Fast Processing of Vexcel UltraCam Digital Aerial Photos

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ABSTRACT: Digital mapping camera is getting more popular nowadays to replace the analog camera. It is especially useful for very high resolution engineering work and photogrammetry. One example is the Vexcel UltraCam camera. The UltraCam is a large format digital aerial camera with a base panchromatic resolution of 11,500 x 7,500 pixels in addition to four-color channels (red, green, blue and near-infrared). Imagery is collected at better than 12 bits per channel (up to 7,000 gray values per channel vis-à-vis the 256 gray values of scanned film) and at a rate of up to one frame per second. This permits the camera to outperform conventional analog film cameras by collecting imagery that is notably clear of film grain noise and with increased dynamic range. It is capable of providing large-scale urban mapping with very small pixels of 3 cm while maintaining high overlap as well as large-area coverage.

The major problem for digital aerial photos is the huge number of photos needs to be processed at rapid turn around times. In this paper we will introduce a new system which uses the latest development in multi-core central processing unit (CPU), graphics processing unit (GPU) hardware, clustered storage, solid-state drive and distributed, node-based computing. The primary capabilities include automated-processing, job-management, scheduling and high-speed processing, while the primary benefits result from two functions: High-speed processing results in shorter production cycles, while node-based parallel computing reduces IT infrastructure, maintenance, support and operations costs compared to desktop or clustered processing. Finally, the interface, speed and results of several digital aerial photo projects using UltraCam imagery will be presented for comparison, including orthorectification, automated seamline selection and generation of mosaic tiles.