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AUTOMATED DEM EXTRACTION FROM AERIAL PHOTOS AND SATELLITE IMAGES

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ABSTRACT

A digital elevation model (DEM), as a representation of the Earth's relief, is now one of the most important data structures used for geospatial analysis and modeling. The digital format of a DEM has made it easier to derive additional information for various applications causing elevation modeling to become an important part of international research and development programs related to geo-spatial data. Unfortunately, DEMs of usable details are unavailable for much of the Earth's surface and when available frequently lack sufficient accuracy.

One solution to this problem is to generate DEMs automatically using stereo pairs of aerial photos or satellites. In addition to SPOT satellites, which has been launched for many years, many new satellites with stereo capabilities were launched in the past few years, such as IRS, ASTER, IKONOS and RADARSAT. The latest addition of ASTER satellites has two significant impacts. First, the data can be downloaded free of charge from the web (http://asterweb.jpl.nasa.gov). Second, it provides a new alternative for mapping at medium-to-large scales and for generating DEM from the along-track stereo.

Different tests were performed using aerial photos and different satellite data. The results will be presented in this paper as a guideline for automatic DEM extraction.