



Innovation in Canada's Wireless Industry:

Maintaining the momentum

**Response from the
Canadian Wireless Telecommunications Association
to the Federal Government's Innovation Strategy Consultation**

October 2002

Executive Summary

The Canadian Wireless Telecommunications Association (CWTA) and its members fully support the Government of Canada's objective of promoting the benefits of innovation throughout the Canadian economy, as outlined in the Innovation Strategy consultation paper published in February 2002.

Innovation in the wireless sector has taken many forms. Wireless companies make significant investments in research and development conducted in-house and by third parties. They have invested in academic institutions and startup companies across the country. They play a critical role in enabling the federal government's Connecting Canadians agenda, provide access to lifelong learning opportunities, and protect and promote the health and well-being of Canadians.

The CWTA notes that a vast array of opportunities to innovate will result in a wide range of innovative results, and that the market has an excellent track record for finding new applications for innovative products and services. The wireless sector has been recognized by governments and private enterprise as a key enabling sector for the economy, and the CWTA notes government policy can help by establishing an environment that frees up more resources to dedicate to investment in innovation.

In this submission, the CWTA describes its membership, the industry in which its members operate, the role of wireless in connecting Canadians, and the investments – in research, education and elsewhere – made by the industry to promote innovation.

The CWTA also submits its recommendations to ensure the wireless industry remains one of the most innovative in Canada. These include:

- The CWTA encourages the government to review the overall costs of regulation – including taxation and licence fees – imposed on the wireless industry, and to reduce these costs as a means to promote reinvestment and encourage more continuous innovation.
- The CWTA encourages the government to ensure that the costs of regulation are applied equitably to all commercial spectrum users.
- The CWTA recommends government, the wireless industry, academia and other stakeholders consider alternatives to the fees paid to government in excess of

the costs of administering spectrum, that would accelerate innovation and network deployment for this key enabling sector of the Canadian economy. These could include, for example, credits for R&D or educational investments and incentives to deploy networks in rural and remote areas.

- The CWTA encourages the government to revisit procedures for the timely release of spectrum to ensure the process is as quick and streamlined as possible.
- The CWTA encourages the government to continue and enhance its efforts to assist members of the wireless industry seeking to export their goods and services.
- The CWTA encourages the government to carefully examine any proposed changes to the environment in which the wireless sector operates to ensure such changes do not restrict the ability of the wireless industry to innovate.

The CWTA supports the Government of Canada in its objective to foster innovation, and welcomes any resulting opportunity for future discussions with government, academia and other stakeholders on this very important issue.

Introduction

The Canadian Wireless Telecommunications Association (CWTA) is pleased to submit this document in response to the Government of Canada's Innovation Strategy consultation paper, published in February 2002 (the Innovation Strategy).

The CWTA and its members fully support the federal government's objective of promoting the benefits of innovation throughout the Canadian economy. There is no doubt that the culture of innovation that has developed in the information and communications technology (ICT) sector – of which the wireless industry is an important part – has been critical to our sector's success.

Innovation in the wireless sector has taken many forms, and has been undertaken in many ways.

- Wireless companies – carriers, manufacturers, applications developers and others – have made significant investments in research and development, performed either in-house or by independent laboratories.
- Wireless companies have also made significant investments to promote and foster innovation activities at universities, colleges and other academic institutions.
- Wireless companies provide financial support to startup companies that are developing innovative new technology, products and services for carriers, manufacturers and customers.
- Wireless companies have developed innovative solutions to address the Government of Canada's *Connecting Canadians* agenda.
- Wireless companies and their customers are active in developing innovative solutions to protect and promote the health and well-being of Canadians across the country.

As the wireless industry has grown and matured in a competitive environment, CWTA member companies have learned some important lessons about innovation. The association is taking this opportunity to share some of these observations with the Government of Canada as it seeks to promote a culture of innovation across all sectors of the economy.

- It is vital to avoid trying to prescribe the form that innovation takes. A vast array of opportunities to innovate will result in a wide range of innovative results. While not all innovations are successful, the market has an excellent track record for finding new – and sometimes surprising – applications for innovative products and services.
- There are great financial and social rewards for facilitating R&D and other innovation in key enabling sectors such as wireless. Government policy can help by establishing an environment that frees up more resources to dedicate to investment in innovation.
- The Government of Canada can be a key enabler of innovation, for example by helping Canadian wireless companies export their products, services and knowledge to global markets.
- The Innovation Strategy consultation process is an example of how the Government of Canada can support innovation: the very exchange of information and knowledge from sectors that have a culture of innovation to those where it is less developed will improve the innovation culture for everyone.

In this response, the CWTA describes its membership, the industry in which its members operate, the role of wireless in connecting Canadians, and the investments – in education and elsewhere – made by the industry to promote innovation.

The CWTA also submits its recommendations to ensure the wireless industry remains one of the most innovative in Canada, and welcomes any resulting opportunity for future discussions with government, academia and other stakeholders.

The Canadian Wireless Telecommunications Association

The Canadian Wireless Telecommunications Association (CWTA) is the industry authority on wireless issues, developments and trends in Canada. It represents cellular, PCS, paging, mobile radio, fixed wireless and mobile satellite carriers as well as companies that develop and produce products and services for the industry.

The CWTA has more than 250 member companies across Canada. These include all major companies licensed by the Minister of Industry to provide common carrier radiocommunications services to the public; companies that develop and manufacture wireless devices for end users and wireless infrastructure equipment for networks; companies engaged in developing wirelessly-enabled applications for numerous services; and companies that provide services and support to the wireless industry.

