A SUBMISSION TO

THE SENATE COMMITTEE ON
TRANSPORT AND COMMUNICATIONS’
STUDY

ON THE MODERNIZATION OF
CANADIAN COMMUNICATIONS LEGISLATION

October 2018
The CBMF/FMCR was federally incorporated on January 3, 2001. It is governed by a Board of Directors drawn from the broadcasting industry and the heritage sector and is committed to the collection, preservation and celebration of Canada’s broadcasting heritage, encompassing radio, television and screen-based services in French, English, indigenous and other languages, and to ensuring public access to this significant cultural record.

The Foundation is convinced that it was our broadcasting system – the most advanced communications technology of the day – that supported the development of a unique Canadian culture in the 20th century. Our interest in legacy radio and television programming is founded in our belief that safeguarding Canadian culture will also depend on our ability to access the past as well as on reliable, predictable communications services that will allow us to engage with and enlighten each other

I The State of Our Communications System: HOW DID WE GET HERE?

In the closing months of 2018 Canada finds itself confronting the greatest communications challenge it has faced in a century of massive technological change.

Canadian engineers figured out how to build a transmitter system to deliver radio service to a small population scattered across the world’s second largest national landmass. And then we harnessed that system to keep Canadians in touch with the million family and friends engaged in the war effort across this country and abroad.

We met the challenge of television – in two languages – tapping into Canadian creativity and imagination to create programs and series that drew millions of viewers each evening and held their own against the blockbuster product of our southern neighbour.

Expanding choices for information and entertainment, we became the world’s most cabled nation and, with the launch of ANIK in 1972, an early-adopter of satellite signal delivery. Optical fibre replaced coaxial cable, greatly expanding the channel and service options available in urban Canada and then the game changed with Tim Berners-Lee’s development in the early ’90s of a computer-based communications system known as the World Wide Web.

During the next two decades, we scrambled to shore up our broadcasting infrastructure, reluctant to acknowledge the inevitable cultural implications presented by this new medium.

We watched with considerable foreboding as the opportunities created by the Web - now renamed ‘the Internet’ – leap-frogged over decades of national policies and
regulations designed to support creators of Canadian cultural products, be they magazines, books, music, film or the programming provided by our broadcasters.

In 2000, a group of prescient creators and broadcasters recognized that the continued existence of Canadian radio and television media was seriously threatened. The distinctive culture that had evolved north of the 49th parallel was at risk and, in the face of industry consolidation, it became apparent that the decades of recorded programming in station and network libraries and program archives – the electronic record of Canada’s evolution from the 1920s onward - was in jeopardy.

**Research revealed the startling fact that Canada was the only developed nation with no integrated, formal process to preserve its complex radio and television legacy.** Neither legislation nor regulation imposed on public or private broadcast licensees establishes a requirement to conserve this electronic record of our national or regional, social and political evolution, nor was any federal institution charged with this comprehensive cultural responsibility.

Geographic realities had meant that extension of service (i.e., bringing radio and television service to communities scattered between the three oceans) had to take priority – and it remains a remarkable achievement. But with the future of Canada’s broadcasting system now at serious risk, as noted above the CBMF/FMCR was federally incorporated in 2001 to address the issue of long-term preservation of and access to the broadcast record of our national evolution.

**II WHY ARE PROGRAM ORIGINALS IMPORTANT?**

Radio and television programs are 20th and 21st century creative products whose social and historical importance is comparable to that of cultural artefacts from earlier times such as manuscripts, paintings and music scores. Their preservation and society’s continued access to them will be critical strands in the design of Canada’s evolving national landscape.

After Gutenberg invented the printing press around 1440, access to the content of most manuscripts increased over the centuries. Arguably, the practical need for them – and for their preservation – could have been minimized by the existence of multiple printed sources. But, in fact, the historic significance of manuscripts as a testament to social evolution grew, influenced by both their rarity and their artistry.
Today, no one would think of destroying the Codex Leicester\(^1\), the Uthman Qur’an\(^2\) or the Stockholm Papyrus\(^3\) because modern copies (even digital ones) are readily available.

