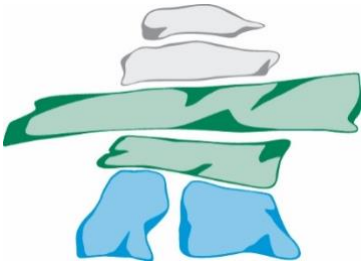
Electronic Voting Alternatives to Support the Canadian Constituency



November 2021

Note to the Reader

The authors of this report are Brian Budd (University of Guelph)[1], Nicole Goodman (Brock University) and Michael McGregor (Ryerson University). Further information about the authors is included as part of the Appendices of the report.

We would like to extend our sincere thanks for those that participated in interviews for the report: Barry Andersen, Jesse Andrews, Sheila Angnatok, Nannette Blake, Richard Catahan, Rob Ford, Mark Gillette, Matthew Heuman, Rob Herold, Lawrence Lewis, Roland Saunders, Bret Scofield, Dean Smith, and Marlene Winters Wheeler.

[1] Please note Dr. Budd was affiliated with the University of Guelph when undertaking this work. He is now with a different employer.

Executive Summary

The purpose of this report is to review electronic voting options to inform the Nunatsiavut Assembly's Special Committee on Voting Alternatives for the Canadian Constituency as they consider expanding voting options for voters. This exploration was prompted by issues with the current mail-in voting system which has created participation barriers for beneficiaries in the Canadian Constituency who are presently located across Canada. Research for this report was conducted by Drs. Brian Budd (University of Guelph), Nicole Goodman (Brock University) and Michael McGregor (Ryerson University).

To arrive at its recommendations the report draws upon scholarly research, interviews with Nunatsiavut Assembly Members, staff, and private sector vendors, a survey of Nunatsiavut electors, and a review of electronic voting experiences in Wasauksing First Nation, the municipality of Kawartha Lakes and the country of Switzerland.

Interviews with Nunatsiavut officials and the survey of electors finds support for the adoption of online and telephone voting for beneficiaries in the Canadian Constituency. Interviews with officials pointed to issues with the current mail voting system and the values interviewees would like to see reflected in a remote voting system. The key takeaway was the need to balance the values of security and accessibility to meet the needs of beneficiaries in the Canadian Constituency. Our survey of Nunatsiavut electors mirrored these themes. Findings revealed modest support for the current mail system, with much stronger support for the introduction of online and telephone voting. This support is motivated by the perception that electronic voting systems are more convenient and can overcome the unreliability of the mail system.

Based on these findings and those generated from our other research methods, we have developed 14 actionable recommendations to support the Nunatsiavut Assembly to expand voting options for beneficiaries of the Canadian Constituency. These include:

1. **Amend the Nunatsiavut Elections Act to allow for the use of electronic voting among Canadian Constituency voters.**

2. **Amend relevant legislation to allow for a longer mail ballot return period.**

3. **Allow for the use of online and telephone voting for beneficiaries in the Canadian Constituency.**

4. **Maintain the use of mail voting.**

5. **Create and regularly update an email contact list.**

6. **Create a web application that allows beneficiaries to update their contact information online.**

7. **Suggest that beneficiaries encourage friends and family to update voter contact information.**

8. **Undertake efforts to boost digital literacy and capacity in the community and at the Nunatsiavut Election Office.**

9. **Equip the Nunatsiavut Election Office with adequate training on the online and telephone voting systems, including common problems and solutions.**

10. **Establish the technical and functional requirements expected from a voting system up front before selecting a vendor.**

11. **Consult with cybersecurity experts prior to drafting the RFP.**

12. **Ensure community ownership of election data when third-party contractors are involved.**

13. **Ensure stakeholders are a part of the implementation process.**

14. **Consider adopting electronic voting for all constituencies.**

Each of these recommendations is presented in full in the body of the report. We conclude the report with some immediate next steps to help guide the Committee in its next phase of deliberation.

Table of Contents

Note to the Reader 1
Executive Summary 2
Table of Contents 4
Introduction 6
Methodology 7
Key Terms & Historical Context 8
    Defining Remote and Electronic Voting 8
    The Growth of Electronic Voting 8
    Online & Telephone Voting in Canada 9
Nunatsiavut Governance & the Canadian Constituency 11
    Nunatsiavut Governance 11
    Interviews with Nunatsiavut Officials 12
Benefits and Drawbacks of Electronic Voting 13
    Access and Security 13
    Benefits and Challenges of Electronic Voting 15
    Indigenous Experiences 17
Experiences with Electronic Voting 19
    Switzerland 19
    The Municipality of Kawartha Lakes 20
    Wasauksing First Nation 21
    Key Takeaways 23
Survey Results 23
Electronic Voting Approaches & Vendors 25
    Approaches to Electronic Voting for the Canadian Constituency 25
    Comparing Vendors Offering Services in Canada 29
Recommendations 32
Conclusion and Next Steps 39
References 40
Appendices 44
    Appendix 1: Lines of Inquiry 44
    Appendix 2: Vendor Lines of Inquiry 45

Appendix 3: Vendor Information Summaries 46
Appendix 4: Author Bios 48

Introduction

The goal of this report is to inform the deliberation of the Nunatsiavut Assembly's Special Committee on Voting Alternatives for the Canadian Constituency. The Committee has been tasked with exploring alternative voting options for beneficiaries in the Canadian Constituency who are presently located across Canada. Historically, voting for this group has been conducted by mail. However, mail-in ballots are not always accessible to all voters. Delays in the mail system, especially since the onset of COVID, have sometimes meant that voters may receive their ballots later than intended and that ballots can be received after the deadline, not counting toward the final tally. To ensure voting is as accessible as possible for voters in the Canadian Constituency, the Committee is exploring other remote voting options which may result in improved access to voting and could promote greater inclusion of community members enhancing community voice and capacity.

To inform the Committee in their deliberation of voting alternatives this report provides an overview and analysis of remote voting systems with a specific focus on electronic types of voting, notably online and telephone voting. It begins by outlining the research methods and approach used to compile this report. Next, we define key terms and provide historical context about the growth of electronic and online voting around the world and in Canada. Third, we offer context about the mandate of the Special Committee and issues beneficiaries of the Canadian Constituency face with the current voting by mail option. This section includes a summary of key findings from interviews with Nunatsiavut leaders and staff. Fourth, we compare mail, online and phone voting and review the benefits and drawbacks of online voting in the context of both Indigenous and Canadian government elections. Fifth, the report reviews experiences from three jurisdictions that provide relevant insights for Nunatsiavut: Switzerland, the municipality of Kawartha Lakes, and Wasauksing First Nation. The sixth section presents the results of the survey of beneficiaries with a focus on respondents from the Canadian Constituency. Seventh, we review the current electronic voting systems and deployment approaches that are best suited for voters in the Canadian Constituency. We also review interview findings from vendors that offer online and telephone voting services in Canada and compare their solutions. Finally, the report concludes with actionable recommendations to support the Nunatsiavut Assembly to expand voting options for beneficiaries of the Canadian Constituency.

