High Resolution Satellite Data Offers New Opportunities in Vermont

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The recent availability of commercial high spatial resolution satellite imagery offers opportunities and advantages to address land use and urban planning, resource assessment, and environmental monitoring issues. Comparable in spatial resolution to aerial photography, satellite data are multispectral and can be acquired any time of the year. The advantage offered by these data include improved land cover characterization, capability to monitor change over time, digital processing capability, and data that are compatible with Geographic Information System technologies.

Earth observation from satellites began in 1972 with the launch of ERTS (aka Landsat 1). Subsequent improvements in spatial and spectral resolution of these sensors, data distribution, and computer hardware and image processing software over the past three decades have now made this technology competitive with traditional aerial photography approaches for mapping land cover at local scales. The table below summarizes the characteristics of current commercial high resolution satellite sensors.

	QuickBird	IKONOS *
Panchromatic (1)	0.61m	1.0m
Visible (3 - BGR)	2.44m	4.0m
Near Infrared (1)	2.44m	4.0m
Operator	DigitalGlobe	Space Imaging
Launch Date	2001	1999
Scene Size (km)	16.5 x 16.5	13 x 13

* Orbital Imaging launched the OrbView-3 satellite in 2003 with spectral bands and spatial resolution comparable to IKONOS.

Figure 1. Natural color, panchromatic, and color infrared composite images from QuickBird satellite data

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Figure 2. A comparison of QuickBird (61cm) panchromatic satellite and VT digital orthophoto quad (50cm) imagery. Although differences in the imagery due to the different acquisition times (year and season) are evident, the satellite imagery is comparable in quality.

1:5,000 VT DOQ (50cm) QuickBird (61cm)

Recent Applications Using High Resolution Satellite Imagery

- **Storm Water Management**
- **Urban Planning**
- **Land Use/Land Cover Mapping**
- **Monitoring Development/Change**

Figure 3. QuickBird satellite imagery can be used to monitor land use change over time. New housing at Barber Farms in South Burlington is evident in the QuickBird satellite data acquired in 2003 that was not present in the 1999 DOQ.

Figure 4. Impervious area map for storm water management derived from QuickBird satellite imagery.

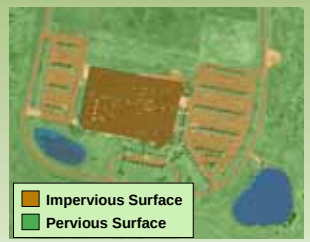

Figure 5. Algal bloom located in Missisquoi Bay is evident in this QuickBird satellite scene collected in September, 2004.

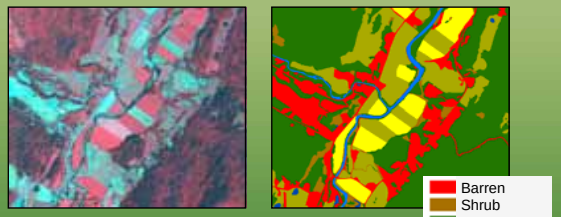

Figure 6. Land use/land cover map of the Mad River valley derived from classification of IKONOS multispectral data.

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