# 2 Introduction

## 2.1 Purpose

Canada's Arctic region has rarely received as much attention as it does today with sovereignty discussions, military exercises, increasing air and sea traffic, and rising commodity prices of resources found in abundance in the Canadian Arctic.

Canadians see the Arctic region as an important part of Canada to be secured for the benefit of the entire country - a key part of our sovereign nation.

This Arctic Communications Infrastructure Assessment (ACIA) was originally inspired by emergency management and security organizations tasked with the security of the Arctic and its people. These organizations identified robust communications infrastructure as a critical foundation for establishing and maintaining the security of the Arctic.

Without the ability to communicate effectively, any response to an emergency or threat of any kind would be compromised.

> *"People's sense of security is attached to their connectivity. Losing communication services can trigger a sense of distress… This will only increase as society becomes more dependant on communication services in the future."* Jennifer Trapnell, Executive Council Office, Government of Yukon

Good communications can be a matter of survival for those involved - whether the emergency is personal, local, regional, or national.

However, in an effort to look for inclusive solutions for some of the communications challenges facing the Arctic, this Assessment examines more than just emergency response and security organizations' issues. It also considers the communications challenges raised by a wide range of territorial and federal government departments operating in the Arctic. It also documents the existing infrastructure and highlights some of the concerns raised by communications service providers.

As people all over Canada become more and more reliant on communication services, the Arctic must keep pace in order to be able to respond not just to emergencies, but to engage in all opportunities that new communications technologies bring. A reliable, affordable communication infrastructure is a fundamental requirement for all aspects of life in the Arctic today.

Internationally, it is recognized that a good communication infrastructure can support improved health care delivery, can help people take advantage of educational opportunities, support the development of thriving businesses, and improve the overall quality of life for people.

The economic benefit of having a good communication infrastructure in Arctic communities is examined from a global perspective in Chapter 8. This chapter also

examines the economic challenge of providing broadband in an extremely high-cost region of Canada, and looks at examples from other countries in solving these challenges.

The economic chapter of this report looks carefully at the role of communications infrastructure in the very survival of many of the communities in the Arctic.

The 100,000 Canadians living in the 75 communities across the Arctic play an important role for all of Canada. They help to maintain Canada's sovereignty over the Arctic, they provide a base and labour for resource exploration and extraction, knowledge on climate change, and are inextricably involved in emergency response, security and reconnaissance. These 75 communities provide a much-needed base for many of the activities that occur in the Arctic today. After all, when an emergency occurs in the Arctic, the people who live there are probably impacted by the emergency and are expected to be part of the solution.

The sovereign north needs a healthy, educated, connected population of Canadians living in the Arctic to be part of the solution for the rapidly changing Arctic environment for the good of the entire country -- and connectivity is a key part of the solution.

Good communications in an emergency is a fundamental requirement. So too, is the requirement for routine modern communication services to Arctic communities -- it is a matter of survival.

## 2.2 Why an Assessment?

In 2009, 'Exercise Operation Nanook' was conducted in the Canadian Arctic. This exercise was designed to test multi-jurisdictional response frameworks and identify opportunities for improving regional mitigation and response planning.

The influx of out-of-territory personnel arriving in one community overloaded the local cell phone and Internet network, and severely hampered the communication capabilities of the emergency responders conducting the operation.

One of the main issues identified by participating agencies in Exercise Operation Nanook was the vulnerability of communications networks in the Arctic.

This exercise brought together the right combination of local and external emergency management and national security stakeholders to start examining ways to improve the communications infrastructure through a concerted federal-territorial effort.

> *"Reliable communications is our Achilles heel when responding to a disaster in the Arctic."*
> Yellowknife visioning workshop participant, NWT

This Assessment is one of the results of this group's efforts to begin meeting the challenges of the Arctic's communications infrastructure.

## 2.3 Who is Behind the Assessment?

Operation Nanook's profound communication failure kick-started the process of addressing the fragile infrastructure with the creation of the Northern Communications and Information Systems Working Group (NCIS-WG), created by the Arctic Security Working Group (ASWG).

The ASWG was established to enhance the security and sovereignty of Canada's North through information sharing and cooperation among federal and territorial government departments, Aboriginal governments and organizations, NGOs, and other stakeholders operating in the North. It provides:

- A forum for information sharing and intelligence;
- A venue for the coordination of activities;
- A venue for planning activities and for testing response capabilities.

