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## EarthScope watches world

### Unavco project uses GPS to track plate movements

By **Corey Dahl, For the Camera**  
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Instead of shooting for the stars, a local nonprofit company is shooting from them.

Boulder-based Unavco is working on a project that will set up global positioning system receivers across the western United States to track the movement of the Earth's tectonic plates.

The Plate Boundary Observatory, part of a \$200 million National Science Foundation project dubbed EarthScope, will help scientists better understand what drives earthquakes and volcanic eruptions.

The project has fueled major growth for Unavco.

"EarthScope is more of a giant telescope pointed down at the Earth," said Mike Jackson, director of the Plate Boundary Observatory for Unavco.

The project's 875 high-precision GPS stations will use satellites to track the distance between each station and monitor change from weeks to decades. Though the technology is similar to that used by the GPS receivers in cars and handheld gadgets, the results are much more precise, providing data down to the millimeter.

Unavco also will set up two different kinds of strainmeters, instruments that track small changes in the Earth's strain due to stressors, such as plate shifts and volcanoes. Buried in 6-inch-wide holes 800 feet underground, 143 instruments will measure any changes in the rock that surrounds them. The highly sensitive instrument can detect changes to the subatomic level.

Less accurate than the borehole strainmeters but more precise than GPS, five long-baseline laser strainmeters will monitor movement at the Earth's surface. A laser mounted in one location will bounce light off an opposite location and record strain through changes in the wavelength of light.

Using both the GPS stations and the strainmeters, Unavco will be able to track plate movement and strain across a three-dimensional field.

"There are projects that have done similar things, but not using the same breadth of instrumentation and geographic scale," Jackson said.

The project is slated for completion in October 2008, after which Unavco has been contracted to operate and maintain the stations for the next five years. The data that Unavco collects will be given to scientists and researchers interested in the Earth's movement.

"Our primary goal here is to provide free and open data to the science and other interested communities," Jackson said. "We're sort of facilitators of research."

The project has been a major catalyst for growth at Unavco. Started by the National Science Foundation in 1984, Unavco operated through the University of Colorado's CIRES program and the Boulder-based University Corporation for Atmospheric Research before becoming a nonprofit in 2001.

When Unavco joined the EarthScope project in 2003, the company's growth skyrocketed.



Sammy Dallal

Effendi Sihombing builds a global positioning system unit recently for Boulder-based Unavco. The nonprofit company has grown dramatically, thanks to a \$200 million National Science Foundation project.

"We went from \$3 million or \$4 million a year, sort of gradually increased, and this year we'll be at about \$30 million," said William Prescott, Unavco's president.

Unavco now employs 95 people and, in addition to its Boulder headquarters, has five satellite offices in California, Utah, Washington state and Alaska.

In addition to working on EarthScope, Unavco maintains a GPS data archive, loans instruments to researchers and trains students on GPS instruments. Unavco also works with manufacturers to adapt equipment to fit the needs of scientists.

"Our goal is to improve the precision of the technology, and get the least expensive, most accurate instruments we can," said Chuck Meertens, Unavco's facility manager. "We're constantly pushing the technology to the next level."

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