

On the usefulness of very high resolution IKONOS satellite imagery for vegetation mapping

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ABSTRACT

Traditional vegetation mapping methodologies consist primarily of field surveying and mapping from aerial photographs or high resolution satellite images. Previous applications of satellite imagery for this task (e.g. Landsat TM and SPOT HRV) have not always been successful, as such imagery proved to have limited spatial resolution. Since 2000 a number of very high resolution commercial satellites have been launched (e.g. IKONOS, Quickbird and to some extent SPOT 5), typically producing images with a spatial resolution of 4-5 meters in multispectral mode (3-4 bands in the visible – near-infrared range) and 1 meter in panchromatic mode. 2 to 0.5 m spatial resolution imagery is expected to be available in the next few years. These new datasets open up new potentials for detailed vegetation mapping. The usefulness of very high resolution multispectral satellite images is demonstrated through examples of on-going projects at the School of Surveying (University of Otago).

- The conservation of New Zealand's native fauna requires a greater understanding of mammal pest movements in relation to landscape features. Such information helps to optimise trap placement, increase catch rate, and support habitat manipulation to discourage predators to access breeding sites. The first example will demonstrate how habitat maps produced from IKONOS images and accurate GPS location data of animals can be combined to analyse fine-scale habitat use of mammal pests.
- In New Zealand about 30% of faults on electrical transmission lines are caused by trees. Utility companies spend large amounts of money maintaining a clear distance between power lines and vegetation. The second example will show how IKONOS images can help to assess the risk of vegetation encroachment in power line corridors. The detailed mapping of tree clumps, and the identification of tree species and height may be combined to predict hot-spots for potential faults in the network.
- Management of vegetated areas by urban planners relies on detailed and updated knowledge of their nature and distribution. The third example will discuss the use of IKONOS imagery for ecological mapping in urban areas as an alternative to aerial photographs. Traditional per-pixel classification approaches are not well suited for very high resolution images, especially in heterogeneous urban environments. Object-oriented classification techniques using spectral and contextual information are proposed to overcome these limitations.