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Synodon develops airborne natural gas pipeline leak detection system

Synodon Inc. may be a new name to the community of Innovation Place, but vice-president of engineering and project manager Doug Miller is definitely a familiar face around the research park. You can now find Miller hard at work in his office within the Concourse Network Centre, at 112A - 116 Research Drive.

Prior to joining the Edmonton-based technology company, Synodon Inc., Miller worked in instrumentation development for SED Systems for 16 years, then served as a consultant on the Canadian Light Source synchrotron. He joined Synodon to help lead the development of an exciting new project - an airborne advanced natural gas pipeline leak detection system called "realSens™."

"We're developing an infrared optical instrument that will detect leaks in gas pipelines from helicopters. Currently the technology for monitoring leaks uses hand-held sensors with people walking the pipeline. In residential areas, the current mode of detection is people's noses," says Miller.

The new technology under development by Synodon promises to be vastly more efficient than current detection systems, which only identify fairly large leaks.

"In high-pressure gas pipelines, which bring the gas from the fields to the distribution points, a small leak can become a large leak in a hurry. Occasionally, there are catastrophic accidents that result in major property damage and loss of life," says Miller.

Miller says that the market potential for the realSens technology is huge, as the world's natural gas pipeline infrastructure spans a distance of more than 4.8 million kilometers. The pipeline consists primarily of steel, buried underground, making it prone to corrosion and leaks. Helicopters carrying the infrared instrument would be able to cover over 100 km of pipeline per hour, detecting early stage leaks before they become problematic.

Leaks from gas pipelines also have a negative impact on the environment. "Leaks from just the gas pipelines in North America amount to approximately 0.3% of all of the gas that goes through the pipeline. That adds up to many millions of tonnes of greenhouse gases released into the environment, and the loss of billions of dollars worth of natural gas annually. In other parts of the world, such as Russia, the volume of gas leaked is much higher. With all of the focus on minimizing emissions of greenhouse gases and the signing of the Kyoto Protocol by Canada, there's a lot of interest in being able to better monitor these gas leaks so they can be quickly repaired."

The realSens service is based on technologies developed over the last decade under the Canadian space program. "Three years ago, we began looking at the technology associated with an instrument called MOPPIT which is currently flying on the Terra satellite. This instrument examines greenhouse gases in the atmosphere and is quite successful. At the same time, one of the MOPPIT science team members, Dr. Boyd Tolton, had a similar idea and did some lab measurements and extended the technology, coming up with an interesting proprietary concept that no one else had noticed. Fortuitously, Adrian Banica, who is the president and CEO of Synodon, was able to negotiate for the Intellectual Property rights with Dr. Tolton and the University of Toronto. In the meantime, Adrian and I had completed a market survey assessing the potential of this technology and discovered huge interest, here in North America and around the world. Dr. Tolton then joined Synodon as our chief scientist."

Government regulations mandate that pipeline operators must regularly inspect their infrastructure for leaks and take other measures to prevent leaks. "Regulations governing leak surveys vary from jurisdiction to jurisdiction, and can specify that the entire network be checked for leaks every one to five years," says Miller.

"Over a five-year period, a small leak can quite easily turn into a large leak."

Most companies with high-pressure pipelines have policies to fix leaks immediately, but Miller says that it can take a long time to walk the pipeline network carrying hand-held devices. "It becomes a very expensive and a very difficult proposition to survey the pipelines on a regular routine basis."

By mounting their new infrared optical instruments on helicopters, Synodon will be able to cover the pipeline networks at over 100 km per hour, detecting even early stage leaks, then providing very exact locations and information to the pipeline companies. "With hand-held survey equipment, you can walk right beside a leak and still miss it," says Miller.

He adds that the detection technology is not limited to natural gas, but can be used to pinpoint leaks of any type of gas transported by pipeline, such as ammonia.

Synodon plans to maintain ownership of all of its detection instruments, working in partnership with existing helicopter survey companies to provide this airborne survey service first in Canada, then in the United States and eventually, Europe.

"Our intent is to have the working lab model with simple optics completed this summer. Our second step is to construct a more rigorous lab model which will incorporate the commercial optics, which are quite large. The second model will also have a much more complex detection system. We will be using this model in field trials, in partnership with Trans Canada Pipelines," says Miller.

A commercial model will be in development simultaneously, so that Synodon can bring its service to the marketplace by 2004.

Miller commutes between Synodon headquarters in Edmonton and his office at the Concourse Network Centre at Innovation Place in his dual roles as vice-president of engineering and project manager.

"I'm responsible for hiring all of the engineering staff, as well as ensuring that the project stays on track and on budget. Our approach to the engineering is to keep our primary staff fairly small, and to try to fill our staffing requirements by hiring consultants and contract or term employees," says Miller.