The purpose of the NCIS-WG is to develop an understanding of communication capabilities in the North, assets that are available, identification of communications deficiencies and redundancies, and development of a timeline to address concerns/issues. It provides a forum for mutual discussion and development in the field of communications in the Arctic.

Members of the NCIS-WG recognize the fragility of the Arctic communications infrastructure affects more than military and emergency response capabilities.

A fragile communications infrastructure also affects the ability of governments to properly provide healthcare and education services, build the economy, protect the environment, and provide good governance. Any successful solution to solving the communications infrastructure challenge involves many players.

In January of 2010, the NCIS-WG members determined that a full Assessment should be undertaken to work towards addressing identified issues and concerns. A steering committee issued an RFP in November 2010, seeking proposals to conduct an Assessment, subsequently contracting the winning bidder, Imaituk Inc., to carry out the Assessment from January to April, 2011.

The NCIS-WG commissioned this Arctic Communications Infrastructure Assessment, with the hope that this report can be a stepping stone on the path to a more robust, stable, responsive Arctic communications system that can benefit both the local population and emergency responders in the future.

## 2.4 Objectives of this Assessment

The purpose of the Assessment as defined by the RFP was to identify existing resources and infrastructure, future requirements and the gaps between them, so that departments

working in the Yukon, NWT, and Nunavut can begin to work together to address stated areas of concern.

The contractor, Imaituk Inc., was tasked with the following activities:

### *A. Identify and Map Current Infrastructure:*

Research and identify communications infrastructure, technologies and capacity in the NWT, Yukon and Nunavut. This objective addresses the NCIS-WG need for a snapshot of "what is", the technologies, network facilities and capacity that currently exist or are available.

### *B. Identify Future Requirements:*

Identify future requirements (3-5 years ahead) for communications infrastructure, technologies and/or capacity that major federal and territorial departments require.

### *C. Conduct a Fit/Gap Analysis:*

Conduct a fit/gap analysis of communications infrastructure, technologies and capacity required to get from the current state to the Departments' desired future state, based on their identified future requirements (B above.)

### *D. Assess Community Development Implications:*

Review relevant literature to identify the communications infrastructure, technology and capacity requirements needed for effective community and economic development. It further includes an assessment of the gaps that exist between the elements (from literature) and the current state in the North, with suggestions for addressing the gaps.

All territorial and federal government departments operating in Yukon, Northwest Territories, and Nunavut were invited to participate in the assessment.

Existing communications service providers of the current Arctic communications infrastructure were also invited to provide their input into this Assessment.

## 2.5 The Report Contents

In carrying out the objectives as stated in the original RFP, the Assessment has been grouped into four areas, corresponding with the original tasks, in a slightly different order, with some additions to provide a complete picture of the issues, current state, future state, economic issues and path forward. This report is divided into four sections, with relevant chapters listed below.

### *A. Current State:*

To document the current state of the communications infrastructure as it stands today, this Assessment looked at the current state of not only the communications infrastructure, but also examined the current state of government needs, and identified the resulting issues in detail, documented in the report as follows:

Chapter 3: Government Needs Today

Chapter 4: Technical State Today

Chapter 5: Issues Today

### *B. Future State:*

To document the future needs, the Assessment has produced two sections, identifying both government needs for the future, and an estimate of the future capacity that will be required to meet those needs:

Chapter 6: Government Future Needs

Chapter 7: Future Technical Capacity

### *C. Community and Economic Development Implications:*

To assess community development implications and the gap between other jurisdictions and the Canadian Arctic, the Assessment focused on how other countries are meeting the challenge of ensuring citizens have access to broadband services, addressing the economic, regulatory and subsidy regimes in building robust communication networks that serve all citizens. The Assessment presents this information as background to the final chapter.

Chapter 8: Insight into the Economics of 'Broadband'

### *D. Fit/Gap Analysis and Strategy Forward:*

Issues raised in Chapter 5, the need for increasing technical capacity as defined in Chapter 7, and overall economic issues raised in Chapter 8 provide the framework for possible recommendations. Strategies for moving forward are the compilation of input from the many people involved in this Assessment.