The same holds true for the world’s inventory of images, from the caves at Lascaux to the San rock painting in Lesotho, the frescos in the temples and tombs of ancient Egypt, the wonders of 6\(^{th}\) century Sui dynasty landscapes or Europe’s Renaissance masterworks, to the unique representations of Canada by Kriehhoff, Carr, Thomson or Riopelle. Around the world their work is digitally accessible at a tap on a keyboard - yet the originals are no less valued. They continue to be preserved and treasured as important components of humanity’s shared heritage.

Radio and television are 20\(^{th}\) century media, the electronic manuscripts and recorded images of people and events in one of the most transformative periods in human history. Their familiarity makes it easy to dismiss them but they are of no less historic and creative value than their more aged predecessors. While the perspective of decades is lacking, it is our generation’s responsibility to ensure that the original record of Canada’s social and cultural achievement is preserved.

It is also important to consider that each communication medium is generally less permanent than the one it succeeds, with the most lasting of all being stone tablets and prehistoric cave paintings! Technologists of the day have constantly laboured to preserve each preceding format, be it (inter alia) parchment, canvas, paper, nitrate film, acetate or DAT tape.

For that reason, long-standing international heritage protocols regard digitization as a useful access mechanism to protect original media from the deterioration of over-use, but NOT as a reliable, secure method of preservation. For that reason, in its definition of world standards the International Association of Sound and Audiovisual Archives (IASA) emphasizes the importance of conserving original analogue carriers after transfer to other media:

> Due to the high density of information, digital carriers are generally more vulnerable to loss of information through damage than analogue carriers .... Although the life of audiovisual carriers cannot be extended indefinitely, efforts must be made to preserve carriers in usable condition for as long as possible .... Original physical carriers and suitable reproduction equipment must therefore be preserved after digitisation of

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1. The scientific writings of Leonardo Da Vinci
2. The earliest known 8\(^{th}\) century Qur’anic manuscript
3. A third century collection of 154 craft recipes recorded in demotic Greek.
Today's digital wizardry is even less stable than its predecessor media and subject to a range of vulnerabilities including cyberattacks, malware infections, image degradation, compromised power sources, ransom and massive electro-magnetic pulses. These factors only emphasize the importance of preserving analog originals and backward compatibility to them, as well as finding appropriate venues for stable, secure conservation of born-digital materials.

III PRESERVING OUR CULTURAL HERITAGE AND PROVIDING PUBLIC ACCESS - IS THERE A CANADIAN SOLUTION?

In the years since its creation, the Foundation has explored options for crafting an efficient Canadian preservation process, worked with broadcasters and producers to determine the scale of need and, as keeper of last resort, beginning the assembly of the National Broadcast Collection for Canada.

In the last decade destruction by electro-magnetic pulse attack has replaced nuclear blast as the principal threat to the electronic documentary record. Digital media are especially vulnerable and, in response, developed nations have begun to focus on subterranean facilities for conservation of their legacy media:

- Britain has redeveloped the underground nuclear warhead storage facility near Gaydon in Warwickshire for preservation of its film and television collection.
- The program archives of Switzerland's seven public radio and TV services (SRG and SSR) are safeguarded in tunnels dug deep beneath the Alps and repurposed from their original wartime application.
- In America, PBS preserves its unique programming collection of analog video and film in a decommissioned mine near Kansas City.
- In 2014, New Zealand transferred responsibility for preservation of some 600,000 hours of original NZ radio, television and film dating back to 1895 to Ngā Taonga Sound & Vision which had developed secure custom-built vaults.
- The original program collections of Germany's broadcasters are now preserved in a restored World War II subterranean hospital complex.

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• Much of the United States’s early audiovisual record of radio, film and commercial television is protected in a secure environment beneath a mountain in northern New York state.

• and the Hollywood majors whose films are now born digital convert those digital masters to analog 35 mm film because it’s a safer way to protect their long-term investment. Along with much of America’s music masters, they are stored in a former salt mine 22 storeys below Butler County, Pennsylvania.

Earlier this year, this country was faced with an immediate challenge: the preservation of eight decades of radio and television programs paid for by the people of Canada and held in trust for them by the CBC/R-C. The Corporation has begun to digitize much of its French and English-language programming but, unlike Radio-Canada, CBC English Services had no interest in preserving its analogue program masters post-digitization.