Synodon plans to outsource a number of design and technology contracts, looking wherever possible to deal with Canadian firms. For its optics needs, for example, Synodon is negotiating with optical design companies in Montreal, Ottawa, Victoria and Toronto.

"We will hire whoever has the expertise to accomplish what we need. We're definitely open to hiring Saskatchewan companies or individuals for specific areas of the project. We definitely don't think we need to have everyone located in one office to do this work. It's a matter of hiring the right people who can work independently, and then managing the work flow," says Miller.

Synodon has just closed its first round of financing on the project. "We are now into the second round of financing. We are looking for a mix of government grants and private investment. We've made it through the first round and have received very positive feedback so far," says Miller.

The market survey conducted by Synodon estimates that its new airborne survey technology could generate revenues in excess of $20 million per year for the company, based only on the provision of services within the North America marketplace. "This is based on a very competitive per-kilometer fee, that is actually less expensive than current manual surveys," says Miller.

For more information about Synodon and realSens technology, log onto the corporate website at www.realsens.ca .

Indy 500 selects Profit Systems

Profit Systems Inc. (PSI), located at 105 - 15 Innovation Boulevard in Innovation Place, has just announced the sale of its EventPro software to the Indianapolis Motor Speedway.
Two separate event management software programs developed by the Saskatoon technology company will be installed at the prestigious sports facility: one at the race track facility itself, the second at the adjacent Brickyard Hotel and Conference Centre. The sale is valued at approximately $10,000.
Indy 500 is not the only big name sporting venue to purchase Profit System's EventPro software. Other clients include Boston's Gillette Stadium, home of the New England Patriots; the University of Alabama - Huntsville; Brigham Young University and West Point Military Academy.
Locally, EventPro software is being utilized by the Centennial Auditorium and Convention Centre, Saskatoon Prairieland Park and the Regina Centre of the Arts.
PSI is a longtime tenant of Innovation Place, established in 1985 by Steve and Rena Mitchell. The company is owned by three principal shareholders. PSI specializes in providing software solutions to business and wholesale distributors, union management, military mess management, preventative maintenance departments and event management.
In addition to EventPro software, the company has also developed a preventive maintenance software program called PMXpert. PMXpert software was originally developed for Hertz Northern Buses in Saskatoon, assisting the company in its vehicle fleet maintenance schedules.
Both products have gained popularity in markets around the world, with sales to companies located as far away as the United Arab Emirates and The Netherlands.
For more information about PSI and its software solutions, check the corporate website at www.profitsys.sk.ca

PARC provides insight into climate change

The Kyoto Protocol has propelled the issue of climate change and global warming to the top of many people's minds these days. Seldom a day goes by when we aren't reminded that our climate is changing rapidly and that the impacts could be alarming.
What you might not know is that in Saskatchewan, important research on this issue involving scientists and public policy makers from across Canada and around the world, is being coordinated at Regina's Research Park.
The Prairie Adaptation Research Collaborative (PARC) was established in March 2000 to facilitate interdisciplinary research on the potential impacts of climate change on the prairies, to recommend adaptive strategies to minimize the negative impacts of climate change, and to take advantage of new opportunities. PARC is funded by three major contributors: Natural Resources Canada, Western Economic Diversification and the three prairie provinces.
"Some people believe that climate change is the most important environmental concern in the world today," says geography professor and PARC research coordinator Dave Sauchyn. "We want to know how we can adjust to it. Our climate is so variable here in the prairies that

many people don't know how big of a concern our climate is. It is hard to see, but on average, our climate is getting warmer and drier."
Sauchyn is excited about the research being conducted by PARC. He says that PARC has already funded close to 40 projects. Research topics include climate impacts on agriculture and forestry, water sources, parks and protected areas, communities and cities, and the energy sector, as well as the analysis of past climate patterns.
"We are trying to bring together scientists, government and industry, people responsible for managing our resources, as well as the communities that depend on the resources impacted by climate change," says Sauchyn.
He says that years before the ratification of the Kyoto Protocol, which occurred in November 2002, Canada began to require a national climate change program or network. PARC was the first organization of its kind to form in the country because the effects of climate change are most severe in the prairie provinces.
"There was a proposal to establish a national network, and PARC was the first one," says Sauchyn. "We have researchers who are highly qualified, including a number of undergraduates who are our next generation of scientists, some graduate students, a post-doctoral fellow, as well as some interns and researchers from the provincial government. Our students and researchers have backgrounds or degrees in a variety of environmental sciences, including geography and even the social sciences."
Just one of the many interesting and important projects that PARC has coordinated is a study of historical climate information from tree rings. Weather records since European settlement cover only about 100 years, but weather records found in tree rings go back more than 1,000 years. These rings provide researchers with information that can help people adapt to current climate change.
Through their research, Sauchyn and his team found that prior to the 20th century, the Prairies were affected by periods of decade-long droughts. From statistical analysis they were able to determine that there is a good chance that a decade-long drought will occur sometime in this century. If PARC's research can help verify the forecasted future climate change, ultimately it will help minimize the expected negative impacts.