Chapter 9: Addressing the Issues: Recommendations

Chapter 10: Strategy for Moving Forward

## 2.6 Arctic Territories - Brief Background

Canada's Arctic Territories include Yukon, Northwest Territories and Nunavut, making up more than 1/3 of Canada's landmass.

More than 100,000 Canadians live in the Arctic, spread out into 75 distinct communities.

The three Arctic territories have a different legal and political status in Canada compared to the 10 provinces. This difference, summarized below for the purposes of this report, results in a unique relationship between Canada and the territories compared to Canada's relationship with provinces.

This different relationship means that Canada has a broader responsibility for communications issues (and more financial resources) than would be the case if similar issues were reviewed from a provincial perspective:

- The most senior representative of government in each territory is the Commissioner (in a province this position is Lieutenant Governor);
- The Commissioner of a territory receives instructions from the Cabinet of Canada via the Minister of Indian of Northern Affairs and under conditions not applicable to provinces, the Parliament of Canada may override legislation passed by territorial legislatures;
- Subject to all the complexities of land claim and other historic issues, the ownership of resources under the ground are generally believed to be held by Canada not the territorial governments (thus Canada's higher financial resources when dealing with Arctic issues compared to the same issues in a province);
- The complex issues related to resource ownership (and the financial benefit of these resources) are the subject of various devolution discussions and agreements that are in various stages across the Arctic and do not at this time apply equally to all territories.

## Yukon

Yukon has 17 communities, with the majority of its 34,000 population living in the capital of Whitehorse, with more than 20,000 residents.

Roads link all but Old Crow (pop 253), the most northerly community in Yukon. According to the 2006 census, 85% of the population reported English as their mother tongue. English and French are the official languages.


Robert Service road leading out of Whitehorse, Yukon. Photo: C. Small

The landscape features some of the country's largest mountain ranges, and boreal forest that covers much of the Yukon territory.

Mining and tourism are mainstays of the Yukon economy. As a territory, the Government of Yukon still depends on approximately 65% of its operating budget to come from the federal government. Over the years, through devolution negotiations, more powers have been transferred from the Government of Canada to the Government of Yukon, which has increased responsibilities for public lands, water, forestry and mineral resources.

## Northwest Territories

The Northwest Territories has the largest number of communities of the three territories, with 33 official communities. Only 77% of the population identify English as their mother tongue. NWT has 11 official languages, nine of which are aboriginal.

Ten of the 33 communities are fly-in only, with no access to roads at any time of the year. A further 9 communities only have winter roads. Of the 43,000 residents, Yellowknife, the capital, has about 20,000 residents, and is the largest community in the NWT.

The Mackenzie Valley is a defining feature of the territory, with rolling hills and boreal forest covering much of the land. NWT also has tundra in the north, where many of the most isolated communities are located.

Fort Providence, NWT. Photo: Legislative Assembly of the NWT

Mining and potential oil and gas are key economic drivers in the NWT. Currently federal transfer payments make up 67% of the NWT government's operating budget each year. The Government of the NWT is currently in talks with the federal government on devolution.

## Nunavut

Nunavut has a vastly different geography from Yukon and NWT. There are no roads serving any of its 25 communities, and the territory is all above the tree line, with rolling tundra in the west and central parts, and mountains covering much of Baffin Island in the east.

The capital Iqaluit, has 7,000 people out of a total population of 33,000, with other communities ranging in size from Grise Fiord (Pop 150) to Rankin Inlet (Pop 2,700). Inuit make up 90% of the population. Only 27% of the population identified English as their mother tongue in the 2006 census. Nunavut has four official languages, including English, French, Inuktitut and Inuinaqtun, with a majority of the population speaking Inuktitut.

Pond Inlet, Nunavut. Photo: L. Thomas

Nunavut became its own Territory in 1999, splitting with the NWT. It also operates as a decentralized government, with various departments operating out of one of 11 communities in an attempt to ensure more jobs are available throughout the various regions of Nunavut, instead of being concentrated in the capital. Nunavut's government depends on the federal government for over 90% of its operating budget.

As the youngest of the three territories, the Government of Nunavut has very little taxation power, and does not share in the resource revenues of the exploding mining sector. The majority of the Northwest Passage is located within the Nunavut jurisdiction of Canada.