Methodology

This report was produced by drawing upon a variety of sources of information. This holistic approach allows us to provide Nunatsiavut with the best possible information as it decides on whether to adopt remote voting and which methods to deploy in future elections for electors in the Canadian Constituency.

1) **Academic and historical literature**: There is a broad and deep literature and history on the effects of online voting, reflecting its growth around this world. This work heavily informs the entirety of this report.

2) **Jurisdictional experiences**: An important part of decision-making regarding voting methods is considering relevant experiences of others. To that end, we provide overviews of the history of the adoption of three settings which share important characteristics with Nunatsiavut. These include a First Nation (Wasauksing First Nation), a municipality that had been highly reliant on paper voting and has a sizeable population living outside of the community (the City of Kawartha Lakes), and a country (Switzerland) where 90 percent of voting has been conducted by mail and where online voting has had good uptake for many years. As part of these experiences, we draw upon a variety of data sources, including survey data from our own work on the Electronic Elections Project (see electronicelections.ca).

3) **Survey of electors**: We fielded a survey of electors to assess satisfaction with the current mail-in voting system and to measure demand for electronic voting among voters in the Canadian Constituency. To not limit participation from electors we allowed eligible electors from any Constituency to take part. Though the uptake on the survey was less that we had hoped, participants nevertheless provided important information. A total of 56 electors completed the survey; 44 of them from the Canadian Constituency.

4) **Interviews**: Six interviews were carried out with seven Nunatsiavut Assembly leaders and staff to get a sense of the unique characteristics of the Canadian Constituency, challenges faced with the current approach, how elections are run, desired qualities of a voting system, types of programs and infrastructure that would be needed for successful implementation of electronic voting, and to understand whether electronic types of voting are compatible with traditional Inuit decision-making processes and cultural values (see Appendix 1 for the questionnaire). We also conducted interviews with six private providers of electronic voting services. Each vendor answered a set series of questions that we feel will be helpful to the Nunatsiavut Assembly if it chooses to move forward with the adoption of electronic voting (see Appendix 2 for the questionnaire).

Key Terms & Historical Context

Defining Remote and Electronic Voting

This report addresses three types of remote voting - mail, online and telephone ballots - with a specific focus on online and telephone voting. Remote voting includes voting systems that do not require voters to attend a physical poll location or other satellite location in the community to cast a ballot. These types of voting are the focus of this report given their necessity for beneficiaries of the Canadian Constituency who live across Canada and need to be able to receive and cast a ballot from their homes.

Throughout the report the term 'electronic voting' is often used for stylistic relief to refer to online and telephone voting. Generally, electronic voting is an umbrella term that refers to voting "systems where [either] the recording, casting or counting of votes in political elections and referendums involves information and communication technologies" (International IDEA, 2011). This can refer to a range of technologies including, but not limited to, mechanical punch cards, optical-based systems, electronic tabulators and voting machines, telephone voting, fax voting, email voting, and online voting (Abu-Shanab et al., 2013).

Online voting, by contrast, commonly refers to receiving or casting a ballot over the internet. This can encompass many types of electronic voting where only part of the voting process takes place online. In the US, for example, some types of email voting are conducted fully online, while in other versions, ballots are received by voters online and then either faxed or mailed back (Thompson, 2018). Under this definition telephone voting might even be considered 'voting online' when using Voice over Internet Protocol (VoIP) technology. For the purposes of this report, we focus on the remote forms of online and telephone voting and define them as follows:

Online voting: *A system of voting where ballots are received, cast, and tabulated using an internet connection.*

Telephone voting: *A method where voters access and cast ballots using a telephone line supported by an interactive voice response system (IVR).*[2]

The Growth of Electronic Voting

The use of technology in elections dates back to early uses of machines such as mechanical level devices in New York City (Shocket et al., 1992). Early electronic voting systems emerged and were first trialled in the US in the 1960s. These included punch card technology at the county level and then shortly after optical scanners and direct recording devices (Ansolabehere and Stewart, 2005; Garner and Spolaore, 2005). The Netherlands was also an early adopter, first trialing US voting machines in provincial elections in 1966 and shortly after developing their

[2] This could be a traditional landline or Internet Protocol network.

own technology (Goldsmith and Ruthrauff, 2013). Since these early technologies electronic voting systems and approaches have continued to evolve with instances of online voting first occurring in the UK in 2002, Canada in 2003, Switzerland in 2003, and Estonia in 2005. Different forms of telephone voting were trialed in the UK (i.e. SMS voting) and Canada (i.e. dial in telephone ballots) at around the same time (Goodman et al., 2010).

To date online voting technologies have been employed in numerous countries around the world including Armenia, Azerbaijan, Australia, Bulgaria, Canada, Estonia, France, Mexico, Norway, Switzerland, UK, and the US. Similarly, electronic voting systems have been used in jurisdictions such as: Argentina, Australia, Belgium, Brazil, Costa Rica, Germany, India, Namibia, Netherlands, Panama, Spain, Russia, and the US, among others. Use of telephone voting is much less prevalent and to the best of our knowledge is presently only used in Canada. While many countries have experimented with voting technologies, the most established online voting programmes have occurred in Canada, Estonia, and Switzerland, despite being recently halted in Switzerland over security concerns (Goodman, 2017). Out of all the possible electronic voting methods, online voting is widely seen as presenting both the greatest potential benefit for accessibility while at the same time the greatest challenge for security (Goodman et al., 2010). Achieving this balance has varied across governments based on level of government, unique jurisdictional needs, and technical capacity.

An interesting and relevant trend is that, in recent years, uptake of internet voting has been growing significantly among Indigenous governments worldwide. Indigenous communities in Canada and the US have regularly used online ballots to support a range of votes for over a decade (Gabel and Goodman, 2021). The technology is also used alongside mail-in ballots to support elections of Māori governance entities (iwi) in New Zealand (Bargh and Rata, 2020). This trend speaks to the willingness of Indigenous governments to experiment with new methods to engage with electors.

Online & Telephone Voting in Canada

As noted above, online and telephone voting have been used in elections in Canada since 2003. The first instance of online voting deployment took place in the federal NDP's leadership election of Jack Layton. Shortly after, twelve cities and townships in Ontario offered a combination of online and telephone voting in the 2003 municipal elections (Goodman, 2014). Since that time online voting has been used by a growing number of municipalities with each local election in Ontario. In 2008, communities in Nova Scotia followed suit and the trend has taken up there as well. In both provinces a combination of voting methods is offered. Some municipalities offer online and paper ballots, while others offer a combination of paper, telephone, and online ballots to electors. Finally, most communities deploying technology offer a fully digital election - either all online or online and telephone voting. In the 2018 Ontario municipal elections, for example, 171 of 414 municipalities that ran elections offered online voting. Of those, 131 eliminated paper voting (Cardillo et al., 2019). A similar trend has been transpiring in Nova Scotia where the norm is also now to run fully electronic elections.