Study of alternatives to antibiotics earns $1 million grant

Scientists from the University of Saskatchewan (U of S) and the National Research Council's Plant Biotechnology Institute (NRC-PBI) have been awarded nearly $1 million from Cargill, the global food and animal nutrition company, for research aimed at improving livestock health and finding alternatives to antibiotics.
The research team will use cutting-edge molecular technologies to study the diverse species of organisms that inhabit the gastrointestinal tract of animals - new knowledge that could improve livestock nutrition and pave the way for effective alternatives to antibiotic use in agriculture.
Cargill Feed Applications will have the opportunity to commercialize the research findings. Andrew Van Kessel, a U of S professor of animal and poultry science, will work with NRC-PBI scientists Sean Hemmingsen and Janet Hill to improve a new diagnostic tool developed by Hemmingsen and colleagues at University of British Columbia, which has already met with preliminary success in studies on pigs. The U of S/NRC researchers will use the tool to identify and quantify bacteria in the intestines of chickens.
"The more we learn about factors which influence animal digestion and gastric function, the more effective and consistent will be our programs for controlling pathogens and optimizing

animal performance," says Wade Robey, director of research and development for Cargill Feed Applications.
"This funding will advance the search for ways to reduce reliance on antibiotics and maintain both the health of Canadian livestock and viable export markets," said Bryan Harvey, U of S acting vice-president of research. "The project also exemplifies the exciting collaboration taking place between U of S and NRC-PBI researchers on our campus."

Saskatoon Regional Science Fair requests sponsors, volunteers

The annual Saskatoon Regional Science Fair (SRSF) will be held again this year at the University of Saskatchewan April 3 to 5, 2003. The SRSF is open to any student registered in grades 7 to 12 who attends school in the Saskatoon area.
Aside from being fun, a science fair project gives students an opportunity to put their science and English skills into action. Students learn that the process of science is much more complex than the usual five steps outlined in "The Scientific Method," and they have the opportunity to manipulate and draw conclusions on data from an experiment of their own design. As well, students must communicate the methods and results of their work in a number of ways - through their written report, through their poster display and orally to judges and members of the public.
This year the organizing committee will be adding a Science Olympics. The Olympics will take place on the morning of April 5 and will give students an opportunity to meet and work with other students to complete a team project. This "top secret" project should be a lot of fun for both the participants and on-lookers.

VOLUNTEERS & SPONSORS REQUIRED
As a charitable organization run by volunteers, the SRSF is always in need of volunteer and financial sponsorship! Volunteers can help in a number of ways:
• Get involved with the organizing committee. We need help with everything from registration to banquets. No previous experience or expertise required! We meet once a month for two to three hours in the evening.
• Become a judge. Judging takes about 4 hours on the evening of April 3. Pizza is free!
• Consider becoming a mentor. The SRSF would like to develop a list of researchers who could assist teachers and/or students with advice or lab supplies for projects. Mentors' contact information will be provided to teachers at the beginning of the school year.
The SRSF has developed a recognition program for sponsors of all levels from "Friend of the Fair" to "Platinum Sponsor." A complete sponsorship information package is available. Our largest budget items are:
• Prizes and Awards
• Banquet and Food
• Science Olympics
This year, the SRSF's biggest fund-raising goal is to send a full contingent of eight students and two adult chaperones to the Canada-Wide Science Fair in Calgary.
For more information about the Saskatoon Regional Science Fair, check the website at www.usask.ca/srsf) or contact Beth Campbell, President (beth@twocarparade.com, 665-6360) or Charles Cuell, Treasurer (cuell@math.usask.ca).

VIDO appoints new board members

Four new board members have been appointed to the Board of Directors of the Veterinary Infectious Disease Organization (VIDO).
The VIDO Board welcomes: Chuck Rhodes, acting dean of the University of Saskatchewan Western College of Veterinary Medicine; Bryan Harvey, acting U of S vice-president of research; Larry Milligan, former University of Guelph vice-president of research; and Gordon Nystuen, deputy minister of Saskatchewan Agriculture, Food and Rural Revitalization.
Lorne Babiuk, director of VIDO, says, "These new board members come to the VIDO board at a time of tremendous opportunity. VIDO is in the full stages of a $20-million expansion which will strengthen our traditional work in disease research and vaccine development, while boosting capacity in key areas such as genomics and bioinformatics."

Enhance your speaking skills

Campus Howlers Toastmasters club meets every Tuesday morning 7:15-8:20 a.m. in 2D21 Agriculture. The club is comprised of faculty, staff, graduate and undergraduate students and is open to those people interested in improving their speaking skills.
If you are interested in improving your speaking skills, please contact Robert Schultz, president, 966-7822, or email: Robert.Schultz@usask.ca