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In This Issue...

Cover Story
CRC's Innovation Centre is helping small business succeed.

Broadcasting in the Digital Age
Research could change how TV signals are broadcast.

Helping Patients Remain in the Comfort of their Home
Using technology to help those with mental illness.

Developing the Next Generation Internet
The next phase of the Internet revolution is approaching.

Ultra-Wideband is Making Waves
Looking at implementing new high-speed wireless technology.

Making CRC Technology Available to the World
CRC technologies are ready to be transferred to industry.

Licensing Corner
World-leading technology for audio evaluation.

Planting the Seed
for Business Success

Fledgling high-tech companies are often challenged by the overwhelming cost of moving forward with R&D programs. In Canada, small- and medium-sized enterprises (SMEs) have a distinct advantage thanks to the existence of the Innovation Centre at the Communications Research Centre Canada (CRC). CRC is the leading federal government laboratory for advanced communications R&D, and for over a decade has made its technologies, facilities, and expertise available to Canadian high-tech companies, through this incubation program, to help them flourish.

To date, the CRC Innovation Centre has helped over 40 companies get off the ground since its first client in 1994, companies that are employing approximately 3000 people across

the country. There are currently seven client companies on site at the Shirleys Bay campus, taking advantage of the tremendous facilities and services offered by the Innovation Centre.

One example of the success supported by CRC's Innovation Centre can be seen in the growth of Ottawa-based Spotwave Wireless, a graduate of the program. The company, which has developed technologies to improve wireless voice and data reception in hard-to-service areas, is on the fast track to success. The company has already deployed over 2000 systems, which are manufactured in Cornwall, Ontario. Having recently received over $12 million in new financing, Spotwave has also been awarded a US patent for its SpotCell indoor wireless technology.

Client companies graduating from CRC's incubator program, like Spotwave Wireless, have an extremely high rate of success. At last survey, these companies had a 96 per cent success rate, significantly higher than the national average, which is 87 per cent. The tremendous links and benefits generated for client companies of the Innovation Centre are obviously a significant factor in this success.

Broadcasting in the Digital Age

With the ongoing push to adopt digital television (DTV), most of the emphasis has been placed on High Definition Television (HDTV) because of the obvious advantages it provides. HDTV is a technology that is capable of producing incredibly sharp and clear pictures that can be displayed on big screens without sacrificing image quality.

However, while HDTV is the most obvious benefit of DTV, there are many other "behind the scene" benefits that are equally important, and can be exploited by using innovative technologies. One such technology is Distributed-Transmission Systems (DTS).

As its name suggests, DTS is simply a way to distribute the TV signal across a service area. Instead of using a single central high-power high-tower transmitter, DTS uses a number of lower power transmitters located at different sites within the service area. This technique has not been used with analog TV because of the risk of creating ghost images on the user's channels. An analog transmission system must use a different frequency channel for each different transmitter used to distribute the signal. Digital transmission systems, on the other hand, do not have this requirement.

Because of this, the limited and valuable spectrum used by TV signals can be conserved using DTV. In fact, under certain conditions it may even be possible to use a single channel for all the transmitters of a digital DTS to form the so-called Single Frequency Network (SFN). As well, DTS provides additional benefits such as better reception, reduced power and antenna height, more consistent reception across the

Single frequency network measurements in Ottawa

entire service area and the ability to open up spectrum for new applications, such as interactive TV, multimedia broadcasting, or any other future applications in the TV bands.

CRC has performed various studies and tests on this technology and so far, the results have been encouraging. The test results, which have shown superior performance of DTS over the single transmitter configuration, have been used to standardize this technology for use in North America.

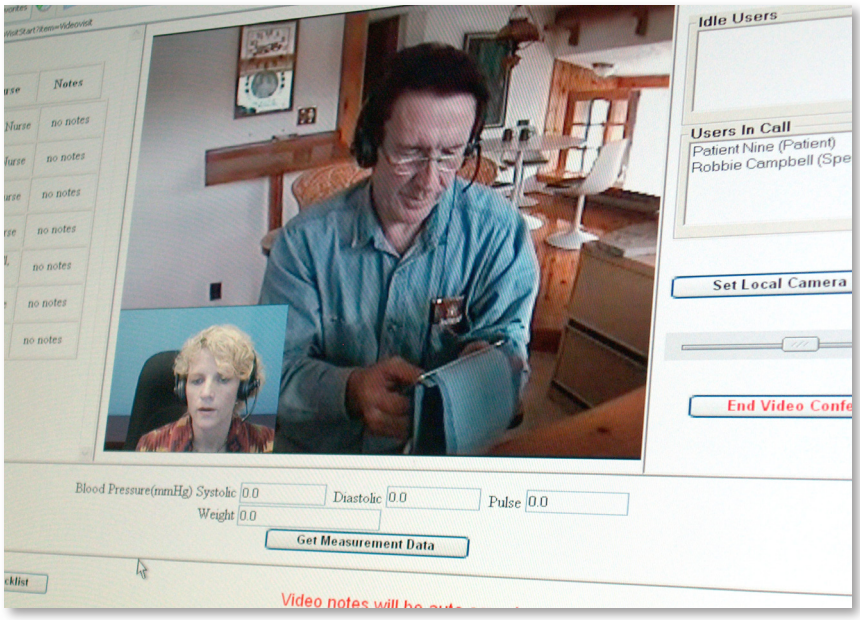
Helping Patients Remain in the Comfort of their Home