Much like municipalities, Indigenous communities across Canada have been increasingly using online, and sometimes telephone, voting to support a range of votes from elections, referendums, ratification and agreement votes, Annual General Meetings, and community polls (Budd et al. 2019; Gabel and Goodman, 2021). The first community to trial online voting was Tahltan First Nation in British Columbia in 2011 for a Northwest Transmission Line agreement and Impact benefits agreement regarding creek and volcano projects. Since then, more than 120 First Nations from across the country have used online voting often to enhance participation of members, especially those living off-reserve; to modernize government processes and enhance self-government; and to boost community voice in important matters (Budd et al., 2019). Métis groups and Inuit communities have also used electronic voting. The Métis Nation of Ontario, for example, has used online voting to support their General Elections, notably seven times since the onset of the pandemic. Likewise, the Inuit Tapiriit Kanatami (ITK), a non-profit organization representing 65,000 Inuit, has employed this method. Across all Indigenous communities, uptake of remote electronic voting methods has intensified with the onset of the COVID-19 pandemic. At least 170 votes using online voting have been launched by Indigenous communities since the pandemic began.

Electronic voting has also been used by provincial and territorial governments. Prince Edward Island used online ballots to support a non-binding plebiscite on electoral reform in 2016. More recently in the 2019 Northwest Territories general election, online voting was an option for absentee voters (Goodman and Gabel, 2021). While no other provincial or territorial governments in Canada have used online or telephone voting yet, the social distancing precautions undertaken because of the COVID-19 pandemic have caused many election agencies to take stock of how they deliver elections in the post-pandemic world. As an alternative to electronic ballots, many agencies have opted to use electronic tabulators. These are electronic devices that are not usually connected to the internet and are used to tabulate ballots at polling locations. Tabulators are now used by all provincial and territorial election management bodies in Canada except Quebec and Newfoundland & Labrador.

Finally, while there has been some interest federally, electronic voting has not been used in national elections in Canada. Elections Canada has commissioned several reports on the subject for research purposes (Goodman et al., 2010; Pammett and Goodman, 2013; Scwartz and Grice, 2012) but beyond online voter registration no additional modernization has occurred. The federal government also considered online voting as part of its 2016 Special Committee on Electoral Reform (ERRE, 2016; Goodman, 2017), but decided against the voting reform citing security concerns. Overall, despite a lack of movement from federal authorities, use of online voting is growing in Canada.

Nunatsiavut Governance & the Canadian Constituency

Nunatsiavut Governance

The Nunatsiavut Government is a regional Inuit government established in 2005 through the signing of the *Labrador Inuit Land Claims Agreement (LILCA)*. Negotiated between the Labrador Inuit, Canada, and the province of Newfoundland and Labrador, the agreement established Inuit self-government over the Nunatsiavut land claim area. The LILCA provides rights and jurisdiction to the Nunatsiavut Government across several different policy areas including health, education, housing, culture, and language.

The fundamental rules, procedures and principles of governance are contained within several different pieces of legislation. The most important is the *Labrador Inuit Constitution*. This Constitution provides a framework for implementing Nunatsiavut self-government and sets out two interconnected levels of governance: the community and regional levels.

The community level of Nunatsiavut Government includes five Inuit Community Governments: Nain, Hopedale, Postville, Makkovik and Rigolet. Each community is elected and represented by an AngajukKâk (or 'mayors'). The regional level of government is the Nunatsiavut Assembly. The Assembly has 18 Members, comprised of the following:

- 1 President of Nunatsiavut;
- 10 Ordinary Members (6 representing Inuit Communities in the Nunatsiavut region, 2 representing Beneficiaries in the Upper Lake Melville region of Labrador, and 2 representing all other Beneficiaries resident elsewhere in Canada (the "Canadian Constituency");
- 5 AngajukKâk of the communities in the Nunatsiavut region.
- 2 Chairpersons of Inuit Community Corporations (corporations established to represent Inuit located in certain urban areas outside of the Nunatsiavut Region and who by virtue of their office also sit as members of the Nunatsiavut Assembly). (RFP, Page 2)

Voting regulations and procedures for the Nunatsiavut Assembly are set out in the *Nunatsiavut Elections Act*. For both general assembly elections and by-elections, beneficiaries living and voting in constituencies located in Nunatsiavut or the Upper Lake Melville region are able to vote either in-person by paper ballot at polling locations or via mail-in ballot. For beneficiaries living in areas outside of Nunatsiavut or the Upper Lake Melville region (i.e., 'the Canadian Constituency'), voting is conducted exclusively through mail-in ballots, as outlined above. Approximately 2/3rds (or 2,128 eligible voters) live in the Canadian Constituency, and they

spread across many different regions of Newfoundland and Labrador, as well as other provinces.

In response to low voter turnout and concerns about the mail-in balloting system for members of the Canadian Constituency, on March 9th, 2021, the Nunatsiavut assembly approved the appointment of the "Special Committee on Voting Alternatives for the Canadian Constituency." The committee's mandate is to explore the adoption of electronic voting for members of the Canadian Constituency to address a set of interrelated challenges concerning the mail-in voting system for beneficiaries identified as the following: "delays in postal delivery, questions regarding security of ballots, identification of voters, cost and lower rates of returns compared to other constituencies." (RFP, Page 3)

Interviews with Nunatsiavut Officials

To better understand the challenges faced by voters in the Canadian Constituency, the barriers administrators encounter serving them, and the values sought from any new proposed voting methods, we conducted interviews with Nunatsiavut Assembly representatives and staff. A total of 6 interviews were carried out with 7 officials during August and September 2021.

Interviewees communicated that there are two primary challenges beneficiaries face when voting by mail. First, interviewees pointed to consistent challenges maintaining an up-to-date mailing list. Due to change of addresses that are not updated, many mail-in ballots that are sent out do not reach the intended recipient. Second, even when mail-in ballots do reach beneficiaries and are sent back prior to election deadlines, delays with *Canada Post* shipping can result in ballots being lost or arriving late. In one instance, an interviewee remarked that in the March 2021 by-election, two ballots were returned from an election held in 2016. While this example is extreme, if a ballot arrives past election day, it is not counted. Indeed, this is a common occurrence due to the relatively short-time frame of Nunatsiavut elections. Under the terms of the *Nunatsiavut Elections Act*, there is only 35 days (i.e., five weeks) between the closing of nominations and election day. This creates a very short time frame by which ballots are printed, mailed, and returned, ultimately resulting in many mail-in ballots from the Canadian Constituency arriving past the deadline to be counted. Improving the delivery of remote ballots by adopting a complementary voting channel could support the enfranchisement of voters whose mail ballots might otherwise have been delayed and made it after the election deadline.

A less common, but nonetheless important, concern that was expressed to us concerned the security of mail-in ballots. Some administrators indicated that mail-in ballots lack security in terms of verification and privacy. Specifically, once a mail-in ballot is sent out, it is difficult to guarantee that it will be filled out by its assigned recipient or that it will be filled out free of undue pressure from other recipients.

