



The next Trans-Canada vision

Emergency services lineup behind 700MHz

by Tom Rataj

The Constitution Act of 1867 created the “Dominion of Canada” and included a written condition to build the Intercolonial Railway as a means of unifying the new nation.

Likewise, the Trans-Canada Highway Act of 1948 created a national highway network as a means of unifying a more modern motorized nation after the Second World War.

Now in the 21st century, the federal government has a great opportunity to make the next great nation-unifying decision, albeit in a slightly less obvious manner unlikely to attract nearly as many votes.

When analog broadcast (over-the-air)

television services across Canada switch to the new digital broadcast standard at the end of August 2011, almost half of the 700MHz radio “spectrum” currently occupied by channels 62 through 69 will be available for other uses.

By reserving a section of this spectrum for the exclusive use of emergency services voice and data networks, the government could ultimately provide Canada with the foundation for a state-of-the-art communications infrastructure that will benefit all Canadians.

Industry Canada announced last November that it intends to auction off licenses to use this by-then available spectrum to the highest bidder in late 2012.

Get in line

First in line are Canada’s national and regional cellular companies. They expect the data traffic on their wireless networks to double every year from now through 2014. The soon-to-be vacant spectrum would easily provide them with much of the capacity they need to match this expected demand.

Many of the large players now rake in substantial profits – the wireless industry generated an estimated \$39 billion in economic activity in 2008. Industry Canada will be tempted to make a quick multi-billion dollar profit by selling off the available spectrum to these cash-rich wireless service providers, as it did the last time spectrum was auctioned off.



Second in line, and certainly not flush with cash, are Canada's emergency services, which also expect to see multiple-fold increases in need and demand for wireless broadband spectrum to support their growing array of communications technologies.

Fortunately there is a move afoot to convince Industry Canada and legislators at all levels to reserve at least 20MHz of the 700MHz band for the exclusive use of emergency services. While some already use 24MHz of the narrow and wide band spectrum in the 700MHz band for voice and low speed data, it will not be enough to meet future demand.

The sweet-spot

By its very nature, the 700MHz spectrum can travel extended distances and penetrate buildings and other obstacles that typically shut-out other radio frequencies.

Concurrently the next generation of wireless data technology is also arriving. Long Term Evolution Advanced-Fourth Generation (LTE-4G) wireless technology will improve wireless broadband (high-speed) performance over the current market leader (3G UMTS/HSPA+), which is already widely available across Canada.

LTE-4G's "rated" download speeds are almost double those of HSPA+ at an amazing 1Gbit/s. This kind of download speed allows many data-intensive applications in the mobile environment, which is exactly what Canadian emergency services are now implementing. Coupled with the high-performance 700MHz frequencies, this would be a major leap forward.

Many newer technologies – including video analytics or Intelligent Video Analysis (IVA), Automated Licence Plate Recognition (ALPR) and various biometric systems such as mobile fingerprint and iris identification – work far more efficiently when connected to live databases back at HQ. Other less cutting-edge technologies and applications already in use will also work far more efficiently when connected to a high-speed broadband wireless network.

Police officers could have live video feeds in their cars from various support services, including helicopters and public CCTV cameras in schools or other public places during emergencies; the possibilities are almost endless.

Firefighters could have live access to building floor-plans and hazmat inventories at fire scenes and could use systems that precisely track the location of every firefighter at a scene, all while monitoring their vital signs for any problems.

EMS personnel could have live access to electronic patient records and other telemedicine systems, allowing doctors to receive live status information from monitors attached to patients in the field. This would help them provide better and more accurate treatment direction.

Frequency spread

Currently, emergency services voice and data networks across the country are spread-out on various frequencies. They use proprietary radio and computer systems and technologies, preventing individual

services from communicating with other agencies. This also prevents them from communicating directly with other emergency services such as fire and EMS during major incidents.

Some existing voice and data systems operate in parts of the radio spectrum which have poor building penetration, forcing officers to stand near windows to use their portable radios – or put up with having little or no voice or data communication while in elevators or underground garages.

The lack of inter-agency communications can have tragic consequences. During the attack on the World Trade Centre towers in 2001, personnel on an NYPD helicopter flying overhead warned the police command to issue an evacuation order because they believed the building was about to collapse. Unfortunately, because of a lack of direct interagency communications, the hundreds of emergency personnel inside did not receive this message. Three hundred and 43 firefighters and paramedics and 60 police officers perished when the buildings collapsed on top of them.

Most Canadian emergency services operate their own private voice radio systems, allowing them to keep out eavesdroppers and ensure their systems function during power outages or other disasters. Some agencies rely on commercial cellular infrastructure for their voice radios systems and many use them for their mobile data systems.

The problem with this is that the emergency service is entirely reliant on these network operators to communicate. While

emergency services may have "priority access" agreements in place, the access is far from guaranteed, especially during major emergencies.

During the large power outage that affected most of eastern Canada and the United States in 2003, the commercial cellular networks continued to function for the most part, but were rapidly overwhelmed by the sudden spike in demand, which greatly exceeded their capacity. Even with "priority access" agreements in place, would you want your mission critical operations impacted, especially during such an emergency situation?

Committee

A Tri-Service Special Purpose Committee created in 2010 by the CACP, Canadian Association of Fire Chiefs (CAFC) and the Emergency Medical Services Chiefs of Canada (EMSCC) is working to raise awareness of this unique opportunity and is lobbying all levels of government.

One of its primary information access points is an excellent website (www.action700.ca), which provides a great overview of the issues and a variety of resources to help emergency services get involved in supporting this opportunity.

There's another big advantage to sharing common spectrum on the 700MHz band all across Canada. Our colleagues south of the border are well on their way to obtain-



ing the same sections of the 700MHz band. If both countries successfully implement this, we would have a continent-wide interoperable voice and data frequency standard, enabling joint operations both at home and along our lengthy mutual border.

All emergency services leaders and personnel should contact their federal, provincial, territorial and municipal representatives to lobby for this important, nation-unifying opportunity.

Tom Rataj is *Blue Line's* Technology columnist and can be reached at technews@blueline.ca.

About CITIG and 700 MHz Resources

Launched in April 2007, Canadian Interoperability Technology Interest Group (CITIG) brings stakeholders together to advance public safety provider interoperability in a co-ordinated fashion. The Canadian Police Research Centre (CPRC), Canadian Association of Chiefs of Police (CACP), the Canadian Association of Fire Chiefs (CAFC) and Emergency Medical Services Chiefs of Canada (EMSCC) helped found and grow CITIG which has now emerged as the unified voice for responder interoperability in Canada.

In addition to supporting efforts around 700 MHz spectrum (see www.citig.ca) and the Tri-Services Special Purpose Committee on 700 MHz Broadband (see www.action700.ca), learn firsthand about the quest for dedicated 700 MHz broadband spectrum for mission critical public safety data at the following two conferences:

The Emergency Services Management Conference in Montreal, Quebec from April 17 to 19, 2011.

The Fifth Canadian Public Safety Interoperability Workshop: A CITIG National Forum in Ottawa, Ontario from December 4 to December 7, 2011.

Information on both these events can be found at www.cacp.ca.

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