QUALCOMM®

EarthScope/Plate Boundary Observatory

Case Study

EarthScope is a National Science Foundation project to build instruments to study the behavior and structure of the North American continent, including earthquake and volcanic processes and definition of the tectonic plates. The Plate Boundary Observatory (PBO), part of the EarthScope project, is a large network of global positioning system (GPS) instruments and strainmeters that measure the deformation of the North American and Pacific plates. UNAVCO, a nonprofit organization that supports and promotes Earth science, oversees the PBO segment of the EarthScope project for the National Science Foundation.

OBJECTIVE

The PBO sought to provide a communications infrastructure for more than 1,100 sites that have geodetic instrumentation. PBO, the most accurate spatial reference system ever developed, will be actively used by surveyors, engineers and others for land control surveys, infrastructure monitoring and many other tasks.

SOLUTION DESCRIPTION

The $100 million PBO project, managed by UNAVCO for the National Science Foundation as part of the $200 million EarthScope project, will use 875 continuous GPS sites, 143 borehole strainmeter stations and five laser strainmeters. The project also includes 100 portable GPS data collection systems for temporary deployments and rapid response.

Constructing the GPS sites began in April 2004. “We now have more than 40 stations operating in Alaska, California, Colorado, New Mexico, Utah and Washington state,” says Greg Anderson, PBO data products manager. Permanent sites are being established throughout the western U.S. Other temporary sites will be deployed across the rest of the country and may be deployed in Mexico and Canada.

Basic GPS sites generate at least 2MB of data per day; strainmeter sites can generate in excess of 100MB of raw data per day. Each site may have as many as four IP-based data collection instruments, such as GPS receivers, web cameras or meteorological monitors.

Data from the more than 1,000 GPS and strainmeter instru-

earthscope UNAVCO

http://www.unavco.org

COMPANY DESCRIPTION

- EarthScope is a National Science Foundation project to build instruments to study the behavior and structure of the North American continent. The Plate Boundary Observatory, part of the EarthScope project, is a large network of global positioning system instruments and strainmeters that measure the deformation of the North American and Pacific plates.

OBJECTIVE

- Minimize capital expenditures, installation, support and ongoing communications costs
- Provide a communications infrastructure for thousands of GPS and strainmeter instruments across the western U.S. and Alaska
- Use a network solution that is ubiquitous and fast, supported by inexpensive equipment that has low power requirements and is easy to deploy and maintain

SOLUTION DESCRIPTION

- GPS sites are connected by the Proxicast™ LAN-Cell 1x Mobile Gateway to the CDMA2000 1X national network from Verizon Wireless
- Where data service is not available, GPS sites are connected to the CDMA2000 1X network by point-to-point RF links

RESULTS

- Avoid expense of nearly $1 million per year by eliminating the need for multiple modems and accounts
- Further scientific understanding of the North American continent
- Provide faster turnaround of data and analysis to member organizations
- Increase the data sampling rates at sites, to further improve modeling, analysis and prediction of seismic activity

ments are downloaded over a CDMA2000 1X network and automatically fed into custom databases and software applications developed by PBO to manage, interpret and present the information.

"We could not have done it without CDMA," says David Mencin, PBO senior engineer. "CDMA is an enabling technology."

To create the communications infrastructure for the vast majority of the sites, PBO is using the Verizon Wireless™ NationalAccess™ CDMA2000 1X network. The connection to the network is enabled by a LAN-Cell 1x Mobile Gateway™ device from Proxicast. In locations where data service is not available, point-to-point RF links will be used to convey the data to a location that has coverage.

"We could not have done it without CDMA. CDMA is an enabling technology."

David Mencin
PBO Senior Engineer
UNAVCO

RESULTS

PBO is one of the largest telemetry/supervisory control and data acquisition networks in North America in terms of geographic coverage, number of nodes and network traffic. Each node represents a significant amount of data: The combined nodes transmit more than 10GB per day over the network.

Managing such a large, geographically disperse and often geographically remote network is highly challenging. Many sites are in remote areas where telephone, DSL or other wired Internet service is not available. Most sites are solar powered because of their distance from electric utility lines. Data is collected continuously from the remote sites, so an always-on solution was attractive.

Working on a fixed budget, PBO had to minimize initial capital equipment expenditures, installation and support costs as well as ongoing communications costs. That meant deploying a wireless solution that was ubiquitous and fast, supported by equipment that was inexpensive, had relatively low power requirements and was easy to deploy and maintain. Using Proxicast LAN-Cell 1x Mobile Gateway eliminated the need for multiple CDMA-based modems and subscriber accounts, avoiding nearly $1 million per year in costs.

CDMA LIST™ Winner

earthscope

UNAVCO

EarthScope/UNAVCO is the 2004 winner of the A-List Award in the Innovation category.

The 3G cdmA-List Awards program honors the leading builders of successful wireless data solutions based on 3G CDMA2000 1X or 1xEV-DO technology. **To learn more about the A-List, please visit www.qualcomm.com/enterprise**

SUPPORTING PARTNERS

The A-List also recognizes supporting partners for their enabling role in assisting winners with their wireless data deployments.

proxicast

verizonwireless