

## TERRAIN VISUALIZATION APPLIED TO VEGETATION STUDIES OF NATIONAL PARKS AND HISTORIC SITES

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### ABSTRACT:

Detailed vegetation databases are being compiled from color infrared (CIR) aerial photographs and used in conjunction with 3D terrain visualization techniques to create interactive displays of National Parks and Historic Sites in southeastern United States. The sizes of the parks vary from about 2000 km<sup>2</sup> for the rugged Great Smoky Mountains National Park, located in the Appalachian mountains of Tennessee and North Carolina, to small national battlefields and historic sites of less than 100 ha. The dense forest cover in many of the parks has required the use of Global Positioning System (GPS) surveys in combination with softcopy photogrammetry, DEMs, image processing techniques and geographic information system (GIS) procedures to construct large-scale digital orthophotos and vector-based vegetation databases (Welch et al., 2000). As part of the study, the DEMs generated by stereocorrelation procedures from the color IR photographs were compared to those available from the U.S. Geological Survey. Mapping the floristically diverse parks also required the development of detailed vegetation classification systems suitable for use with 1:12,000 and 1:40,000 scale CIR aerial photographs. Elevation, slope and aspect of the terrain are all very important environmental factors that determine the type of vegetation associations that will be found in a particular setting. The relationship between vegetation classification

and terrain was assessed by draping orthophotos and vegetation maps onto DEMs to create 3-D perspective views (Madden and Jordan, 2001). Flyovers through the vegetation-draped 3D perspectives were constructed to help researchers visualize vegetation changes in relation to elevation, slope and aspect. Statistical analyses also were conducted to quantify the spatial correlation between vegetation and terrain characteristics. Output from these studies include interpretive data sets that will aid park managers and researchers in laying out nature trails, modeling fire behavior and developing displays of interest to park visitors.

### REFERENCES

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