Ohio Section

American Institute of Professional Geologists

Presents:

Making the Most of Ohio's Free Airborne Lidar Data for Geologic Applications
William C. Haneberg, Ph.D., C.P.G

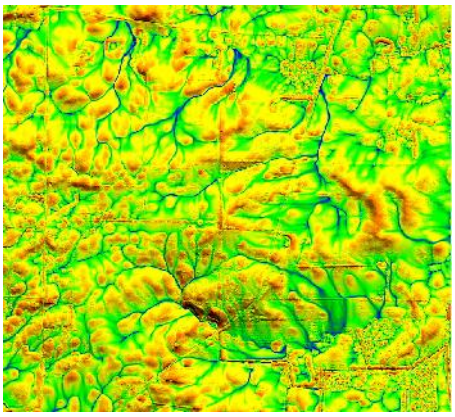
February 25, 2010; LaScala Italia Bistro, Dublin, Ohio

Abstract: High-resolution digital elevation models (DEMs) created using airborne LiDAR (Light Detection And Ranging), a form of laser scanning, have given geologists a tool to identify and map landforms in unprecedented detail, especially in areas covered by dense forest or jungle canopies. The Ohio Statewide Imagery Program (OSIP) makes ours one of the very few states to offer freely available statewide airborne LiDAR coverage. That puts Ohio geologists in industry, government, and academia in the enviable position of having virtually unlimited access to cutting-edge topographic data useful for many engineering, environmental, and natural-resource-extraction projects. Although OSIP (and other LiDAR sources in other areas) offer off-the-shelf DEMs that can be useful for some applications, better results can often be obtained by downloading and processing laser ground-strike (or point-cloud) data in order to assess the limits of resolution and create DEMs optimized for geologic interpretation. The basics of LiDAR technology include errors and limits to resolution as they affect the sizes of features that can be mapped, interpretation of geologic features such as landslides, linear structures due to faults or joints, glacial landforms, sinkholes, wetland areas, and river migration zones. Basics also include data formats, and instructions for downloading OSIP lidar data. Two Ohio examples—one involving landslides and bedrock structures near Cincinnati and the other involving the surficial expression of a bedrock fault covered by glacial deposits in the northern part of the state—illustrate geologic applications of OSIP data.

THE SPEAKER: Dr. William C Haneberg is a Cincinnati-based consulting geologist who has used airborne LiDAR digital-elevation data for landslide mapping and modeling, fault-scarp identification in support of seismic-hazard assessments, delineation of glacial landforms in urbanized areas, development of land-use-zoning maps, surface-water flow simulation and watershed delineation, and structural mapping on projects in the United States and Papua New Guinea. Other recent digital terrain modeling projects have involved fieldwork in the Indian Himalaya and Nepal. Bill is the author or coauthor of more than 100 published papers and abstracts, in addition to an award-winning book on computational geology, and has twice been an invited speaker in LiDAR sessions at national Geological Society of America meetings. A native of Cleveland, he earned his B.S. from Bowling Green State University and both his M.S. and Ph.D. from the University of Cincinnati. Before leaving to establish his consulting practice in 1999, he was Assistant Director and Senior Engineering Geologist at the New Mexico Bureau of Mines & Mineral Resources—the state's geological survey. He also was an adjunct professor at New Mexico Tech. In addition to his consulting practice, he is currently an adjunct professor of geology at the University of Cincinnati and is teaching a digital-terrain-modeling seminar at Northern Kentucky University. For more information, please visit www.haneberg.com.

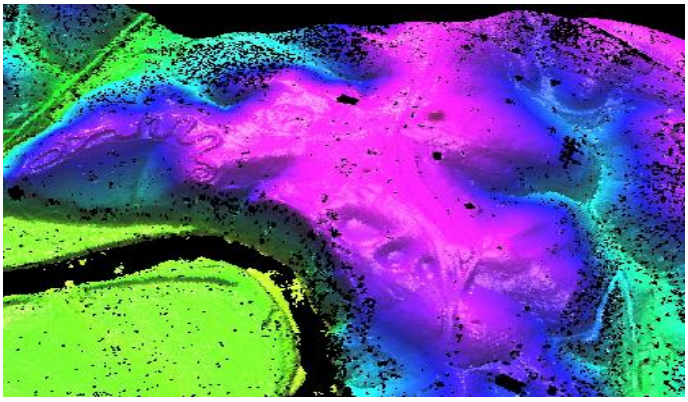
q Project Imagery Utilized by Bill Haneberg q

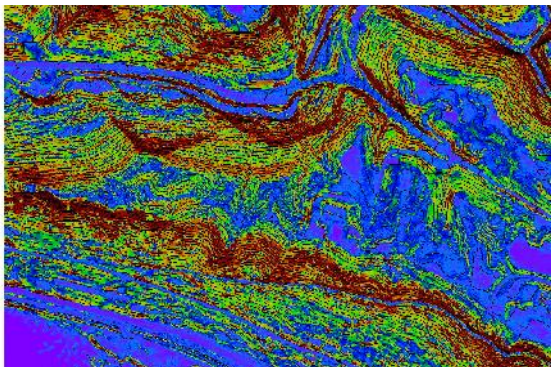
Hear more about these, and see other beautiful images on February 25!!!



This is a 10,000 by 10,000 foot area consisting of four standard OSIP tiles merged together and containing a total of 16,000,000 elevation values. It is colored by the topographic index (sometimes called wetness index), which is log (A/tan b), where A is the upslope contributing area and b the slope angle at each point. It quantifies, at least in a general sense, the capacity of the landscape to deliver water to a point (A) relative to its capacity to disperse water by overland or shallow subsurface flow (tan b). Wet areas are green and blue; dry areas are brown and yellow. Topographic index maps can be useful for things ranging from landslide studies to wetland delineation to interpretation of underlying structural geology.

Serpent Mound Indian effigy and other nearby Indian structures highlighted by LiDAR imagery.





This image covers one of the classic landslide locations in the Cincinnati area, including Bill Haneberg's PhD field study area along the Ohio River valley, and is colored according to slope angle.

Date: February 25, 2009

Location: LaScala Italian Bistro, Dublin, Ohio

http://www.lascalaitalianbistro.com/LaScala.html Use this URL to see the location of LaScala's Restaurant.

Schedule:
5:00 to 6:00 pm Social Hour
6:00 to 7:00 pm Dinner
7:00 to 8:30 pm Presentation

Reservations:
President-elect Tom Berg, tberg@columbus.rr.com; (614) 431-2480