The ability to remain independent and at home is a major concern for patients suffering from mental illness. The Communications Research Centre Canada (CRC) is working on a pilot project to demonstrate how telecommunications can complement current homecare programs to improve the quality of care for patients, while also making the homecare system more efficient and economical.

The Remote Assertive Community Homecare program, or REACH, uses satellite broadband technology to connect patients requiring daily supervision with care providers from Assertive Community Treatment (ACT) programs. The technology allows ACT staff to supervise the taking of medication and monitoring of the patient's health remotely. The patients thus receive the treatment they need while remaining in the comfort of their home environment. By using technology to supplement in-person visits, travel time and costs are reduced, allowing the ACT staff to support more patients than would otherwise be possible.

The pilot project involved approximately 20 patients in the area of Woodstock, Ontario who have had their homes outfitted with a computer, health-monitoring software, an interactive touch-screen monitor and a video conference link. The system is also equipped with other remote devices, such as a wireless weight scale and a blood pressure monitoring device. Readings from these devices are sent back to the ACT team member for monitoring.

The pilot project, led by Telesat and funded by the Canadian and European Space Agencies, involved partnerships with Infosat Communications, Lawson Health Research Institute in London, Ontario, Peel Corporation, VaaSah Inc and CRC. CRC has been supporting this important initiative since its beginning in 2004 by contributing its expertise in satellite



communications systems. Staff have gone to patient's homes to setup the satellite connections and have provided training to the ACT members on the use of the technology.

To date, the majority of patients and ACT staff have been very pleased with the new system and have found that it has made a significant difference in the amount of time spent for their daily check-ins. The project was scheduled to be completed in January, at which point the potential for deploying this new technology on a broader scale will be evaluated by an independent third party.

Developing the Next Generation Internet

The Internet has become an essential tool for business in Canada. From the very beginning, CRC has been a leader in Internet technologies, and that leadership continues as the next generation of the Internet is emerging.

Web 2.0 is a term that has been coined to describe a new way that the World Wide Web is being used; as a platform to run applications, rather than merely a simple collection of web sites.

The Networked Media Laboratory at CRC was one of many organizations that were developing Web 2.0 applications before the term was coined. This should not be surprising – the Networked Media Laboratory has been developing applications for the Web since 1993. The newest applications developed by the Network Media Laboratory, including web-based office tools and on-line professional development systems, take advantage of the Web 2.0 approach.

These types of Web 2.0 applications have three major advantages.

First, Web 2.0 applications are native to the web. They run on web servers and are accessible from any web browser. This means that Web 2.0 applications are provided as services to be accessed, not as programs to be installed – users get accounts, not installation disks. It also means that developers can improve the application continuously, providing bug fixes within minutes and new features within hours.

Second, Web 2.0 applications harness collective intelligence. Users are organized into groups, share data, and exchange comments. They are recruited to assist in the development by being encouraged to report any suspected bugs immediately and to suggest new features or ways to improve the interface. As a consequence, the usefulness of Web 2.0 applications increases as more people use them. The intent is to make users feel like they are part of a community when they are using the application.

Third, Web 2.0 applications use software development tools that are optimized for rapid development on the web. Rather than using existing technologies, the Network Media Laboratory has developed its own proprietary high-level scripting language that is simpler to learn, allows rapid program development, and minimizes errors.

By developing applications that take advantage of these important characteristics of the Web 2.0 concept, CRC's Networked Media Laboratory is once again working to further the advancement of important technologies that will have a major impact on the way business is done.

Ultra-Wideband is Making Waves

More and more, wireless devices are taking over the marketplace. With the growing market for wireless applications, researchers are working on new technologies that can provide better services

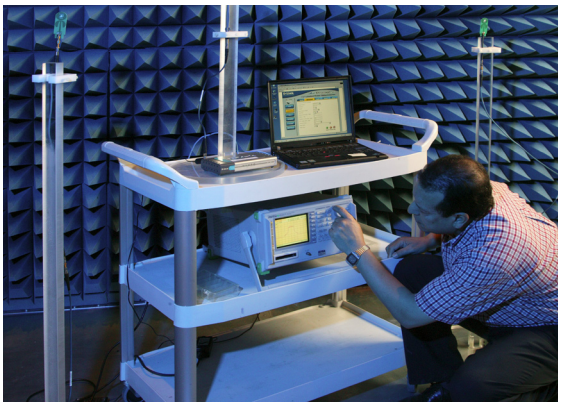
to particular niches within the industry to complement existing technology.

