



LiDAR Study Reveals Chaco Canyon's Great North Road

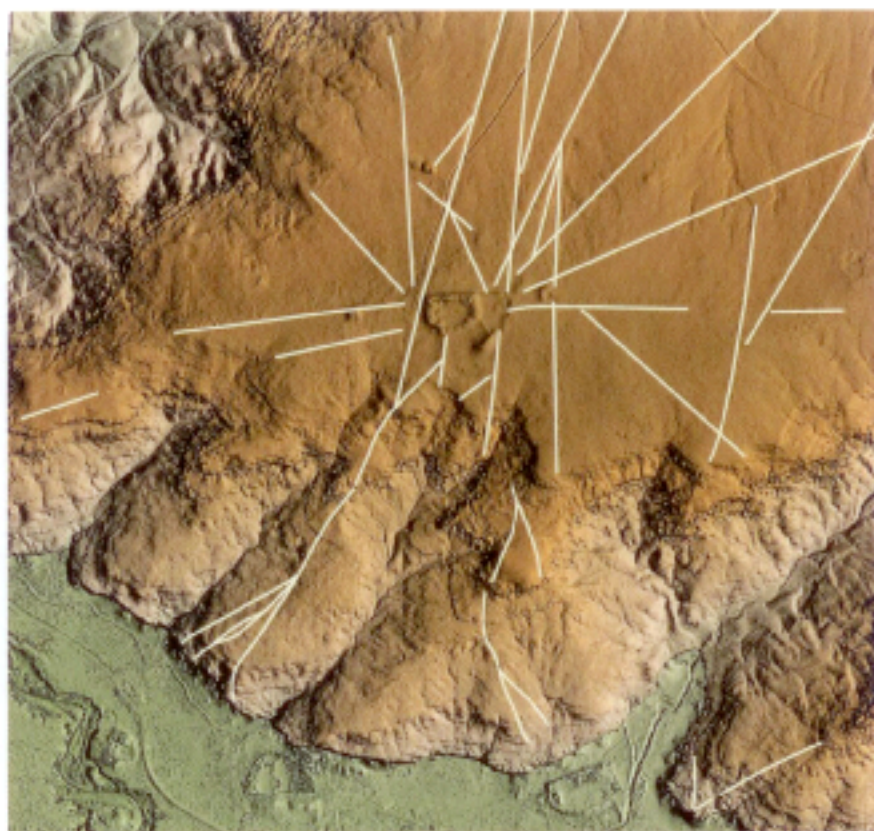
The study proves the effectiveness of this remote-sensing technology.

Researchers using LiDAR, an optical remote-sensing technology, recently recorded over 40 miles of the Great North Road that was built by the occupants of Chaco Canyon, a large Anasazi center in northwest New Mexico.

"This project was an opportunity to test the effectiveness of LiDAR as a technology for identifying and recording Chaco roads, hundreds of which are thought to have been developed throughout the Four Corners area between A.D. 700 and 1200," said Anna Sofaer, founder and president of the Solstice Project, who instigated the study. The Great North Road, considered a cosmographic expression of the Chaco culture with likely astronomical orientation and use, was chosen for the study because some sections are well documented while others are not. This situation made this road a good test to evaluate LiDAR's capability to identify both known and unknown road segments.

A LiDAR (Light Detection and Ranging) sensor was mounted on an airplane that flew over the Great North Road. The sensor emitted thousands of laser pulses per second that reflected off the ground. The Great North Road, like many other Chacoan roads, is a linear path dug out of the ground, and consequently it's lower than the surrounding terrain, though in some cases by only a few inches. The laser pulses clearly detected these "topographic anomalies," said Rich Friedman, a geologist who was involved with the project.

"The results were extremely rewarding," Sofaer said. "LiDAR proved to be a tool with unprecedented capability to record the subtle and rarely visible Chaco roads. Road segments



The lines on this LiDAR image represent Chacoan roads. The Great North Road is the long, north-south line that runs next to the western edge of the semicircle in the middle of the image.

that could not have been detected from ground or aerial survey became visible in the LiDAR imagery. Computer manipulations of the light source on the 3-D images bring out the subtlest of linear features, including one road with a depth of no more than three and a half inches."

The Chacoans built a network of roads, many of which were remarkably straight and as wide as 30 feet. Many of the road segments do not connect ancient buildings with each other or with natural resources, but rather with topographic features on the landscape that are often marked with shrines or ritual architecture, suggesting they

served a cosmographic rather than utilitarian purpose. The LiDAR study also documented segments of a number of other Chacoan roads, which are threatened by erosion and oil and gas development.

The Solstice Project is a non-profit organization established by Sofaer in 1978 to study, document, and preserve the remarkable Sun Dagger site, a celestial calendar of Chaco Canyon, and other works of the ancient cultures of the American Southwest. The organization was awarded a grant by the National Trust for Historic Preservation that partially funded the LiDAR study.

—Tamara Stewart