Overall, challenges with mail-in ballots are associated with consistent rates of low participation among members of the Canadian Constituency. This raises concerns among representatives about the extent to which community voice is represented in votes. Beyond this, the challenges associated with voting by mail were identified as contributing to a larger sense of political apathy

toward Nunatsiavut affairs. Leaders and administrators highlighted a feeling of apathy among beneficiaries in the Canadian Constituency, linked to barriers in participation and a sense of political disengagement stemming from geography.

All these factors form the backdrop of Nunatsiavut's consideration of electronic voting. In our interviews with Nunatsiavut elected representatives and administrators we learned valuable information about the desired design and values involved in a prospective electronic voting system. A recurring theme across our interviews is the importance of achieving a balance between security and accessibility. When asked about their concerns with electronic voting, many interviewees cited security. Specific concerns resolved around the possibility of data breaches, the inability to verify the identity of electors and a lack of safeguards to ensure voter privacy. However, there was also a recognition that any prospective electronic voting system also needs to prioritize access. Promoting accessibility for members of the Canadian Constituency is critical to addressing the barriers associated with the mail-in system and improving turnout rates. Consequently, interviewees highlighted that, if security measures produced a voting process that was too technical and cumbersome, it likely would fail to meet Nunatsiavut's initial motivations to explore electronic voting in the first place. The reflections stress the need to balance the values of security and accessibility in order to meet the needs of Nunatsiavut beneficiaries.

Benefits and Drawbacks of Electronic Voting

Access and Security

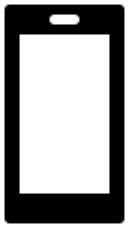
Debates over the implementation of new methods of remote voting tend to revolve around two potentially competing concepts. These concepts represent important democratic values that must be weighed in any decision on voting methods. The first value is "access". The democratic rights of Canadians are outlined in *The Canadian Charter or Rights and Freedoms* which guarantees the right to vote. Similar guarantees are outlined in *The Labrador Inuit Constitution* which upholds requirements for political process and institutions to be accessible, open and responsive in addition to guaranteeing the right to vote for all Nunatsiavut beneficiaries. To guarantee political rights, there needs to be access to the means of participation, whether it be voting by mail, telephone, in person, or online. Access is a matter of degree, and making voting easier, through whatever means, increases access in that it can reduce the effort required to vote. Remote methods are thought to increase accessibility because they do not require voters to meet at a polling location. Employing multiple methods or broadening the voting window are other ways to increase access. At the same time, barriers can be put into place that might reduce access. For instance, strict identification requirements can be a hurdle for many electors. In general, improving the accessibility of elections is thought to increase participation rates.

As is the case with any democratic values, balance is key. Access is important, but it must be weighed against other, potentially competing, goals. One such value is "security". The Nunatsiavut Assembly uses a secret ballot in public elections, and privacy is integral as part of

this. Ensuring that a vote is ‘counted’ is also important, in that it ensures that our opinions are factored into decisions on who governs us. Security concerns can cast doubt on both of these fronts. While security can be a concern with any method of voting, remote methods are thought to be particularly susceptible to breaches. When we cast ballots in person, we personally place our vote into the ballot box. If our votes are cast through the mail, on the phone, or online, we do not have the same sense of certainty that our vote is received. Of these remote methods, online voting tends to be the most discussed, due to concerns that software either may not work, or that it may be compromised intentionally by some outside actor. For all types of voting, steps can be taken to increase security. Some of these, however, may reduce accessibility. For instance, the security of remote voting systems can be increased by adding steps that make the voting process more complex, and thus less accessible. In any discussion of voting reform, a balance between these two principles must be found.

The following Table outlines some differences between online, telephone and mail voting with respect to these values:

Table 1: Comparison of online, telephone, and mail voting methods

Online	**Telephone**	**Mail**
		
-Easy access from home or anywhere with a device that has an internet connection	-Easy access from home or anywhere that has telephone reception	-Easy access from home only, but can be cast anywhere there is a postal box
-Credentials required to authenticate voter identity	-Credentials required to authenticate voter identity	-No credentials required, authentication typically done at registration
-Immediate submission of the ballot	-Immediate submission of the ballot	-Ballot submission can take days to weeks depending on postal delivery
-Quick tabulation of results	-Quick tabulation of results	-Slower tabulation of results, depending on when mail is received
-Uses no paper	-Uses no paper	-Uses a lot of paper
-Requires an electronic device or smart phone	-Requires a phone	-No technology required
-Requires a working internet connection (susceptible to	-Requires a working telephone line or VoIP network (susceptible	-Requires only postal service

internet issues)	to dropped calls and interruptions)	
-Some digital literacy is required	-Minimal digital literacy is required	-No digital literacy required
-Ability to track session data for audit purposes	-No ability to track session data for audit purposes	-No ability to know who voted
-Has basic Transport Layer Security	-Does not have Transport Layer Security	-N/A
-Possibility for a paper record with certain systems (new feature)	-No possibility for a paper record	-A paper record
-Requires technical support	-Requires technical support	-Requires support for assembling and counting ballots

Benefits and Challenges of Electronic Voting

This section draws on published academic research to outline the key benefits and challenges associated with online voting. Telephone voting, as noted, is far less studied and currently as discussed in this report, only practiced in Canada. We begin by surveying research from non-Indigenous contexts before discussing emerging research on the adoption of online voting by Indigenous communities in Canada.

There are many studies that have examined the adoption of online voting in Canada and other contexts. This research has identified the following benefits of online voting: increased voter access and convenience, turnout, and improvements in electoral administration. We discuss each of these benefits before moving to a discussion of challenges associated with online voting. Common challenges include security concerns, risks of voter coercion and the creation of new digital barriers to participation.

Benefits

Among the most cited motivations for the adoption of online voting are increasing voter access and convenience. In non-Indigenous contexts, online voting has been used to increase electoral accessibility for select groups who have difficulty in accessing physical poll locations. These groups can include persons with disabilities/mobility challenges, citizens and military personnel living abroad, incarcerated persons, postsecondary students living away from home and residents living in rural/remote areas (Germann & Serdült, 2017; Goodman et al., 2010; Goodman & Smith, 2017; Goodman et al., 2018). Beyond accessibility for targeted groups, when it if offered alongside other voting methods, online voting often emerges as a preferred option for many voters due to its convenience. Research from Canadian municipalities and in other international contexts (i.e., Estonia, Brazil, and Australia) have consistently found convenience is one of the key reasons that electors vote online (Alvarez, Hall & Trechsel, 2009; Germann & Serdült, 2017; Goodman & Pyman, 2016; Goodman & Smith, 2017).