Work on ultra-wideband (UWB) began in the early 1960's. Because of its ability to communicate over short distances with a high data rate and low power requirements, UWB has the potential to be an important player in a sector that already includes other wireless technologies like Bluetooth© and WiFi©. UWB has data rates up to 100 times faster than Bluetooth© and two to three times faster than WiFi©, meaning it could have a major impact on wireless applications in the future. Industry Canada is currently working on setting rules for the use of this technology in Canada.

While some UWB applications are already available for very specific uses such as through-the-wall and ground penetrating radar (UWB was originally developed for the military before being expanded to civilian applications), there is some concern about how UWB will be implemented more broadly. UWB is an underlay technology. It's emissions are spread out over a very large frequency band and one of the key activities in current research is to find a way to prevent interference to other existing users of the spectrum.

To date, CRC's UWB work has included models of possible interference by UWB devices on existing radiocommunications systems, the development of two UWB sources for use in studies to predict possible interference as well as some antenna research. The goal of this work has been to provide independent advice to the government and industry on the possible implications of UWB on current spectrum usage.

In addition to the research, CRC has worked with the Radio Advisory Board of Canada on it's response to Industry Canada's Consultation Paper on the Introduction of Wireless Systems Using Ultra-wideband Technology. As well,



CRC has submitted contributions to the International Telecommunications Union – Radiocommunication Sector (ITU-R) Task Group 1/8 on UWB, that worked to develop international recommendations on this technology.

Making CRC Technology Available to the World

Developing new innovative technologies is one thing. But getting them into the hands of the industry is quite another, and that's where the Communications Research Centre Canada (CRC) excels. CRC has repeatedly been recognized as one of the top government facilities for technology transfer, working to support industry through licensing of technologies and sharing of expertise.

The CRC's Technology Transfer Office works to help private sector companies in Canada and abroad take advantage of the numerous leading edge technologies developed by CRC researchers. These technologies are licensed and can then be incorporated into products that are made available around the world.

Some of the telecommunications industry's leaders have chosen CRC technologies, including big names like Telesat, Dolby, NASA, Panasonic, CBC and the BBC.

Some examples of CRC technologies that are available for licensing include:

MILTON
A Microwave-Light Organized Network (MILTON) is a new way of delivering broadband Internet to less populated areas. Currently being tested in Kanata and Bangalore, India, the MILTON technology is a last mile solution that provides wireless broadband beyond current fibre optic infrastructure.

SCARI++ (Software Defined Radio)
The SCARI++ Software Suite is a development tool for programmers and manufacturers of software defined radio (SDR) systems. It simplifies the development process for these radios, allowing developers to focus on their applications, rather than the specifics of the programming requirements. SDR is the next wave of radio systems currently being used by the military and emergency responders.

Fiber Bragg Gratings
Fiber bragg gratings are a key technology for fiber optics and photonics originally developed by CRC researchers in the 1990's. This technology is currently used by literally dozens of manufacturing companies around the world who have recognized the technology for its ability to improve the efficiency of optical communications systems. CRC has also now developed new ways of producing bragg gratings using femtosecond lasers, creating gratings that are ideally suited for high temperature sensor applications.
For more information about CRC's technology transfer activities or to find out about technologies available for licensing, please visit the Technology Transfer Office web site at http://www.crc.ca/techtransfer.

Licensing Corner

Measuring Audio Quality with Canadian Software

Imagine a software package that acts as an electronic ear, listening to sounds and analyzing them so that their quality can be measured automatically and reliably. That's exactly what the CRC-SEAQ software product has been doing for the industry for several years. This electronic ear is the embodiment of an international ITU standard which CRC's research scientists have contributed to develop.

The software, which is currently available for licensing, helps improve the performance of audio technologies by measuring their output signal quality using either subjective (tests using human subjects) or objective (using a computerized model of the human ear) methods. Major companies such as Dolby, Phillips, Panasonic, Samsung and NASA have licensed CRC-SEAQ.

By using either the subjective component or the objective component of the CRC-SEAQ software, equipment manufacturers and audio engineers can scientifically measure and improve their products. Broadcasters and transmission networks operators can use the electronic ear to automatically monitor the quality of the audio signals they transmit.

CRC-SEAQ is the result of a decade of research on audio quality testing. It is a boon to the audio industry and one that is invaluable in efforts to strive for realistic and quality sound.

More information about the CRC-SEAQ software can be found at http://www.crc.ca/aas.