This past spring Canada was about to become the first developed nation to systematically destroy the historic record contained in its collection of original English-language electronic artefacts.

The Foundation attempted to negotiate a delay in destruction of these collections to allow time for completion of an alternate plan already underway. When the Corporation refused to consider a postponement, ACTRA and the Friends of Canadian Broadcasting joined the Foundation in a national online campaign that saw in one week some 19,000 emailed expressions of concern land on the desks of the CBC’s EVP - English Services, the Minister of Canadian Heritage and, later, each member of the CBC’s Board of Directors.

To our considerable relief, we have now been assured there is a three-year moratorium on destruction of any of the CBC’s archived program masters.

IV WHERE TO FROM HERE?

This Committee has been charged by Parliament with study of the changes necessary to safeguard Canada’s communications system. A not dissimilar assignment has been handed to the somewhat oddly constructed Broadcast and Telecommunications Legislative Review panel, appointed earlier this year by then-Minister of Canadian Heritage, Mélanie Joly - but not due to report for another 15 months.

For the record, may we note here our concern that the Minister’s confidence in the longevity of the existing system may be misplaced. In fact, there is no certainty that Canada’s English-language private sector TV networks will remain viable for that long.
For decades, CTV and Global have relied on carriage of popular American TV series in prime time to boost their commercial revenue (through the unique Canadian regulation allowing simultaneous substitution). A number of American services are planning to begin streaming their programs in January and throughout 2019; that fact may limit the availability of such programs for purchase by Canadian networks as well as significantly decreasing their appeal as part of a rigid TV schedule. It will undoubtedly have a negative affect on Canadian TV audience numbers and on their commercial revenue they generate.

During the “Let’s Talk TV” hearings in 2014, TV executives tabled with the CRTC their willingness to hand back network licences in the face of continuing revenue decline. The Commission’s own figures are evidence that, in the intervening few years, this has occurred. Their television operations are being subsidized by the parent companies’ success as ISPs and, given their fiduciary responsibility to deliver a positive return to investors, it would be foolhardy for them not to consider the option of network closure.

In the long-term, this may in fact be inevitable and for that reason we believe it is now essential to consider the complete re-invention of Canada’s communication system.

We know that, no matter what their language of choice, the voices of Canadians and the products of their many talents are a minority in North America. Moreover, our advanced technical infrastructure brings to most Canadians a choice of information and entertainment sources unmatched anywhere else.

But we also know that, despite the similarities we share with other North Americans, we are a distinct people. Culture evolves in ways that reflect the priorities of its society. A healthy, predictable system of national communication is the key tool in ensuring Canadians are able to determine the unique cultural elements that will define their nation in the 21st century and beyond.

If private sector carriers are no longer able to sustain local, regional or national communications, then it will remain the responsibility of the Government of Canada (and a vibrant national public media service) to ensure the support of all aspects (analogue and digital) of our cultural birthright is maintained.

Graham Spry, one of the founders of Canada’s broadcasting system, saw the role of a national public broadcaster as the central nervous system of a country. In an address to the Royal Society of Canada, he pointed out that, “Without communication there is no society, be it a hive of bees, a troop of boys scouts, a Bar Association or a nation.”5

In the face of global competition and soaring production costs, we must take care to ensure that Canadians’ ability to communicate, to share their concerns and celebrations

is not obliterated ... or confined to the individual, un-curated expressions of social media.

Decades ago, the CRTC’s founding Chair, Pierre Juneau, warned us that,

To preserve and develop our ability to create and produce our own imagery is something we simply cannot do without. To enable ourselves to see everything, including ourselves, through our own eyes and our own systems of production and diffusion, will require a long and persevering effort.\(^6\)

This is not the time for surrender. With this study, your Committee is setting the stage for the next chapter in Canada’s evolution, a challenging but not impossible task.

V A NATIONAL MEDIA REPOSITORY FOR CANADA

With support from the Department of National Defence and the Department of Canadian Heritage, the CBMF/FMCR is developing a proposal to transform the mothballed underground former NORAD headquarters into a world class media preservation facility. An engineering assessment to determine the scope of remediation required will begin shortly.

Additional background on this plan is attached in Appendix A.