In addition to access and convenience, online voting has commonly been adopted as part of efforts to increase rates of participation. While research in the Canadian context has found online voting to have positive effects on participation, the overall relationship is more mixed when consulting international studies. Some research has found that online voting can increase turnout from 3 to 10 percent, while other studies note no increase (Alvarez et al., 2009; Gerlach & Gasser, 2009; Goodman & Stokes, 2020; Germann & Serdült, 2017; Solvak & Vassil, 2018; Trechsel & Vassil, 2010; Vassil & Weber, 2011). This inconsistent relationship highlights the importance of context in understanding the impact of online voting on participation. For example, the effect of online voting on participation tends to be less when other remote voting options (mail-in or telephone voting) are offered beforehand or at the same time (Germann & Serdült, 2017; Goodman & Stokes, 2020; Mendez, 2010).

Finally, online voting also has benefits for electoral administration. Online voting, by virtue of relying on digital ballots, has been found to eliminate issues associated with improperly marked ballots and mistakes during ballot tabulation. More generally, online voting has been shown to offer overall benefits to efficiency and accountability by allowing ballots to be counted faster and more transparently (Goodman, 2017; Pammett & Goodman, 2013).

Issues and Challenges

While there are several benefits, research has also shown that there are unique issues or challenges associated with the uptake of online voting. One broad set of challenges concerns issues of security. The implementation of online voting presents a variety of security challenges related to authentication, audibility and verifiability, electoral integrity and privacy.

Authentication concerns the ability of officials to confirm voter identities, ensure their eligibility to vote, and ensure that only one of their ballots is counted (Ahmad et al., 2020; Gritzalis, 2002). One of the largest challenges with implementing online voting in the context of Canadian federal, provincial and municipal elections is that there is currently no way to digitally verify a voter's identity (Goodman, 2017). One common verification option is to provide voters with a custom PIN code; however this has been criticized by experts as insecure. A more secure option for verifying digital ballots is to take a 'layered' approach whereby multiple pieces of personal information or steps (response to a secret question, an object such as a voting card or special code, and biometric data) are required to cast a ballot (Chevallier, 2010).

A second security challenge concerns audibility and verifiability. In the context of elections, ballots must be audited and verified before being released. Online voting can complicate this process as voting takes place between an individual's device and external computer servers that are often owned by service providers. This process means that digital ballots are counted and verified using computer algorithms rather than hand-counting by polling personnel (Benaloh et al., 2014; Essex, 2016).

The challenges related to auditability and verifiability present additional issues for electoral integrity and privacy. One of the most common concerns about implementing online voting is the potential for large scale security breaches that manipulate election results. Similarly, there

are concerns that security threats (e.g., distributed denial of service (DDoS) attacks; malware) will also have negative impacts on the privacy and security of individual voters. One potential threat is that an outside actor will be able to change or view votes. An additional privacy challenge is the potential that voting remotely will result in coercion or fraud. For example, remote online voting could allow for situations where families are forced to vote collectively or there is undue familial pressure to vote for a particular candidate or party (Goodman, 2017). However, this challenge is not an issue specific to digital voting, but rather applies to remote voting methods (mail-in and telephone voting) more generally.

While security challenges are inherent to digital voting platforms, there are several measures and safeguards in place to ensure electoral security and voter privacy. Online voting services use baseline measures such as Transport Layer Security (TLS), blockchain technology and end-to-end encryption to ensure voter privacy, allow for ballot verification and maintain electoral integrity for both administrators and voters (Elections BC, 2014; Goodman, 2017).

Continuing to employ practices that have been used as a baseline to improve safety such as Transport Layer Security (TLS) and introducing other elements such as end-to-end encryption and cryptographic end-to-end verifiability can help to mitigate the security concerns on both individual and universal levels (Elections BC, 2014; Goodman, 2017; Nasser et al., 2016).

Digital access and literacy represent a final set of challenges concerning the implementation of online voting. Online voting has been shown to benefit those with greater access to and experience with digital technology voting (Sciarini et al., 2013; Serdült et al., 2015). As a result, online voting can leave certain types of voters, namely those with low levels of access and experience, disadvantaged. This pattern has been observed in municipal elections in Ontario where the removal of paper voting options resulted in those with lower digital access and skills being left behind (Goodman et al., 2018). Issues of digital access and literacy have been found to be mitigated by continuing to offer traditional paper and mail-in ballots as an option to voters. Providing different voting options concurrently ensures that voters do not become disenfranchised.

Indigenous Experiences

Research conducted prior to the COVID-19 pandemic has highlighted several benefits and challenges with online voting that are unique to an Indigenous context. One of the key motivations to adopt online voting is to increase rates of voter participation and create more accessible governance processes for members residing off community lands (Budd et al. 2019; Goodman et al. 2018). These members face challenges participating in community votes due the necessity to travel long-distances to vote in-person or rely on mail-in ballots. Research has shown that online voting is an effective means of better engaging and fostering the participation of off-reserve members in First Nations across Canada (Budd et al. 2019). Like challenges faced by Nunatsiavut beneficiaries in the Canadian Constituency, many off-reserve members view mail-in ballots as unreliable and cumbersome.

In addition to improving participation among members not living on community lands, online voting has also been shown to positively contribute to attitudes of trust toward on-reserve governance processes, particularly in a First Nation context where research has been done. As a result of colonialism and federal paternalism, many First Nations face issues of trust and engagement among their members toward leaders and band council governments. Online voting has been introduced alongside other digital tools to create more responsive, transparent, and accessible governance practices. Research with First Nations has shown that online voting helps to increase a sense of community connectedness by generating dialogue and awareness of on-reserve governance issues and votes.

A final benefit of online voting is an extension of governance capacity. One of the most common types of decisions that online voting has been used for in a First Nation context are sectoral self-government ratification votes. In these instances, First Nations develop and ratify community-based legislation that replaces sections of the Indian Act (Gabel et al. 2016a; Budd et al. 2019). Online voting has been found to help improve engagement and administrative capacity which in turn has allowed communities to pursue collective political goals. The introduction of online voting and other digital tools has also allowed First Nations to create email membership directories to facilitate outreach and information sharing (Budd et al. 2019).

Despite benefits, there are also many challenges related to the uptake of online voting. One of the largest challenges concerns digital divides. For many Indigenous communities, especially those located in rural or remote areas, high-speed Internet access remains limited. Another challenge is cost. To offer online voting in the short-term, Indigenous communities must contract a private sector vendor. The price and design of services can vary significantly between vendors which can lead to significant costs being incurred. A second type of digital divide concerns issues of digital literacy. Like many non-Indigenous communities, there are concerns that a shift to online voting will disenfranchise less tech-savvy and/or older voters (Goodman et al. 2018). Research has shown that this challenge can be mitigated by continuing to offer online voting alongside paper and mail-in ballots (Gabel et al. 2016b; Budd et al. 2019).

