



Leveraging Advanced Networking Technologies to Connect the Earth Sciences Research Community and Accelerate Discovery

Around the world, scientists are gathering information about the depths of oceans, the upper reaches of the heavens, and the many ecosystems in between. This wealth of earth observation data is required to develop solutions to some of the greatest global challenges facing our planet: climate change, population growth, food and water shortages, and the growing demand for renewable energies. However, this valuable information often resides in the labs of individual researchers or in regional repositories that are beyond the reach of many scientists.

To tackle this problem, researchers at the Universities of Alberta and Calgary, together with Cybera, the organization that manages Alberta's high-performance network, are leveraging advanced networking capabilities and funds provided by CANARIE. They are focused on four powerful goals: to increase the volume and quality of earth observation data; to enable earth science researchers to work more collaboratively; to create a repository of knowledge that benefits the broader scientific community; and to build re-usable tools for researchers working across different disciplines.

Through CANARIE's Network-Enabled Platforms (NEP) program, the team has developed GeoChronos, a web-based collaboration environment that enables earth scientists to better access, process and share data from geographically distributed sources. Drawing on powerful compute capabilities, it is designed to process very large amounts of information obtained from sensors located on the ground, in the air and on satellites. These devices generate complex data for mapping, environmental monitoring, resource management and a variety of ecological assessments. GeoChronos integrates these data sources, and enables scientists to work with this information seamlessly over the web.

"GeoChronos harnesses the power of social networking tools such as blogs and wikis, but with a scientific bent," said Jill Kowalchuk, Vice President, Project and Partnership Development of Cybera. "It provides a powerful online platform for research collaboration. To date, over 70 scientists from Europe, North and South America have tested the platform with promising results."

Early adopters emphasize that spontaneous interaction with international partners is one of the key benefits of this technology. "Our environmental research has global implications," says Dr. Arturo Sánchez-Azofeifa, Professor of Earth and Atmospheric Sciences, and Director of Centre for Earth Observation Sciences at the University of Alberta. "To reap the value of individual site-based observations, data must be accessible to the broader scientific community, and put to work in national or global strategies that support collective action."

"GeoChronos allows scientists to focus on *science* rather than technology," says Dr. Cameron Kiddle, Technical Lead for the project and Research Fellow at the Grid Research Centre, University of Calgary. "Researchers can dynamically share large volumes of data over the high performance CANARIE and Cybera networks, without specialized software or hardware. GeoChronos could also support the development of standardized reporting and data management techniques in the earth sciences field."

Currently used for monitoring tropical dry forests in the Americas, this platform has potential applications in many scientific disciplines. "Leveraging \$900 000 from CANARIE's NEP program and \$235 000 from Cybera, we aim to build re-usable tools for researchers working across the spectrum of science," says Dr. Kiddle. Focused on this goal, the team is now developing a more robust production version of the platform. For scientists around the globe, GeoChronos truly creates a new way of looking at the world.