More information on the CWTA and its members can be found on the association's web site at: <http://www.cwta.ca>.

The CWTA's members are active in all areas of the wireless industry.

Wireless networks include cellular and PCS networks; paging systems; mobile radio networks; and mobile satellite systems.

Service providers include network operators and resellers.

Wireless device companies develop, manufacture and/or market wireless phones and pagers; wirelessly enabled PDAs and handheld computers; wireless cards and adapters for computers and other portable data devices; hands-free devices and accessories; and non-licence spread spectrum and frequency hopping network equipment for wireless LANs.

Wireless network infrastructure companies develop, manufacture and/or market switches and routers; radio base stations and repeaters; filters and batteries; point to point and point to multipoint broadband wireless systems; cabling systems and cable locating equipment; antenna systems and towers; test and measurement equipment; microwave and satellite hardware; power supplies; and communications shelters, cooling and ventilation systems.

Wirelessly enabled applications developers create and commercialize applications for connectivity applications; remote sensing and monitoring; telematics; content creation, aggregation and presentation; mobile commerce and electronic payments systems; in-building wireless services connected to public networks; location-based services; short message services; wireless Internet integration; geographic information systems; security systems; voice-activated services; international roaming services and home and building automation services.

Services and support companies offer network design and construction services; project management; real estate and site acquisition services; RF and civil engineering; maintenance services; customer service (including call centres); distribution and logistics; marketing; systems integration; billing and collection; information management; competitive intelligence and research; telecom/IT consulting services; legal services and continuing education services.

The wireless industry in Canada

It should come as no surprise that the CWTA's members welcome the Government of Canada's interest in ensuring our country continues to benefit from an environment that recognizes, encourages and fosters continuous innovation. As this report outlines, wireless communications is one of Canada's most innovative sectors – and the CWTA's members plan to carry on this tradition.

Percentage of workers with a university degree, 2001ⁱ

Software & Computer Services	47%
Communications Equipment	42%
Computer Equipment	40%
Telecommunications Services	27%
Electronic Components	23%
All Canadian Industries	20%

Wireless has been a great success story in this country:

- Canadians now use more than 14 million wireless devices on a daily basis, and the number of wireless users continues to grow steadily.
- The industry employs some 25,000 Canadians directly. Most of these employees are in highly skilled positions, and earn on average 30% more than the average Canadian worker.
- Beyond direct employment, thousands of other jobs are supported indirectly by Canada's wireless industry.
- Canada's wireless industry makes important direct contributions to the Canadian economy. For example, since 1995 Canada's wireless carriers have invested more than \$10.7 billion in capital expenditures on mobile phone communications networks, products and services.
- Canada's mobile wireless carriers contributed about \$1.3 billion to Canada's GDP in the first quarter of 2002. In 2001, the wireless carriers contributed about \$4.9 billion to Canada's GDP.
- Wireless also makes important indirect contributions to the economy, as it is an enabling technology for many other sectors of the economy. In addition to constructing essential communications infrastructure, wireless technology fosters increased efficiency by employees by enabling them to provide faster customer service. It allows companies to monitor equipment in remote locations. It enables

ⁱ Statistics Canada, Labour Force Survey, 2001

businesses to track mobile assets. For many small and medium enterprises, the convenience of mobile communications is vital and can contribute to work life balance. It makes possible immediate, virtual meetings at which crucial business decisions can be made. In short, wireless can enhance productivity in every sector – and fundamentally improve the way a business operates.

- In 2002, wireless service providers (PCS, cellular and paging) generated \$6.6 billion in revenue, or some 18% of the total telecommunications services revenue in Canadaⁱⁱ

“The telecommunications industry’s impact on the Canadian economy goes beyond the revenues and employment generated by the industry itself. Telecommunications, including wireless services, provides a critical infrastructure for knowledge-based and other economic sectors, which has an enormous ‘enabling’ impact on the rest of the economy.”

Industry Canada’s “A Spectrum Policy Framework for Canada (2002 Revised Edition)”, Gazette Notice No. DGTP-004-02

Growth of the wireless industry

Growth continues in all segments of the wireless communications industry in Canada – including mobile telephony, paging, mobile radio, satellite and fixed wireless. In addition to network operators, each of these segments comprises service providers, equipment and device manufacturers and suppliers of other products and services to the industry.

Mobile Telephony Services

Wireless phones were introduced to Canada in 1985, and there are currently four national providers of mobile telephony (voice and data) services. In addition, a number of smaller companies provide mobile telephony services in smaller cities and communities across the country. Canada’s mobile telephony sector is a competitive environment characterized by nationwide coverage, innovative products and services and leading-edge mobile data applications at prices that are amongst the lowest in the world.

ⁱⁱ Statistics Canada, Quarterly Telecommunications Statistics, 1st Quarter, 2002

As of Q2 2002, there were 11.1 million mobile telephony users in Canada, representing market penetration of 37%ⁱⁱⁱ.

Paging Services

Canadians have enjoyed the benefits of paging for more than 30 years. Originally marketed primarily as a business tool, in recent years the consumer paging market has also flourished, particularly among young people.

As of 2001, there were 1.8 million users of paging services in Canada, representing a market penetration of 6%^{iv}.

Mobile Satellite Services

Mobile satellite services have been operating in Canada for several years, providing voice and data services primarily to governments and companies operating in rural and remote areas, and those needing true national – or even global – coverage.

