The Acquisition and Assembly of Large Scale, High Resolution Photorealistic Models of Geological Outcrops

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Abstract

The potential of photorealistic outcrop models is their ability to bring into the lab and the classroom an accurate surface representation of the outcrops. The draping of high resolution photos (to 1 mm per pixel) onto the TIN (Triangulated Irregular Network) mesh of a LiDAR (Light Detection and Ranging) derived model provides an accurate, lifelike appearance of the outcrop in digital form. The geologist can make most of the physical measurements of the outcrop that he would make in the field using the entire outcrop for analysis, rather than being limited to areas that he can physically access in the field. In addition, advanced analyses such as down-plunge cross-section, facies classification, and bed thickness characterization are facilitated with the digital model. The digital models allow the geologist to rapidly revisit the outcrop in the office for further analysis, to annotate the results, and to insert links to other documentation. However, there have been two major barriers to the adoption of photorealistic outcrop models for the study of geology – the effort required to assemble a large model at high optical resolution and a means to easily interact with the model and extract data. Custom software and hardware have been developed to enable the acquisition, assembly, and analysis of large scale, high optical resolution geological model