

3D Digital Documentation Summit

Submitted by:

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Speaker Bios

Mike Nulty is CoPR's Technical Coordinator. Michael manages the Center's state-of-the-art digital technology, including interactive website construction, SketchUp 3-D site maps, virtual tours, and other similar tools. His private sector work has involved historic and adaptive reuse projects. Michael's research interests lie in examining how the applications of digital technology can enhance our understanding, appreciation, and investigation of historic cultural landscapes.

Neffra Matthews

As a Geographer with the Branch of Resource Technology the majority of my work focuses on producing and integrating 3-dimensional digital data with imagery for enhanced visualization and analysis. Examples of applications for this technology are the detailed documentation of delicate, changing, or difficult to access subjects, such as biological soil crusts or archeological sites (i.e., rock art). My formal education is a Masters of Science Degree in geology from the University of Kentucky. Previous work experience includes the Kentucky Geological Survey and the Defense Department.

Tom Noble

As a member of the Branch of Resource Technology, my expertise includes all aspects of photogrammetric projects, image manipulation and rectification, close range photogrammetric techniques, geodesy, cadastral surveying, 3D modeling, AutoCAD, and programming LISP routines inside AutoCAD. A graduate of Oregon Institute of Technology with a Bachelor of Science degree in Civil Engineering.

A Comparative Study Using LiDAR Digital Scanning and Photogrammetry

Through a National Park Service grant, the Center of Preservation Research (CoPR) at the University of Colorado Denver and the Bureau of Land Management (BLM) have partnered to develop a comparative study between LiDAR digital scanning and Photogrammetry technology, using point cloud data capture. CoPR employs the use of LiDAR digital scanning and the BLM utilizes Photogrammetry.

The rapid evolution of digital cameras and increasing capabilities of computers and analytical software has dramatically expanded the variety of situations to which photogrammetry may be applied, while simultaneously decreasing the costs of acquisition, processing, and analysis. A variety of resource specialists (such as hydrologists, soil scientists, archaeologists, paleontologists, biologists, range conservationists, and engineers) can greatly benefit from 3D products derived from modern photogrammetric techniques. This is especially true in the field of ground-based or close-range photogrammetry.¹

In comparison, LiDAR technology has been developed allowing the development of high definition, high accuracy, and high productivity digital documentation. Major innovations in digital image processing and 3D modeling software and computer hardware capabilities have allowed for access to vast amounts of data and information.

The comparative study focuses on the accuracy of the data collected, time factors, gathering and processing the digital data, cost of labor, and hardware and software needs in the areas of:

- 1) Project Planning Assessment including: project goals; deliverables and outcomes desired; data collection methods, data management planning and site assessment.
- 2) Data Gathering on site including: acquisition techniques; accuracy, completeness, resolution and time, as well as resources required.
- 3) Data Management including: processing of digital data; application of the data; representation; and accessibility for short-term applications.

Both CoPR and the BLM scanned/photographed the same structure at the same time. This presentation will show an analysis of man hours, computer time, hardware costs, software costs and deliverable products, in addition to an analysis of the two different data sets describing accuracy reports as well as noted differences and similarities.

¹ Aerial and Close Range Photogrammetric Technology: Providing Resource Documentation, Interpretation and Preservation. Technical Note 428 by Neffra A. Matthews Bureau of Land Management, September 2008.