Mobile Radio

Mobile radio includes Specialized Mobile Radio (SMR) and Enhanced Specialized Mobile Radio (ESMR). SMR has been available in Canada since 1984, while ESMR was launched 10 years later. These dispatch radio-style systems are operated by a number of service providers and have more than one million users across the country. About 80% of users are on public networks.

Fixed Wireless

Fixed wireless services are for the most part still at an early stage in Canada. But some operators are up and running, and fixed wireless promises to play a vital role in the Government of Canada's *Connecting Canadians* agenda. Fixed wireless services may be used to extend the reach of traditional wired broadband networks, and can even offer a competitive alternative to wired networks. These services have been licensed in a number of bands, including 2.5 GHz, 24 GHz, 28 GHz and 38 GHz. In addition, a number of Canadian companies manufacture and sell fixed wireless services equipment that operates in licence-exempt bands. This equipment uses spread spectrum and/or frequency hopping technology to create wireless local area networks.

ⁱⁱⁱ CWTA Research

^{iv} Idem

Connecting Canadians

Wireless has played, and will continue to play, an important role in fulfilling the Government of Canada's *Connecting Canadians* agenda. The CWTA applauds the government for this initiative, recognizing that ensuring all Canadians have access to networks such as the Internet will contribute to the development of a culture of innovation and knowledge in every region of the country and in every economic sector.

Fixed wireless networks are currently being established. These are faster and more cost-effective to deploy than wired networks, and will play a significant role in connecting all Canadians – particularly those in rural areas – to the Internet.

Meantime, with their ability to contact a specific person rather than a specific place and follow a user anytime, anywhere, mobile wireless networks have been connecting Canadians since their introduction.

Looking ahead, next generation technologies such as 1xRTT and GPRS already provide anytime, anywhere, data connectivity to Canadians. The next leap in speed and bandwidth – enhanced third generation technologies – will enable wireless systems to offer a mobile alternative to landline connections. These will have enough capacity to satisfy the bandwidth requirements of most current applications – and drive the development of new applications that leverage the integration of wireless and the Internet.

The Canadian wireless industry connects Canadians in many other ways, too:

- In April 2002, Canada's four national wireless Personal Communications Services carriers, the CWTA, and equipment vendor CMG Wireless Data Solutions announced that Canadian wireless users were now able to send and receive Short Message Service (SMS) messages between networks. This innovative example of inter-carrier co-operation bridged several different digital wireless transmission protocols and created North America's first carrier-independent mobile text messaging network^v.
- A choice of four service providers for mobile phone service is available to more than half of all Canadians.

^v CWTA Research

- Bell Mobility, Seneca College, the Northern Alberta Institute of Technology, McGraw-Hill Ryerson and other partners have joined forces to demonstrate Mobile Learning starting in the Fall 2002 semester. Students at the two institutions will pilot the program that will provide insight about the educational benefits of wireless handheld technology for students.
- Inukshuk Internet and SaskTel were licensed by Industry Canada in 2000 to build broadband wireless networks across Canada. As part of this comparative licensing process, both companies made commitments to develop and implement Learning Plans that would use their networks to connect Canadians and promote lifelong learning.

Innovation happens here

Innovation in the wireless communications sector is happening right here in Canada. In addition to many home-grown wireless companies, the Canadian operations of many multinational giants are recognized R&D performers with a proven record of success. Research and development is performed in-house, but also through partnerships with universities, colleges, outside labs, and other wireless companies.

“The government needs entrepreneurs and innovators such as yourselves to step up to the challenge of providing high speed local access infrastructures...

“The pioneering efforts and expertise in wireless broadband technology of many Canadian companies – be they service providers, equipment manufacturers or software developers – will ensure that Canada will be a strong competitor internationally.”

Hon. Dr. Gilbert Normand, Secretary of State (Science, Research & Development) in a speech to CWTA members in Toronto, February 10, 2000

- Calgary is a hotbed of wireless development, home to more than 100 firms engaged in, or supporting, the wireless industry.
- Nortel Networks conducts research primarily in Ottawa and Calgary. At Nortel's Ottawa facilities – the largest industrial high-tech campus in Canada – scientists and engineers develop wireless technologies to deliver the Internet to remote locations and a variety of portable devices. Nortel's Westwinds Campus – a 350,000 sq-ft facility in Calgary – has been home to the company's Wireless Centre of Excellence since 2001.
- Ericsson Canada has a long-established research and development centre in Montreal, which creates and tests systems for multiple wireless standards and technology for 3G telecom solutions. The organization is now one of Ericsson's

largest R&D centres outside Sweden, and was named in 2001 as one of Ericsson's five Global Expertise Centres. Since its launch in the mid-1980s, Ericsson has awarded several global mandates for wireless technology to the Montreal centre, which has expanded significantly three times since it was established. From fewer than 50 employees in 1986, the R&D centre now employs more than 1,650 people and occupies four buildings covering a total of 450,000 square feet. With \$270 million in R&D investment in 2001, the Montreal centre is ranked number five in overall R&D spending in Canada.