Finally, online voting also poses challenges regarding the technology's fit with traditional Indigenous decision-making cultural norms and values. Research has found that some First Nation members are concerned about the potential that digital technologies will create anonymized and less transparent forms of participation that replace in-person deliberative decision-making (Budd et al. 2019). The fit with traditional decision-making norms and values is an important consideration for any Indigenous community considering deploying online voting. Nonetheless, many communities that have experimented with the technology have found their members express largely positive opinions toward future uses of online voting (Budd et al. 2019; Goodman et al. 2018).

Experiences with Electronic Voting

As already noted, electronic voting has been widely adopted in a variety of settings. Still, some locales are better than others for providing insight into what Nunatsiavut might expect if it decides to move forward with remote voting. In this section, we provide an overview of the experiences of three jurisdictions that have adopted online voting. Each shares some important similarities with Nunatsiavut and provides relevant lessons for the Special Committee as they consider electronic voting alternatives for the Canadian Constituency.

Switzerland

The country of Switzerland is one of the earliest, and most extensive, adopters of online voting, and it has been the subject of a great deal of attention from abroad. The Swiss have a long history of employing online voting at all levels of government and for referenda (the first vote that included an online voting option was in 2003). Switzerland consults its citizens through votes more than any other country in the world and has long employed internet voting to do so. The country is therefore a particularly important example for any government contemplating the adoption of online voting.

As is the case in the Nunatsiavut Canadian Constituency, mail voting was the primary method of voting prior to the adoption of online voting, so remote voting has long been the norm. However, turnout in Switzerland has historically been relatively low. In addition to regular elections for all three levels of government, referendums take place about four times annually, which can cause voter fatigue. A primary rationale for adopting online voting in Switzerland was to combat this low turnout, largely by improving voter convenience. Online voting was also thought to be a particularly attractive way of increasing turnout among the roughly 10 percent of Swiss citizens living abroad, who vote at much lower rates than their domestic counterparts.

Since the canton of Geneva first used internet voting in 2003, the voting method has diffused steadily throughout the rest of the country. It is now used in elections and referendums at all levels of government. The spread of online voting has been done in a piecemeal fashion, given the nature of Swiss politics. Electoral regulations are decided independently by a large number of separate bodies in Switzerland; the country is a decentralized federation, and cantons and municipalities set their own rules. However, the fact that online voting has been adopted independently by so many governments and election management bodies speaks to the support for the system in that country.

Online voting is currently a standard option across Switzerland, where the method is used alongside mail voting. Interestingly, despite the availability of an online voting option, mail voting remains the most popular method of voting. Domestic and foreign based voters differ on this front, however. An online voting option has been available to citizens living abroad since 2008. Expatriates have adopted the online voting option at much higher rates than their Swiss-based counterparts (Germann and Serdült, 2014). Such a pattern suggests strongly that the adoption

of an online option has proven attractive to electors who are geographically distant from their government.

In addition to the support for online voting from Swiss decision makers and evidence of the system's popularity among expatriates, public opinion data show that Swiss citizens more generally are supportive of online voting. A survey conducted in 2016 by the Centre for E-Democracy found that support for internet voting is high. Seventy percent of respondents were either somewhat or completely in favour of internet voting (Serdült, 2016). By multiple measures, therefore, the Swiss experiment with online voting can be considered a success.

The Municipality of Kawartha Lakes

Municipalities in Ontario are among the heaviest users of remote voting in the world. In the 2018 elections, 177 municipalities in the province allowed voters to cast ballots remotely, of which 131 were completely paperless (Cardillo et al., 2019). The first cities to allow for online voting did so in 2003, and the method has grown in popularity with each election.

Among the lengthy list of municipalities that employ online voting is Kawartha Lakes, a geographically sizable town of about 75,000 individuals located north-east of Toronto. We include this city for two important reasons. First, it shares several important features in common with Nunatsiavut (and with elections in the Canadian Constituency, in particular). Second, the city was included in a research study that we conducted in 2018 (*The Electronic Elections Project)*. As part of that study, we collected survey data from 364 eligible voters, including information on their attitudes towards the adoption of online voting. We describe below how voters in that city have responded to the shift away from paper ballots, and towards internet and telephone voting.

There are several important features of Kawartha Lakes that make the City instructive here. First, a large share of electors are seasonal residents, and they live outside of the constituency at election time (elections are held in late October). Parts of Kawartha Lakes are considered to be 'cottage country' by residents of the GTA, and many property owners reside in the area during more temperate times of the year. To accommodate seasonal residents who still wish to have democratic input in Kawartha Lakes, the City has always maintained a system of remote voting. Since the city's creation by amalgamation in the 1990s, it has never had in-person voting - all voting has historically been done by mail. Remote voting has therefore long been the norm, as is the case with the Canadian Constituency.

Another reason why the case of Kawartha Lakes is of relevance here is that the City has recently made the shift from mail-in ballots to internet and telephone voting (the switch which is investigated in this report). Kawartha Lakes City Council voted to make this change in 2017, and they confirmed it unanimously in 2021. City officials themselves have therefore expressed strong support for the new system. In doing so, the City has listed several advantages of these

new methods of voting, including emergency preparedness, efficiency, accessibility, accuracy, automatic tabulation, and convenience.[3]

As for the question of how electors feel about this change, we can draw upon data from our own research. As part of *The Electronic Elections Project*, we conducted an online survey of several thousand Ontarians, including 364 residents of Kawartha Lakes.[4] One of the questions we asked survey participants is whether they agreed that internet voting should be available for municipal elections. 78.3 percent of respondents from Kawartha Lakes agreed that internet voting should be used, 17.6 percent did not, and 4.1 percent had no opinion. In addition to city councillors, residents themselves therefore are extremely supportive of online voting.

Of final note is the fact that Kawartha Lakes suffered from a delay in the publication of results in 2018. Dominion Voting, the online voting systems provider, experienced some technical issues on election day in Kawartha Lakes and elsewhere.[5] In total, approximately 51 municipalities that used Dominion's internet voting portal experienced delays in voting, and voting periods were extended in many instances. The widespread support for internet voting, both on the part of council and the public, persists despite the technical problems experienced in 2018. Kawartha Lakes is working with a different company, *Simply Voting*, for the 2022 elections.

Wasauksing First Nation

Wasauksing First Nation is an Ojibway, Odawa and Pottawatomi community located in Northern Ontario adjacent to the municipality of Parry Sound. In 2017, Wasauksing First Nation used online voting in a ratification vote to pass Land Code legislation. Under the terms of the Indian Act, First Nations do not have direct control over the management of their reserve lands, including the ability to lease, develop and pass environmental regulations. In 1996, the federal government negotiated the Framework Agreement on First Nation Land Management with a group of 13 First Nations. As a signatory to the agreement, First Nations are provided the opportunity to develop a custom Land Code which replaces up to 44 sections of the Indian Act and allows communities to assume greater governance capacity and jurisdiction over their reserve lands. After signing onto the framework agreement in 2013, Wasauksing began the process of drafting and passing their Land Code into law. To successfully ratify their Land Code, Wasauksing was required under the terms of the Framework Agreement to hold a ratification vote amongst their members.