VI CONCLUSION

We emphasize the following essential elements for your consideration.

- It is imperative that the redesign also address the creation and operation of Canada’s National Media Repository and enshrine its responsibilities in legislation to ensure the long-term preservation of the historic records contained in our analogue and digital media.
- We must safeguard the essential role of communication in the environment of the local and regional communities that are forging Canada’s vital national culture.
- We must ensure that the challenges of geography not limit our ability to communicate with each other and celebrate the experience of being Canadian.

\(^6\) "The Right to See Everything ... Including Ourselves. Pierre Juneau to the Empire Club of Toronto, February 24, 1972."
Such an undertaking will require a repeat of the Aird Commission’s exercise of 1929: design of a contemporary national communications structure for Canada, the skeleton of which may well be based on a revitalized national public-service communications system.

Should the Committee wish to explore these concepts in greater detail, representatives of the Foundation would be pleased to discuss them with you.

Submitted on behalf of the CBMF/FMCR,

Douglas Thompson
Chair
Appendix A:
North Bay’s Cold War Nerve Centre

Radar screens on the SAGE system are monitored in what was called the Blue Room.
PHOTO: CANADIAN FORCES MUSEUM OF AEROSPACE DEFENCE—PCN4720

There is a select group within the Canadian Armed Forces who have received a certificate at the end of their tour of operations in North Bay, Ont., inducting them into the Brotherhood of Underground Mushroomers.

It was an in-joke among those who kept a vigilant eye on Canada’s skies during the Cold War, spending all their working hours in a secret complex deep in the ground where daylight never shone.

“We called it the Hole. When you did a tour there you received a pin and certificate with a mushroom drawn on it,” said Master Corporal Allan Silk who volunteers at the Canadian Forces Museum of Aerospace Defence at Canadian Forces Base North Bay, 350 kilometres north of Toronto.

The construction of the Underground Complex (UGC) took four years—one and half years just to excavate and two and a half to build and outfit. One of the prize exhibits in the museum is a chunk of solid
rock which looks like a mushroom that was excavated during the building. It is kept by the display for the Brotherhood of Underground Mushroomers.

The 19-tonne blast door into the main entrance is opened easily.

PHOTO: CANADIAN FORCES MUSEUM OF AEROSPACE DEFENCE—NBC72-1391

“You had everything you needed there. There was a barber shop, a gym, cafeteria, and doctors’ offices. We assumed that if we had to stay there we could go three weeks or more without needing supplies,” said Marshall Swartz of Bracebridge, Ont., who was stationed at the underground complex three times.

Traffic in the Tunnel
The complex also had all it needed for running a war—a command post, intelligence centre, briefing rooms and a telephone network. It used civilian hydro electricity but had two banks of batteries to provide electricity in case of a power failure. They were backed up by generators that could run on diesel or natural gas.

“We had a reservoir down there for cooling the equipment and the air. We called that our lake. We had a rowboat – and this was our navy.”

But the most impressive credential to the selection committee was its geology. Here was a 2.6 billion-year-old rock formation of granite, one of the hardest rocks on the planet. They built an underground complex 60 storeys beneath the surface, capable, it was believed, of withstanding a four-megaton nuclear blast which would be 260 times more powerful than the atomic bomb dropped on Hiroshima.

The Brotherhood of Underground Mushroomers certificate and the granite mushroom.

In 1957 Canada and the U.S. formally created the North American Air Defence Command, or Norad, later called the North American Aerospace Command.

The SAGE (Semi-Automatic Ground Environment) system was complex and large. Most of all, it had to operate out of a secure facility. After a Canada-wide survey was conducted, North Bay was selected to house the facility in part because there already was an air force base, eliminating the need to build one. As well, North Bay was a rail, highway and telecommunications crossroads and nearby Trout Lake offered all the water needed to cool the complex.
The UGC cost was $51 million of which Canada paid one third and the U.S. paid the rest. It always had a Canadian in charge and a U.S. officer as second-in-command, mirroring Norad headquarters in Colorado which is overseen by an American general with a Canadian lieutenant-general as his deputy.