- Research in Motion Ltd. opened an R&D centre in Kanata, Ontario in 1999 to complement the activities of its main research centre in Waterloo. In 2000, the company received a \$34 million investment from Technology Partnerships Canada that enabled the company to accelerate its R&D in the area of wireless Internet applications.
- Nokia Canada expanded its headquarters in Ajax, Ontario by 27,000 square feet in 1999 – then by another 43,000 square feet in 2000. Nokia also operates a product creation facility in Vancouver – the only mobile phone R&D facility in Canada – which employs more than 180 personnel. In addition, Nokia has a facility in Kanata, Ontario, which focuses on channel marketing, customer service administration and technical assistance for Nokia Internet Communications initiatives.
- Alcatel Canada has some 4,000 employees across the country. Alcatel Canada's Ottawa campus is home to one of 12 global Alcatel Research and Innovation Centres, and focuses on new technologies in security and encryption and advanced core routing. And Burnaby, B.C. is home to Alcatel's TAS Canada R&D Centre, which develops communications-based train control systems (intelligent transportation systems).
- Sierra Wireless established the Wireless Ready Alliance in 1998. This group brings together world leaders in wireless devices and applications to deliver wireless data solutions to the mobile computing market.
- Ericsson, Nokia and others established the OFDM Forum in March 2000. This international organization brought together hardware manufacturers, software developers and others to develop a standard for wireless licence-exempt networks based on orthogonal frequency division multiplexing.

Canadian wireless companies invest in innovation

In addition to research and development carried out directly, the members of Canada's wireless industry have made substantial investments to promote innovation at home and around the world. These include funds set up to support emerging companies, enabling them to commercialize their products and test them with the co-operation of an established carrier, as well as financial and other support provided to universities, colleges and other institutions.

Canada's wireless industry has long recognized the importance of education in increasing the sector's competitiveness. And the wireless industry and its members have been strong supporters of education and of educational environments that promote and foster innovation.

- In 2000, CWTA and Canada's wireless telephony carriers established a \$500,000 scholarship fund for graduate students whose primary field of study is related to wireless telecommunications. During the five-year life of the fund, up to 50 of Canada's most talented students will benefit.
- In 1999, Nortel Networks committed \$20 million over 10 years to create 7,000 scholarships in Canada. These scholarships assist undergraduate and graduate students enrolled in advanced technology programs at six universities and two colleges in Ontario. This investment was matched by the Government of Ontario under the Ontario Access to Opportunities Program. Also in 1999, Nortel invested \$10.3 million to create the Nortel Networks Institute for Advanced Information Technology at the University of Waterloo.
- Microcell Telecommunications and other members of the telecom industry established the International Institute of Telecommunications in Montreal in 1999. This creative think-tank – launched with an initial \$12 million commitment – brings together companies and governments with research institutions and universities. Its goal is to build Canada's pool of qualified technical talent to stem the brain drain and to ensure Canada's telecom industry continues to lead the world in technological innovation.
- A \$3 million investment established the Rogers AT&T Wireless Communications Laboratories at the University of Toronto's Bahen Centre of Technology. These

laboratories conduct research into wireless information technology, while providing new educational opportunities to electrical and computer engineering students and faculty.

- The CWTA and its members invested \$1 million to help establish the R. Samuel McLaughlin Centre for Population Health Risk Assessment at the University of Ottawa. This centre – a resource for a range of stakeholders including government, industry and the public – delivers a comprehensive program of research in population health risk assessment. The CWTA's commitment includes financial support for SSHRC/NSERC Industrial Chair in Managing Technological Change at the R. Samuel McLaughlin Centre.
- Ericsson Canada established the Centre for Wireless Communications at the University of Waterloo in 1996. Ericsson provided \$1 million over five years as seed money to start this centre, which is attached to the university's Department of Electrical and Computer Engineering.
- A gift from the Motorola Foundation helped McGill University in Montreal create a multi-million dollar optical communications, wireless communications and multi-media signal processing research laboratory facility. This facility, part of the Department of Electrical and Computer Engineering, is dedicated to dense wavelength division multiplexing – a technology critical to enhancing the capacity of the Internet. About half the funding will be devoted to wireless research.
- In 1997, the Natural Science and Engineering Research Council of Canada (NSERC) and Nortel Networks established the NSERC/Nortel Joint Chair for Women in Science and Engineering in Ontario. This initiative – and four others like it across Canada – encourages women to participate in science and engineering programs and careers. The chair holder acts as a role model and contact person for women in these fields, and participates in public forums to promote science and engineering careers to Canadian women.
- Nortel Networks, the University of Toronto, Carleton University and the University of Calgary received Synergy Awards in 1998 for university-industry R&D partnerships. That year, Nortel distributed some \$20 million to more than 100 institutions globally to support research and education. Nortel's commitment to Canadian universities includes an eight-year, \$8 million investment in the Nortel Institute for

Telecommunications at the University of Toronto; contributions to the Advanced Software Engineering Research and Training Laboratory and the Advanced Materials Laboratory at Carleton University; and the Software Engineering Research Network at the University of Calgary.