Wasauksing chose to offer online voting as a balloting option to their members in the Land Code vote. Along with in-person and mail-in paper ballots, Wasauksing's members were provided the option to vote online in the ratification during and in advance of voting day (February 25, 2017). Wasauksing's members had the option to vote in-person during advanced polls held in

[3]See https://www.kawarthalakes.ca/en/municipal-services/internet-and-telephone-voting.aspx

[4] The survey was fielded by Forum Research Inc. Respondents were recruited via phone and redirected to complete surveys online. See https://www.electronicelections.ca/ for additional details.

[5] See Dominion Voting's statement at https://www.kawarthalakes.ca/en/municipal-services/resources/Financial-Statements-Election/Statement-Dominion-Voting-Ontario-IV-Issue-Oct-22-2018.pdf

December of 2016, as well as regular polls during the official voting day. Mail-in ballots were also sent to members ahead of the advanced polls and were accepted up to the official voting day for the ratification vote. Online voting was offered beginning on December 10th, 2017 and closed at 8:00 am on February 25, 2017. Wasauksing's key motivation to adopt online voting in the ratification vote was to remove voting barriers and enhance participation.

A large portion of Wasauksing's members reside off-reserve. The necessity to travel to vote in person or vote remotely using a mail-in ballot had been identified by community leaders as key obstacles to consistent participation amongst off-reserve members. In the land code vote, the participation of off-reserve members was essential for the community to reach participation quorums outlined in the Framework Agreement. The Framework Agreement stipulates that for a Land Code to be successfully ratified a First Nation must 50 percent + 1 of all voters need to vote "yes" on a land code, with a community also achieving the overall participation of at least 25 percent + 1 of all eligible voters. Online voting was adopted largely to help Wasauksing extend the participation of those living off-reserve by removing barriers related to paper balloting options, and by extension help reach the quorums necessary to successfully pass their proposed Land Code.

To offer online voting, Wasauksing partnered with private-sector vendor Vote-Now who facilitated voter registration, ballot casting and tabulation. To support online voting uptake, Wasauksing was proactive in engaging its members. The community launched several initiatives to generate awareness of the Land Code vote and educate members on different voting options available to them. These initiatives included in-person information sessions, a website devoted to providing information on the Land Code and the ratification vote, and regular articles on the vote published in Wasauksing's community newsletter.

Overall, Wasauksing's experiences with online voting in the land code vote were viewed as successful. Wasauksing successfully ratified their Land Code, with 76 percent percent of voters voting in favour of the ratification. The community also saw a sizable uptake of remote voting. Of the 251 ballots cast, 151 ballots (75 Internet and 76 mail-in) were cast remotely, with most of those ballots cast by off-reserve voters. In light of this, online voting proved to be an effective tool for those living off-reserve.

In addition to a sizable uptake amongst off-reserve voters, Wasauksing members also reported general feelings of satisfaction with online voting. 100 percent of online voters surveyed during the ratification vote indicated being satisfied with their online voting experiences. Survey data collected also indicated that a majority (63 percent) of paper voters would consider switching to online ballots in future elections of votes. Overall, survey data reveals that online voting is increasingly important for both on and off-reserve voters. The satisfaction with online voting was mirrored by community leaders and administrators. Those tasked with leading elections and votes in Wasauksing reported that the technology increased their capacity to engage their members throughout the duration of the Land Code process. The technology also helped to improve ballot tabulation and transparency during and following the conclusion of the vote.

Overall, Wasauksing First Nation's deployment of online voting during the land code vote was a success. The technology positively contributed to the engagement and participation of off-reserve members while also providing demonstrable benefits for electoral administration.

Key Takeaways

- Online voting has found widespread support from both electors and public officials in all of these cases.
- Online voting should be offered as a supplement rather than a replacement for existing voting methods (i.e., paper and mail-in ballots).
- Online voting is appealing for all electors, but uptake tends to be greater among voters living outside of communities (i.e., out of country/off-reserve voters).
- Online voting tends to be well received in areas with sizable populations living off community lands or where other remote voting methods are well-established (i.e., voting by mail).
- Building awareness and offering training on the use of online voting prior to voting day is key to driving uptake.
- Discussions of online voting in open forums such as community meetings and newsletters can help build trust and comfort with the technology.
- In instances where quorums are required, online voting can help administrators to monitor and update votes in real-time to support outreach and engagement.

Survey Results

Having shown that internet voting has been largely met with success and support in other settings, it is helpful to consider how beneficiaries of Nunatsiavut think about the possibility of adopting online voting. As part of our research, we launched a survey of Nunatsiavut electors to gauge their opinions on voting alternatives. The survey was hosted using the Qualtrics interface and was posted on the Nunatsiavut website and shared on government Facebook pages. A total of 56 respondents opted into the survey. Even with this limited number of respondents, however, the data provide some important insight into the attitudes towards voting options. We note that the full dataset will be made available to the Nunatsiavut Assembly.

Overall, three themes emerged from the survey responses. First, support for the current vote by mail system is modest. Second, there is widespread support for online voting, and only slightly less support for the introduction of telephone voting. The final finding is that the two primary reasons for support for these new systems are convenience, and concerns that votes cast by mail might not be counted.

Most survey respondents are members of the Canadian Constituency. Among these electors (N = 44), rates of satisfaction with the current vote by mail system are underwhelming. Only 50 percent of respondents report being satisfied. When those who said they were unsatisfied were asked why this is the case, responses were generally related to concerns about Canada Post's

ability to ensure that ballots are received in Labrador in time to count in the election. Sample responses include:

> "Sometimes the mail is delayed"
> "Sometimes Canada Post gets delayed and that results in mail-in ballots arriving late thus rendering my vote void"
> "Because I am never sure if my ballot gets back to Labrador in time to count"
> "Always worried about receiving it in time. Always worried that it will not arrive back in time due to weather delays"
> "There's no guarantee of the mail ballot being received."
> "I worry about if my ballot is going to be counted, if its going to get back to Labrador in time"

With support for mail voting at such modest levels, it is unsurprising that most survey respondents were in favour of other methods. We asked respondents in the Canadian Constituency if they were in favour of introducing internet voting (with the stipulation that existing voting options remain in place). 81 percent were supportive of the idea, 14 percent were opposed, and 5 percent were unsure. Support for telephone voting was slightly lower, at about 67 percent (with 24 percent opposed at 10 percent who did not know). Overall, therefore, respondents are highly supportive of the introduction of these electronic voting methods.

So what then lies behind these attitudes? Among those who are supportive of internet voting, we asked them why they held this position. Most answers were related to themes of convenience and ensuring that votes are received. Sample answers related to convenience include:

> "So easy, don't have to go out to vote, vote in the comfort of your home"
> "It is more convenient and reliable"
> "Ease of voting. I'm more likely to vote"
> "It's more convenient"

Other responses mentioned concerns that votes might not be counted if sent by mail:

> "It would be faster and easier to tell if it was received"
> "Because it would help make sure people's votes are counted"
> "It would ensure that everyone in the rest of Canada can ensure their vote is received on time"

On the whole, the survey data suggest that respondents in Nunatsiavut, and in the Canadian Constituency more specifically, are open to the introduction of electronic voting methods. There are considerable concerns with the current mail voting system, largely based upon concerns that votes may not be received or counted due to logistical considerations. At the same time, there is support for both internet and telephone voting, based upon the belief that new methods would make voting more convenient, and that it would ensure that votes are properly counted.