Canadian and American military personnel started working in the complex Oct. 1, 1963, and continued 24 hours a day, seven days a week until October 2006. “This was all underground,” said Mel Cannell, a retired lieutenant-colonel in Regina who was stationed there four times. “If you were claustrophobic at all you would go out of your mind.”

The SAGE computer system consisted of two huge computers nicknamed Bonnie and Clyde taking up 11,900 square feet. Everything that flew in the northern Norad region had to be identified in two minutes. If not, fighter aircraft, kept fully fuelled and fully armed, were scrambled. The aircraft and the pilots were stationed in a Quick Reaction Alert hangar at the end of the runways. They were expected to be airborne in five minutes.
From the 1950s into the 1990s, the military base was the largest employer in North Bay which today has a population of about 53,000. “I loved the city. It was a great place to raise children,” said Cannell.

The SAGE computers were eventually replaced by the Regional Operation Control Centre (ROCC). It was a more versatile system that was substantially smaller than SAGE. It only took up floor space equal to about two houses.

Plans to replace the Underground Complex started in the 1990s. Its computer and communications systems were no longer state-of-the-art and the cost of running such a large facility underground was becoming uncontrollable.
PHOTO: LIBRARY AND ARCHIVES CANADA—E010858623

A new above-ground building was built and on Oct. 26, 2006, Colonel Rick Pitre, the base commander, led a symbolic parade of complex staff out of the UGC for the last time. During its 43 years of operation, about 17,000 Canadian and U.S. military personnel had worked there.

The Hole is still there but all the equipment and furniture has been taken out. All that remains are the cooling and ventilating systems that only maintenance workers are allowed to visit.

ADDITIONAL INFORMATION from various sources

What a structure it is: 680 feet underground; three stories tall; can house over 400 people, can stop an atomic bomb; and has two very long entry halls. It is not Superman’s cave, although he would be proud of it. It is the NORAD North Bay Underground Complex, Ontario Canada.

The Norad North Bay Underground Complex is the most extraordinary military installation ever built in Canada. During the Cold War, Canada was in an unenviable geographic position, lying directly between the Cold War’s principal adversaries, the Soviet Union and United States. This meant if the war turned “hot”, Canada would become a major nuclear battleground: to reach their American targets—cities, military bases and industrial installations—Soviet nuclear weapon-armed bombers would have
to cross Canadian airspace. Meanwhile U.S. interceptors would swarm the airspace to shoot the attackers down.

Norad North Bay Under Ground Complex

Thus, by default Canada was the air defence “front trenches” for the North American continent. For this reason, plus its friendship with the United States, on 12 September 1957, Canada and the U.S. formed NORAD, the North American Air Defence Command, an organization that unified the two countries’ air defences into a single, coordinated, fast-reacting, continent-wide network. It was (and still is) a true partnership; the Commander-in-Chief of NORAD is always an American, the deputy commander always a Canadian. Both are able to access the highest levels of the U.S. and Canadian military and national governments. Canadian and American NORAD personnel work at each other’s bases and installations, performing the same defence duties, under the same uncompromising scrutiny—all NORAD personnel, regardless of nationality, are under constant threat of no-notice evaluation. That is, they can be tested at their job at any time, with no warning.

The NORAD Agreement was officially signed by both nations on 12 May 1958. The name was altered to North American Aerospace Defense Command, 12 May 1981, to more accurately reflect the extent of command’s responsibilities, keeping watch of activities in space over North America as well as those inside the Earth’s atmosphere.
By virtue of Canada’s front line position, the Canadian air defence command and control center was deemed the most important piece of the NORAD “pie”, with respect to bombers. (North Bay was never involved in ballistic missile defence.) Its early warning of and reaction against a Soviet nuclear air attack were critical for the survival of the U.S.-Canadian portion of the North American continent. As one air force officer put it: “(regarding a bomber attack) We lose North Bay, we lose the continent.” Ergo, the center was a prime target for a Soviet nuclear strike. To minimize the possibility of its destruction, planners decided to build the facility underground. It would be the only subterranean regional command and control center in NORAD.