Canadian wireless companies have also been very active in financing R&D off-campus:

- Nortel Networks has made a huge research and development commitment in Canada over the years. In 2000, Nortel invested US\$3.6 billion worldwide in R&D, about half of which was spent in Canada. Nortel's Canadian employees have filed patent applications or have been granted patents on more than 7,000 inventions – representing about two-thirds of all Nortel patents and applications worldwide.
- In 1998, Bell Mobility and its Canadian partners and TELUS Mobility, supported by the Canadian Network for the Advancement of Research, Industry and Education (CANARIE), created the Wireless Telecommunications R&D Investment Program. This program – with up to \$6 million committed by the carriers so far – provides investment funding to small and medium-sized companies through a competitive process. Typical investments range from \$100,000 to \$500,000 and require matching funds from applicant companies.
- Bell Mobility Investments, created in early 2001 with \$30 million in funding from BCE Ventures, makes equity investments in and provides R&D funding to companies that are pioneering developments in the wireless Internet and data sectors. Areas of interest include location-based services and m-commerce, as well as applications for next generation high-speed wireless networks, such as entertainment services.
- Microcell Telecommunications leveraged a US\$15 million commitment to create GSM Capital in 1998. GSM Capital – which includes investors and GSM network operators from around the world – is a US\$160 million fund that invests in companies that develop wireless communications products and services. The success of GSM Capital prompted Microcell and other investors to create ARGO II: The Wireless Internet Fund in 2000. This US\$300 million fund invests in companies developing innovative products and services for the wireless Internet.

- In early 2002, Motorola announced its Montreal-based Software Development Centre achieved the highest-ranking maturity level in the Software Engineering Institute's Capability Maturity Model (SEI - CMM). This marked the first time a Canadian organization achieved Level 5 – an accomplishment achieved just two years after the centre was established in 1999. More than 70% of Motorola Canada's employees work in R&D

R&D Performers

The wireless industry in Canada is well-served by organizations that perform research and development activities. Industry Canada's *Guidelines for Compliance with the Radio Authorization Condition of Licence Relating to Research and Development*, published in June 1999, identifies 22 R&D centres across the country (listed right). Wireless carriers can invest in research and development performed by these organizations to comply with their spectrum licence R&D requirements. Many of these centres are connected with universities or other academic institutions.

In addition, partnership programs are available through

a number of organizations. For example, the National Research Council and Communications Research Centre both partner with the private sector through the Industrial Research Assistance Program (IRAP). CANARIE partners through its

- **R&D Centres :**
- **Applied Microelectronics Inc. (Halifax NS)**
- **BC Advanced Systems Institute (Vancouver BC)**
- **Canadian Centre for Marine Communications (St. John's NF)**
- **Canadian Institute for Broadband and Information Network Technologies Inc. (Regina SK)**
- **Canadian Institute for Telecommunications Research (Montréal QC)**
- **Canadian Microelectronics Corporation (Kingston ON)**
- **Centre de recherche industrielle du Québec (Montréal QC)**
- **Centre de recherche informatique de Montréal (Montréal QC)**
- **Communications and Information Technology Ontario (Kanata ON)**
- **Communications Research Centre (Ottawa ON)**
- **Daltech Electrical and Computer Engineering Department (Halifax NS)**
- **Defence Research Establishment Ottawa (Ottawa ON)**
- **Electromagnetic Research Centre (Winnipeg MB)**
- **Institut national de recherche – télécommunications (Verdun QC)**
- **Micronet (Toronto ON)**
- **National Research Council of Canada (Ottawa ON)**
- **Telecom Applications Research Alliance (Halifax NS)**
- **TR Labs (Edmonton AB; Calgary AB; Saskatoon SK; Regina SK; Winnipeg MB)**

Technology and Applications Development Program. And PRECARN Associates Inc. has a Strategic Technologies Program.

Innovation in our communities

Often, stories are told of people using wireless to conduct business more efficiently. With anywhere, anytime access, it is possible to respond to client needs immediately, regardless of whether the user is at the office, at home, at the park, in an airport lounge, at the cottage, or even out of the country.

But more importantly, wireless is being used in creative, innovative ways to improve the safety and the quality of life of Canadians from coast to coast.

- The CWTA and its members are working with other stakeholders to develop a wireless Enhanced 9-1-1 service in Canada. A number of successful trial programs have taken place across the country to improve the ability of wireless companies to enhance the information passed to public safety answering points when a 9-1-1 call is placed from a mobile phone.
- The Shock Trauma Air Rescue Society (STARS) provides a safe, rapid and highly effective aero-medical transport system to critically ill and injured patients throughout Alberta. TELUS Mobility donated \$250,000 in services and technology to the STARS "Seconds Count" Campaign to help enhance response times.
- SupportLink provides wireless phones to victims of domestic violence or stalking in Ontario. This partnership between Rogers AT&T Wireless, Ericsson Canada and the Government of Ontario is an intervention strategy designed to improve the safety and security of these vulnerable members of our society. TELUS Mobility participates in a similar program in British Columbia.
- In 1997, Bell Mobility and the Solicitor General of Ontario created the Communities on Phone Patrol program. Bell Mobility donated wireless phones and air time to patrol volunteers in communities throughout Ontario.
- Rogers AT&T Wireless is a long-time sponsor of Operation Red Nose in Quebec City. The company donates wireless phones and air time to the organization in its fight to keep impaired drivers off the road.

- SaskTel Mobility subsidiary SecurTek markets SafetyNet, a wireless alarm system for the elderly or infirm. An alarm is worn around the neck or on a wristband, and with the press of a button connects the wearer to a monitoring station that can dispatch emergency response personnel and provide them with relevant information about the person in need – including medical information.
- Asurion, North America's largest provider of enhanced services for the wireless communication industry, opened a new customer contact centre in Moncton, New Brunswick in May 2002. This 10,000 sq-ft centre also houses the U.S. company's Canadian operations. Through networks including Bell Mobility and Rogers AT&T Wireless, Asurion provides wireless customers with roadside assistance and handset insurance programs.

