accuracy of results of classifying data from mid-level to very high spatial resolutions (Landsat ETM+, SPOT 4, ASTER, SPOT 5, QuickBird). Data from all of these sensors were classified for both urban and rural settings. The project examines accuracy levels between spatial and spectral resolution.

OBJECTIVES

Compare the accuracy of classified maps between satellites of varying spatial and spectral resolutions. Data include 30 meter (Landsat ETM+), 20 meter (SPOT 4), 15 meter (ASTER VNIR), 10 meter (SPOT 5), and 2.44 meters (QuickBird). Two tested hypotheses are:

- H_0 – Spatial resolution of remotely sensed data does not affect the accuracy of classified maps.
- H_0 – Spectral resolution of remotely sensed images does not affect the accuracy of classified maps.

METHODOLOGY



RESULTS

Spatial resolution results indicate that QuickBird, with the highest spatial resolution performed significantly poorer, in terms of providing accurate classification, than any other sensor with respect to the rural environment. It also was significantly worse than Landsat ETM+ in providing accurate classification in the urban environment. In terms of spectral resolution, the results when testing for accuracy in classification using only the three bands common to all sensors (green, red, near-infrared) there was essentially no difference between any of the sensors. This outcome supports the hypothesis that spectral resolution plays an important role in land cover accuracy more than spatial resolution.

Spectral Bands	Wavelength Interval (µm)	Spatial Resolution (m)	Landsat ETM+, 8 bit, January, 2003	
			Band	Wavelength Interval (µm)
1 (Blue)	0.45 - 0.52	30	1	0.45 - 0.52
2 (Green)	0.52 - 0.60	30	2	0.52 - 0.60
3 (Red)	0.63 - 0.69	30	3	0.63 - 0.69
4 (Near-IR)	0.76 - 0.90	30	4	0.76 - 0.90
5 (Mid-IR)	1.55 - 1.75	30	5	1.55 - 1.75
7 (Mid-IR)	2.08 - 2.35	30	7	2.08 - 2.35

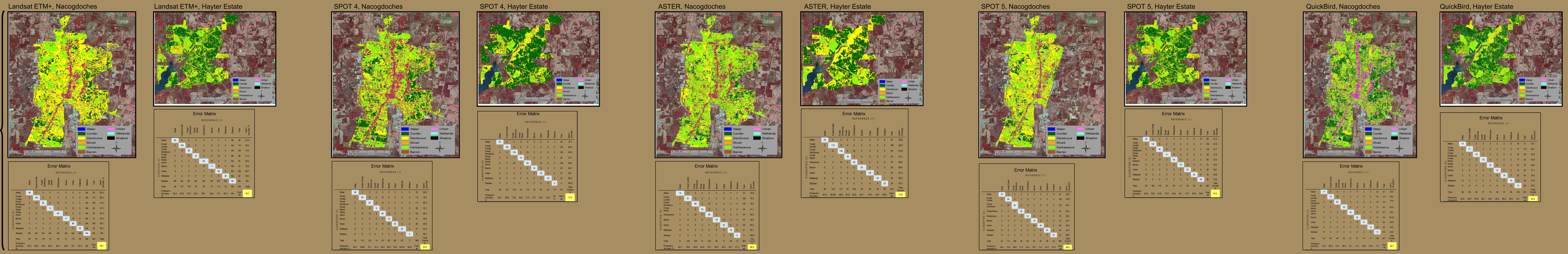
Spectral Bands	Wavelength Interval (µm)	Spatial Resolution (m)	SPOT 4, 8 bit, January, 2003	
			Band	Wavelength Interval (µm)
1 (Green)	0.50-0.59	20	1	0.50-0.59
2 (Red)	0.61-0.68	20	2	0.61-0.68
3 (Near-IR)	0.78-0.89	20	3	0.78-0.89
4 (Mid-IR)	1.58-1.75	20	4	1.58-1.75

Spectral Bands	Wavelength Interval (µm)	Spatial Resolution (m)	ASTER VNIR, 8 bit, February, 2003	
			Band	Wavelength Interval (µm)
1 (green)	0.52-0.60	15	1	0.52-0.60
2 (red)	0.63-0.69	15	2	0.63-0.69
3 (near-IR)	0.76-0.86	15	3	0.76-0.86

Spectral Bands	Wavelength Interval (µm)	Spatial Resolution (m)	SPOT 5, 8 bit, February, 2003	
			Band	Wavelength Interval (µm)
1 (Green)	0.50-0.59	10	1	0.50-0.59
2 (Red)	0.61-0.68	10	2	0.61-0.68
3 (Near-IR)	0.78-0.89	10	3	0.78-0.89
4 (Mid-IR)	1.58-1.75	10	4	1.58-1.75

Spectral Bands	Wavelength Interval (µm)	Spatial Resolution (m)	QuickBird, 11 bit, January, 2003	
			Band	Wavelength Interval (µm)
1 (Blue)	0.45-0.52	2.44	1	0.45-0.52
2 (Green)	0.52-0.60	2.44	2	0.52-0.60
3 (Red)	0.63-0.69	2.44	3	0.63-0.69
4 (Near-IR)	0.76-0.90	2.44	4	0.76-0.90

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