Following a cross-Canada survey of candidate sites, North Bay was selected:

1. An air force base existed, eliminating the need to build one.
2. The City of North Bay was a rail, highway and telecommunications crossroads of the country.
3. The geology comprised a 2.6 billion year old rock formation altered 1.5 billion years ago by the Grenville Metamorphic Event into granite, one of the hardest rock types on the planet, excellent armor against a nuclear strike.
4. Trout Lake, on the eastern edge of the city, presented an abundant source of water needed to cool the complex.

**Origin of the Norad North Bay Underground Complex**

Because its subterranean location complicated access by firefighting vehicles and personnel, the complex was fashioned from fire-retardant and fireproof materials, making it one of the most fire-safe structures in the country.
The complex (which still exists) comprises two sections. The “Main Installation” is a three-story, figure-eight shaped building inside a 430 foot long (131 meter), 230 foot wide (70.1 meter), 5.4 story (54 feet, 16.5 meter) high cave. The “Power Cavern”, which provides life support and utility services to the complex, is a 401 foot long (122.23 meter), 50 foot wide (15.24 meter), 2.7 story (27 foot, 8.23 meter) high chamber. Taken together the complex encompasses over 6 million cubic feet.

Access to the complex is via a 6,600 foot long (2,012 meter) North Tunnel from the air base, and a 3,150 foot long (960 meter) South Tunnel from the city. The tunnels meet; the idea was if a nuclear weapon struck the air base the blast would shoot down the North Tunnel and out the South Tunnel, minimizing blast damage to the complex and its structures. In fact, the three-story Main Installation is mounted off the ground on specially designed pillars (not springs) to reduce seismic shock—on 1 January 2000, North Bay was rattled like a jar of pennies by an earthquake registering 5.2 on the Richter scale, yet occupants in the Main Installation did not feel a thing.

As an added measure against damage from a nuclear blast, as well as for the security of the installation, the complex is situated behind three 19-ton steel bank vault-type doors. The doors are normally kept open, and shut in times of emergency. Despite weighing as much as a medium-size bulldozer, each door is so well balanced it can be moved effo

**Features of Norad North Bay Underground Complex**

Air defence operations officially began in the UGC on 1 October 1963, and continued around-the-clock, unabated for 43 years until October 2006. There was nothing like it in NORAD (the Cheyenne Mountain Complex did not officially open until 1966) or in Canada, and it attracted world-wide interest. As well as air defence facilities, the Main Installation encompassed a barber shop, small medical center, gym, cafeteria, chaplain’s office, and other amenities for the complex’s personnel (important since the complex was designed to seal up in time of war), plus a command post, intelligence center, briefing rooms, a telephone switching network large enough to handle a town of 30,000 people, and a national civil defence warning center.
When sealed up, the Underground Complex could support 400 people for upwards of four weeks cut off from the outside world. Since Canada would be the front line for the air defence of North America if the Cold War turned “hot”, it was crucial to ensure that air defence operations would continue as long as possible. A critical factor was electrical power.

Normally, the complex gets its power from the outside civilian hydro-electric grid. In the event of a power failure, such as the August 2003 blackout that hobbled the northeast United States and Canada, two banks of 194 batteries automatically switch on and provide electricity to the complex while an electrical generator is readied to take the load. Once a generator is running, it can power the complex without stopping as long as it has fuel either diesel or natural gas.
The ROCC/SOCC system remained in use in North Bay until air defence operations were moved out of the Underground Complex, in October 2006.

Due to its important, sensitive role in the security of Canada and North America, working in Norad North Bay was limited to very few people. Over its 43-year span in air defence operations only about 17,000 Canadian and American military personnel and civilians served in the UGC. Of this number approximately 15,500 were Canadians, out of nearly a million men and women over the same time frame who were members of Canada’s Department of National Defence.

**CONVERSION ADVANTAGES of this site:**

Federally owned facility mothballed for 12 years

Upkeep: $500,000 + annually

NDHQ interested in releasing ownership

Safest world site beneath 60 storeys of granite

Cooling system utilizes water from a neighbouring lake

Access by road, rail and air

No high-target neighbours or large population centres nearby

Built to world-class standards that may require only minimal upgrades

Space at least double estimated current requirement for media storage

Local construction industry capable of site remediation/customization

Existing data systems can support installation of server(s)

Bilingual college/university infrastructure to support ongoing staffing needs

‘Swords into ploughshares’ optics are politically advantageous