Results

A report of this size can only begin to highlight the innovative products and services that have been developed, fostered, nurtured and commercialized by the Canadian wireless industry. What should be apparent, however, is that all sectors of the industry are being innovative in Canada and that the culture of innovation that exists in the wireless industry in Canada has been created from within. Canadian wireless companies have identified and pursued markets and opportunities at home and abroad, and the fruits of innovation have been widely recognized as conferring competitive advantages.

The investment in innovation – in terms of time, money and human resources – is significant. But the investment pays a handsome dividend as new technologies, hardware and applications attract new wireless users to all sectors in the industry.

In addition, the markets for the industry's products and services have proven highly effective at leveraging the systems provided by wireless companies into additional, innovative applications. A critical mass of innovation actually accelerates the rate at which innovation takes place.

- Research in Motion has produced and is marketing voice-enabled versions of its *BlackBerry* wireless personal digital assistant to operate on a number of current and next generation network protocols, including CDMA/1xRTT, GSM/GPRS and iDEN.
- Canadians using *BlackBerry* devices on the Rogers AT&T Wireless network can now view attachments on the device, and print attachments on any printer or fax machine, using an application developed by PrinterOn Corporation. This web services company – based in Kitchener-Waterloo – specializes in wireless and remote Internet printing for enterprises and business travelers.
- TELUS Mobility and TELUS Multimedia Solutions created and launched *TELUS Instant Messenger*, a national service that consolidates Instant Messaging access on both TELUS Mobility digital wireless phones and desktop PCs through TELUS Web portals.
- TELUS Mobility's *Pocket Web* portfolio includes *Breaking News*, a wireless web service that delivers headlines from the Globe and Mail and CNN to wireless devices.
- Bell Mobility's Digital Data to Go provides users with a full suite of innovative wireless data solutions encompassing wireless on-line banking, real-time e-mail and web browsing.
- Motion Wireless of Markham, Ontario developed a wireless point of sale system tailor-made for golf courses. *CartMaster* uses the Bell Mobility network to manage information regarding inventories, tournaments, events and employee activities, as well as cash, debit, credit and third party card transactions.
- Wirelessly enabled applications from SaskTel Mobility include *LoadTrak*, a vehicle tracking system for fleet management and monitoring of temperature-sensitive cargo. SaskTel Mobility services also include *Site.link*, an end-to-end solution for monitoring, alarming and control of process instrumentation in the oil and gas, water treatment, and other sectors.
- Rogers AT&T Wireless, Ericsson Canada and the Hamilton-Burlington and District Real Estate Board partnered to develop and introduce a wireless Multiple Listings Service (*Wireless MLS*). This service provides realtors with mobile access to approximately 4,000 listings in the real estate board's MLS database through wireless handheld devices.
- Curo Interactive of Kelowna B.C. has developed a user interface operating system that simplifies the use of electronic devices such as wireless phones. The system works through audio prompts and allows the standard phone's keypad interface to be reduced to a single button.

- Sierra Wireless GPRS modems are used to deliver a mobile workforce solution to the largest gas transporter in the United Kingdom. The company partnered with Lucent Technologies to provide CDMA2000 wireless modems for Lucent's *Secure Mobile Data Solutions for Enterprises* portfolio, and with TELUS Mobility to develop 1xRTT modems for next-generation CDMA technology. Another modem from Sierra Wireless is an integral part of Florida-based Pro Tech Monitoring's satellite-based tracking system for offenders on probation or parole.
- TELUS Mobility offers wireless gaming across its PCS network, using technology from Vancouver-based Air Games Wireless. Air Games Wireless designs, publishes, and distributes entertainment software for mobile phones and wireless handsets, and has carrier clients in Canada, The Netherlands, The Philippines and New Zealand.
- A few other companies that have benefited directly from investments by Canadian wireless carriers include BlueTree Wireless Data of Montreal, a developer of wireless modems and applications for remote monitoring; Montreal-based Elix, a developer of interactive business solutions; Eftia OSS Solutions, Inc. of Ottawa, which develops operational support products for telecom service management; Hyperchip, Inc. of Montreal, which designs and manufactures terabit and petabit routers; MOTIVUS Software Ltd. of Vancouver, which develops solutions to extend the office desktop environment to the mobile worker; and Soft Tracks Enterprises of Richmond, B.C., which develops mobile payment systems.

Areas for improvement

As the examples provided throughout this report illustrate, the wireless industry has been and continues to be one of the most innovative sectors in the Canadian economy. Furthermore, wireless companies, like other telecom companies, develop and market products and services that have been recognized as key enablers of a successful knowledge-based economy. This role confers on wireless an importance that goes well beyond the activities of the wireless industry itself.

Therefore, the CWTA suggests that any proposed changes to the environment in which the wireless sector operates be carefully examined to ensure such changes do not restrict the ability of the wireless industry to innovate. In addition, in the following paragraphs, the CWTA sets out a number of changes which are required now to fully unleash the innovative potential of the industry.

Incentives to innovate

The social and economic productivity gains provided by wireless telecommunications are undisputed. This productivity is a key component in facilitating and indeed encouraging innovation. Whether a consumer is using mobile banking or a technician is accessing corporate data banks from an off-site location, wireless technology allows Canadians to be more effective and productive. The innovative underlying technologies and services are in many cases, made in Canada, and can readily compete in world markets.

