University of Nevada, Reno, surveys earthquake faults through downtown

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The minivibe truck, using a relatively light 700-pound reaction weight, will stop every 30 feet, set the shaker on the asphalt and vibrate the ground for a few minutes. Hundreds of monitoring sensors connected by cable transmit the soundings to the recording truck. It's a slow process, with the truck creeping less than one mile a day along the river route. Credit: Mike Wolterbeek, University of Nevada, Reno

The Seismological Lab at the University of Nevada, Reno is finishing the first phase of seismic surveying through downtown as part of U.S. Geological Survey study to create an earthquake hazard map in the Reno-Carson City urban corridor.

"There are several suspected faults in the downtown area, and we don't know much about them," John Louie, professor of geophysics in the Seismological Lab said. "We finished the Truckee river profile along

Riverside Drive with the minivibe truck and will finish the small southwest Reno portion this week."

"We have really good data," he said. "We're confirming the results of a gravity seismic survey we did 10 years ago, and will be able to more precisely map those and any additional faults we may find."

The gathering of data for this portion of the USGS project will be complete this week and analysis and findings will be completed in the next several months. Louie will work with the USGS to complete abstracts of the research by September to be presented at the American Geophysical Union's annual Fall meeting in San Francisco this December.

"This will be the first chance to present it, and I look forward to having our colleagues see our interpretations," he said.

The Seismological Lab's portion of the project will last 11 days as they do full-scale seismic reflection soundings up to a half-mile deep and for a total of seven miles along the Truckee River and on Reno streets.

"This is a process of discovery," Louie said. "We've looked for the suspected faults, may possibly find faults we don't know about and will be able to identify the most hazardous faults."

The truck, using a relatively light 700-pound reaction weight, stops every 30 feet, sets the shaker on the asphalt and vibrates the ground for a few minutes. Hundreds of monitoring sensors connected by cable transmit the soundings to the recording truck. It's a slow process, with the truck creeping less than one mile a day along the river route.

Louie is the principal investigator on the seismic survey for the University. He will be working with two PIs from the USGS to make

thousands of soundings to complete the high-resolution, non-invasive seismic imaging study using industry techniques for oil and gas exploration.

Louie has seven students working in the crew, gaining valuable real-world experience.

"They will have the opportunity to participate in a real, professional survey not just a class exercise," he said. "They will have a comprehensive view of the whole process, from knocking on doors notifying residents of the work, to placing the ground motion sensors and interpreting the 3D computer results."

The engineering and geological sciences department has two co-principal investigators collaborating on the project: Dr. Pat Cashman, an expert in structural geology, and Dr. Ilenna Tibuleac, research seismologist and geophysicist.

"This is a rare project for the USGS," Louie said. "They have little money for these types of projects and we're pleased they have turned their attention here."

The survey will be done using the latest tools of the trade: the vibrator truck is made possible through a National Science Foundation grant, and the several-thousand-dollar software used to process and interpret the data is being donated for the project by the Reno-based global geotechnical engineering firm Optim, which provides geophysical software and data services around the world.

Source: University of Nevada, Reno