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SatMagazine

A Ten Year Triumph

ATK + NASA's Earth Observing-1

A Case In Point

DeformationComms

Located in an unassuming office park in Boulder, Colorado, UNAVCO is a non-profit, membership-governed consortium sponsored by the National Science Foundation (NSF) and National Aeronautics and Space Administration (NASA), and supports a myriad of science communities — including those who focus on the deformation of ice, imaging the structure of the atmosphere, and the Earth's response to ground water, sea level, and other aspects of the hydrosphere. UNAVCO also provides science support through a combination of community coordination, field engineering, technology innovation, and instrument testing.

One **UNAVCO** project, ***Plate Boundary Observatory***, provides unprecedented imaging of the Earth's plate boundary deformation. In addition to the UNAVCO facility in Boulder, Plate Boundary Observatory maintains regional offices in San Clemente, California and Anchorage, Alaska and has deployed hundreds of global positioning systems (GPS) and seismic monitoring stations in the western U.S. to collect seismic data.

To transfer and archive these large amounts of data from remote stations, Plate Boundary Observatory relies on the ***HughesNet***® satellite broadband service. Unlike terrestrial solutions, HughesNet does not rely on cable or phone wires, so it's available to consumers, businesses, and research organizations anywhere in the continental U.S., regardless of how remote the location — which allows the Plate Boundary Observatory team to transfer data back to UNAVCO quickly, easily, and securely.

Rough Terrain For Data Collection

In the early 1980s, soon after the first experimental GPS satellite was launched, UNAVCO was created to solve the challenge of applying GPS to geosciences for measurement and imaging purposes. UNAVCO, in turn, formed Plate Boundary Observatory in the late 1980s using GPS to study the three-dimensional strain field resulting from deformation across the active boundary zone between the Pacific and North American plates. It now comprises arrays of GPS receivers and Strainmeters that are positioned across the western U.S. and used to measure underground strain over time periods ranging from 15 seconds to decades and longer.

Originally, Plate Boundary Observatory engineers were required to haul the GPS equipment out to a research site, survey and gather data manually, transport the data back to UNAVCO, and repeat everything the following year to measure movement over time.

"As GPS costs declined over the next few years, it became more economical for us to install the equipment permanently," said *Warren Gallaher*, Senior Network Engineer. "We also were able to get dial-up connectivity at a few of the less remote sites that helped with communication and data transfer."

The Move For Satellite Broadband

With such spotty connectivity, however, dial-up didn't prove to be a permanent solution for data transmission. "We really needed a stable, reliable service that could help us archive everything we collected," said *Gallaher*.

A Case In Point

After researching options for high-speed connectivity and trying out a very expensive satellite solution from a Canadian service provider, *Gallaher* and the Plate Boundary Observatory team signed up for ***HughesNet*** satellite broadband in 2002.

"We spend a lot of time at research stations like our location in Yellowstone where satellite connectivity is really our only option for communicating and archiving data at UNAVCO," said *Gallaher*. "The Hughes satellite modem and small antenna are just perfect for what we need." Gallaher also likes the stability of their HughesNet service.

With remote locations across California, Oregon, and Washington, along with five in Yellowstone, reliability and ease of use are extremely important for the Plate Boundary Observatory team of engineers.

"Our job is to get new, important data back to geologists at our member organizations and universities. They aren't very interested in how the equipment works or how we transfer it, they just want the data," said *Gallaher*. "For the sake of our program, it's crucial that we are able to do that without any headaches and HughesNet allows us to — it truly satisfies a niche that we couldn't find with other providers."

Broadbandquake

Today, Plate Boundary Observatory has installed more than 1,000 GPS stations and about 80 strain seismic stations, all of which can get online and transmit data back to Boulder. The data collected is also freely available online as soon as it can be downloaded and moved to the archives. UNAVCO is also using HughesNet to support and maintain reference stations for **NASA**'s **Jet Propulsion Laboratory** in California and is considering deploying it for a different project in Africa.

"Similar organizations and small businesses with various locations should realize that HughesNet, above all else, is a stable, easy-to-maintain solution," said *Gallaher*. "We're committed to cutting-edge geodynamics research and HughesNet allows us to bring back important data really easily."

HughesNet offers a full suite of services designed to help organizations such as UNAVCO and Plate Boundary Observatory adapt to their environment. Download speeds range from 1 Mbps up to 5 Mbps — additionally, the seven HughesNet Business Internet plans also can be customized to include private networks and backup solutions.

About UNAVCO

The UNAVCO Facility in Boulder, Colorado, is the primary operational activity of UNAVCO, Inc. and exists to support university and other research investigators in their use of Global Positioning System (GPS) technology for Earth sciences research. The Facility performs this task by providing state-of-the-art GPS equipment and field engineering support for projects, installing, operating and maintaining continuous GPS networks globally, undertaking new technology development and evaluation of commercially available products for research applications, and by archiving GPS data and data products for future applications. The Facility is funded under multi-year grants from the National Science Foundation (NSF) and National Aeronautics and Space Administration (NASA).

The Mt. Lewis site, which is part of the organizaiton's BARGEN network.