The recognition of the advantages of wireless telecommunications is a reality in Canada with approximately 5300^{vi} new customers signing on every day. In 2001, there were approximately 11 million wireless customers in Canada. Beginning at the end of 2000, the number of wired access lines has decreased every quarter for a total decrease in the number of access lines of more than 600,000 lines, or 3%^{vii}. In the same period, more than 2 million new wireless access lines were established (an increase of 25%). According to Statistics Canada, this new phenomenon may be the early sign of wireless substitution for wireline services^{viii}. Mobile communications is now a very important productivity tool used by all types of businesses and by consumers.

While the benefit of wireless telecommunications is undisputed, it has been shown that taxation and other government imposed costs directly affect the welfare of wireless consumers and thereby suppress demand for service, and impose an efficiency loss on the economy of \$0.53 (US) for every \$1 (US) currently raised in taxes^{ix}.

Jerry Hausman, an MIT economist, studied the efficiency effects on the U.S. economy of wireless taxation. In his paper, Hausman highlighted that the taxation of wireless services should be 'evaluated in terms of its distortionary effect on consumer behavior and economic efficiency' in comparison to other revenue sources for government expenditure^x.

^{vi} CWTA Research – Subscriber Company Reports 2001

^{vii} Statistics Canada, Quarterly Telecommunications Statistics, 1st Quarter, 2002

^{viii} Statistics Canada, Quarterly Telecommunications Statistics, 1st Quarter, 2002

^{ix} Hausman, J., Efficiency Effects on the U.S. Economy from Wireless Taxation, Department of Economics, MIT, Cambridge, MA, February 2000, p.2

^x Idem, p.4

Hausman shows that taxes diminish the consumption of a good or service, and in the case of wireless, can also lead to a decrease in usage of the infrastructure investment made by wireless providers. He calculated the effect of 'deadweight loss' and economic inefficiency from the distortionary effect of taxation on wireless services. In his view, the decrease in economic efficiency accounts for both harm to consumers, from the deadweight loss perspective, and harm to wireless providers^{xi} who have invested billions of dollars in their networks and to acquire their licences from the federal government.

One Canadian example of an economic impact on customers and the wireless industry is the level of government fees and other costs for spectrum that has been allocated other than through auctions. In the United States, Commercial Mobile Radio Service (CMRS) providers compensate the FCC directly for the costs of administering and managing radio frequency spectrum. For 2002, this cost was assessed at \$0.24 (US) or approximately \$0.38 (CDN) per subscriber^{xii}. In Canada, license fees (which include administration and spectrum management costs as well as economic rent) paid by cellular/PCS carriers amounted to more than \$10 per subscriber^{xiii}.

While these figures are not directly comparable, the large difference between the levels of the two governments costs point to a competitive imbalance between the Canadian and U.S. markets. Such costs directly affect the demand for wireless services and accordingly impact the productivity of businesses and consumers. Furthermore, such costs and their resultant effect on demand have a dampening effect on innovation.

The CWTA encourages the Government of Canada to consider ways to reduce the cost of regulation as a means to promote reinvestment thereby encouraging more continuous innovation. For example, the four national PCS and cellular service providers pay licence fees in excess of \$150 million each year. Over and above these fees, these same companies pay an explicit contribution levy to the CRTC to support service to high cost serving areas. Accordingly, the CWTA believes there is a clear need for government to review the overall levels of such costs imposed on the wireless industry.

^{xi} *Idem*, p.4

^{xii} FCC R&O FCC02-205, July 5, 2002

^{xiii} Based on estimated license fees of \$150 million and YE 2001 subscribers of 10.8 million

Similarly, while the use of auctions toward spectrum licences has generated significant revenue to the government^{xiv}, some of this revenue could be returned to the industry to foster innovation. The emerging wireless Internet arena provides ample opportunity for Canadians to lead.

The CWTA recognizes that the application of economic principles plays an important role in achieving the Department of Industry's mandate to responsibly manage the radio spectrum on behalf of Canadians. The Association urges the Department to ensure that economic principles are applied equitably to all commercial spectrum users. We would also like to note that, at this time, a small group of spectrum users contribute a disproportionate share of the Department's spectrum revenue. The CWTA estimates that Cellular and PCS service providers pay in the range of 50% to 60% of the total spectrum fee revenues collected by the Department. The remaining fees are paid by the remainder of all other spectrum users. These licensees contribute far less licence fee revenue to the Department than Cellular and PCS licensees, despite the fact that, in the aggregate – and in some cases individually — they have been licensed with far more spectrum.

The CWTA considers it appropriate, that as part of the Innovation Agenda, the government undertake an examination and review of these types of fees and taxes that directly affect the wireless industry.

Beyond an assessment of the overall level of these fees and costs, the CWTA and its members believe these fees and other payments to government could provide greater returns to the Canadian economy if wireless companies were able to invest this money in areas such as innovation and network deployment.

The Canadian wireless industry has demonstrated it has a solid track record for innovation and is eager to work with educational institutions, government laboratories and other incubators of innovation. The association therefore suggests that industry, government, academia and other stakeholders examine alternatives to licence fees and other costs of regulation that would encourage further innovation in the sector.

^{xiv} Approximately \$1.65 billion was collected in two auctions, the 1999 auction for fixed service licences at 24 and 38 GHz and the 2001 auction of additional PCS spectrum, February 2001

Such alternatives could, for example, be in the form of credits for R&D or educational investments (beyond those required by conditions of licence) in lieu of payments. The CWTA and its members believe direct investment by the industry to upgrade electrical and computer engineering labs, establish software development programs, and undertake other educational initiatives will have a more substantial, longer lasting positive effect on the Canadian economy than paying licence fees and other regulatory charges that go well beyond the cost of managing Canada's spectrum resources.

Timely Release of Spectrum

Radio frequency spectrum is the lifeblood of the wireless industry. As spectrum manager, one of the objectives of the Department of Industry is to ensure that spectrum is released for licencing in a timely manner. The CWTA fully supports this objective and the Department's efforts to achieve it. One area that could be improved would be speed of the post licencing process, particularly with respect to auctions. Currently, following the conclusion of an auction, each bidder must prove qualified to hold a licence for the spectrum acquired during the auction.

It has been some our members' experience that the length of time for the completion of post-auction qualification process has been unacceptably long despite the expectations of an expeditious process. Possible solutions include streamlining the confirmation process for licence conditions, particularly the Canadian control and ownership requirements, or pre-qualifying bidders and applicants. It is our belief that these recommendations would assist our members in continuing to provide innovative state of the art products and services to their customers.

Supporting export opportunities

The Canadian wireless industry has an impressive history of growth – and not all of the Canadian wireless industry's growth has taken place at home.

Half the world's population has never made a phone call. To address this, many less developed regions of the world are building wireless networks instead of traditional wired networks because it is considerably more cost-efficient to install and maintain a wireless infrastructure – and Canadian manufacturers of wireless networking equipment are among those benefiting from this.

The Minister for International Trade, Pierre Pettigrew, noted in the third annual *Report on Canada's State of Trade*, issued by the Department of Foreign Affairs and International

Trade in May 2002, that Canada's new economy is playing an increasingly important role in our country's overall trade success. The CWTA firmly supports that and has taken its own steps to promote international trade opportunities for Canadian wireless companies. For example, in March 2002 the CWTA signed a memorandum of understanding with the Hong Kong Wireless Technology Industry Association under which the two organizations will jointly promote wireless technology and build cooperative ties between the two regions.

However, the wireless industry has not been immune to the global slowdown in investment and spending on telecommunications and other high-tech equipment and services. In the same report, the federal government notes that the value of exports of telecommunications equipment by Canadian companies dropped 60% in 2001, following a very strong performance in 2000.

The level of high-tech spending worldwide is expected to rebound from its sharp decline in 2001, but this opportunity will be pursued by manufacturers from around the globe and it is important that Canadian wireless equipment vendors be in a position to benefit from this recovery.

The Department of Foreign Affairs and International Trade, through its trade commissioners around the world, already provide much-appreciated assistance for Canadian companies in the wireless industry — particularly smaller manufacturers and applications developers — seeking to export. The CWTA encourages the Government of Canada to continue to support these companies and work with the CWTA to identify and develop solutions to improve this relationship.

Recently, the CWTA was pleased to learn of the government's efforts to increase the number of foreign trade representatives who facilitate Canadian businesses abroad and help generate successful export opportunities in various global markets. Although this modest increase is commendable, it is our view that the announcement of these additional resources will not answer the call.

The CWTA urges the government to further increase the number of trade commissioners, trade officers and others who facilitate Canadian businesses abroad and help generate successful export opportunities in various global markets. In addition, we would suggest that the government specifically direct these resources to focus on specific industry sectors, such as wireless telecommunications. It is our belief that a

more focused approach would provide Canadian wireless companies the increased visibility and assistance they require in achieving successful exports. The government should also consider enhancing its presence and visibility in foreign markets.

Our members have identified the need for the government to implement stronger and more visible 'Made in Canada' branding or marketing campaigns. There is an urgent need for Canada to invest and position itself in key foreign markets. The association is keen to work with the government to identify and organize new events and opportunities at which Canadian know-how and expertise can be showcased and marketed to the world.

Balancing regulation and innovation

The CWTA urges the federal government to carefully consider and consult on the potential harmful effect on innovation of any proposed regulation. Proposals that increase the regulatory burden or introduce other costs to be borne by communications companies can delay, or even cancel, the introduction of new products and services that connect Canadians and help people embrace the knowledge economy.

As an example, CWTA would like to highlight the potential impediment to innovation the Federal Government's current consultation on lawful access to telecommunications might have on the industry. The Association believes that the proposal requiring wireless providers to absorb the costs associated with providing lawful access to new technologies and services may be counterproductive to the efforts of the Government to spur innovation.

Developing Canada's wireless networks

The CWTA believes that the Department can further address socio-economic factors by providing incentives for licensees to serve rural and remote areas. For example, spectrum licence fees could be discounted when the radio spectrum is used to provide services in rural and remote areas.

This approach would generally promote the objectives of Canadian telecommunications policy, and would advance the objective found in section 7 (b) of the *Telecommunications Act* which is “to render reliable and affordable telecommunications services of high quality accessible to Canadians in both urban and rural area in all regions of Canada”.

The application of this principle would have the effect of driving down the cost of serving rural and remote areas and in creating a more favourable business case for carriers. This in turn would result in the provision of affordable services in areas that would not otherwise have proved economically viable.

Given that the market in such areas is small, a reduction in the underlying operating cost of providing the service may, in many cases, transform non-viable business alternatives into profitable opportunities. In such cases, spectrum fee discounts could prove to be useful in further extending the benefits of advanced telecommunications services to rural and remote regions of Canada. This result would be consistent with the objectives of both Canada's Innovation Strategy and Connectedness Agenda.

The CWTA supports the Government of Canada in its objective to foster innovation, and welcomes any resulting opportunity for future discussions with government, academia and other stakeholders on this very important issue.