Though there was some self-selection in the survey, and a limited number of participants, we see very little resistance to the introduction of online and telephone voting.

Electronic Voting Approaches & Vendors

This section reviews the types of systems on the market that are most relevant for application in the Canadian Constituency. It also comments on specific approaches to deployment that may be helpful. While governments can use the same electronic voting system, approaches to deployment can vary, producing different outcomes and experiences for voters and administrators.

Approaches to Electronic Voting for the Canadian Constituency

While each vendor has its own system and technology there are generally a few characteristics by which systems can be distinguished.

Steps in the system. Generally, there are two approaches with regards to the steps it takes to vote online or by telephone practiced in Canada. One approach enables voting immediately so long as a voter has the predetermined credentials to authenticate their identity and cast a ballot. This approach is commonly referred to as a "1-step" approach because if voters have their credentials, they can cast a ballot without additional work.

A second approach is referred to as a "2-step" model. In this design, voters are required to register to vote online and by phone. Registration is usually carried out over email, requiring voters to have access to a valid email address. Without completion of this step, voters are unable to access their ballots. This extra layer adds effort on the part of the voter and as such has been shown to negatively affect uptake. In the case of Ontario municipalities, for example, one study showed that when no registration requirement was required 35 percent more people voted by internet (Goodman and Stokes, 2020). On the other hand, some believe that the additional step provides a layer of security since it makes ballots more challenging to compromise given that someone would need to have access to the email account and voter's credentials to fraudulently cast their ballot.

In Indigenous elections and votes in Canada both 1-step and 2-step approaches have been used. In many cases the choice in approach has been driven by what the selected vendor offers. Some vendors have a 2-step model built in as part of their system design. Such an approach can be useful for building an email list of beneficiaries but does add an additional opportunity cost to the process. Some communities have decided that, because they did not have a detailed voters' list, the 1-step model was simpler and worked better for both voters and administrators. On the other hand, other communities have decided the opposite and have used the 2-step process as an opportunity to build an email list. The context of each community is

different, and the Nunatsiavut Government will need to take the unique circumstances of the Canadian Constituency into consideration when making this decision.[6]

Authentication (i.e., required credentials).

The principle of authentication is the act or process of identifying a voter's identity and that they are in fact a legitimate, eligible voter. Authenticating a voter's original identity ensures they can access the voting system and cast a ballot (Abu-Shanab et al., 2013). Depending on the type of electronic voting system, the process of authentication may be either manual or digital. In the case of electronic tabulators, for example, voters are authenticated manually at the polls and mark their ballot by hand before either placing it in the tabulator themselves or having an official do so for them. With online, telephone and some voting machines authentication is electronic (IDEA, 2011).

While manual authentication typically involves checking traditional identity documents, when authentication is carried out remotely other credentials that can be provided and verified electronically are relied on (Elections BC, 2014). In Canada, authentication for online and telephone voting systems has involved voter's providing credentials that either verify their identity or their eligibility to vote. In online voting these credentials are typed in and with telephone voting they are keyed in using an interactive voice response (IVR) system (Halderman and Teague, 2015). In most municipal elections, commonly relied upon credentials include date of birth (DOB) and a unique alphanumeric PIN code located on the Voter Card, which is circulated to home addresses by mail. Some municipalities also require email as part of the registration process outlined above, which provides another layer of authentication.

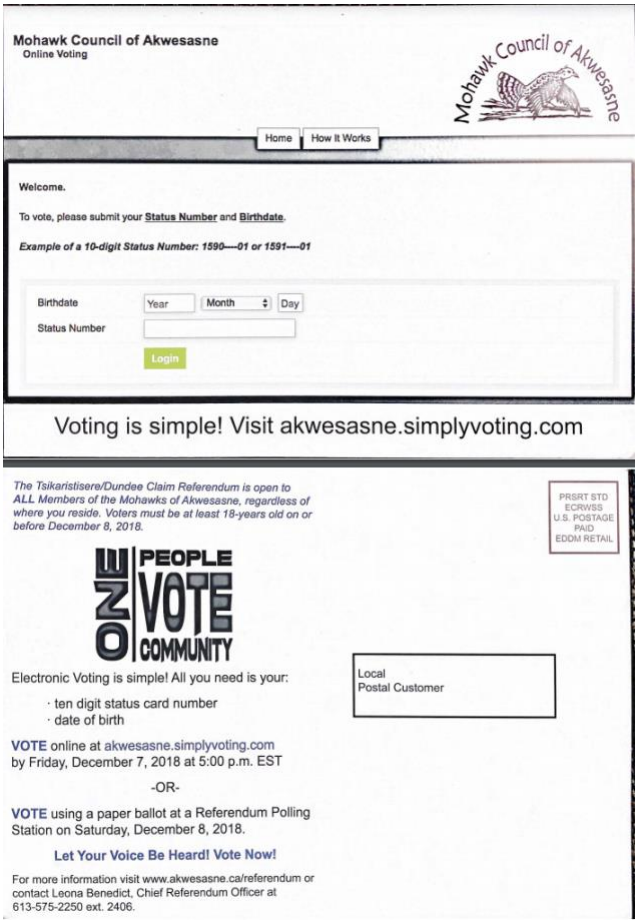
In First Nations a variety of approaches have been used. Some communities have opted to require email as an additional step to pre-authenticate voters before giving them access to the secure link by which ballots are cast. Some have used DOB and a unique PIN only, while others have relied upon a ten-digit status card number in combination with other credentials. Use of the status card number is a preferred credential from a security standpoint because it is something that identifies a voter, which not many people know and that the voter is unlikely to share. Date of birth, by contrast, is something that other people are more likely to know, especially friends and family. It is also a piece of information that people may share on public forums such as a Facebook profile. If someone were to gain access to a voter's mail (to retrieve their Voter Card and PIN) and knew their birthdate from a public social media profile, they could potentially fraudulently cast their ballot.

In the case of the Nunatsiavut Assembly, use of beneficiary number is an ideal credential given that it is more private than other options such as date of birth. As outlined in the recommendations, below, beneficiary number should be paired with an additional credential.

[6] We outline this direction further in the Recommendations, below. The information in this paragraph comes from experience through seven years of working with Indigenous communities to deploy online voting and the interviews with vendors carried out for this report.

Figure 1 includes an example of a Voter Card from a Mohawk Council of Akwesasne referendum where status card number and date of birth were required to authenticate voters.

Figure 1. Mohawk Council of Akwesasne Online Voter Card



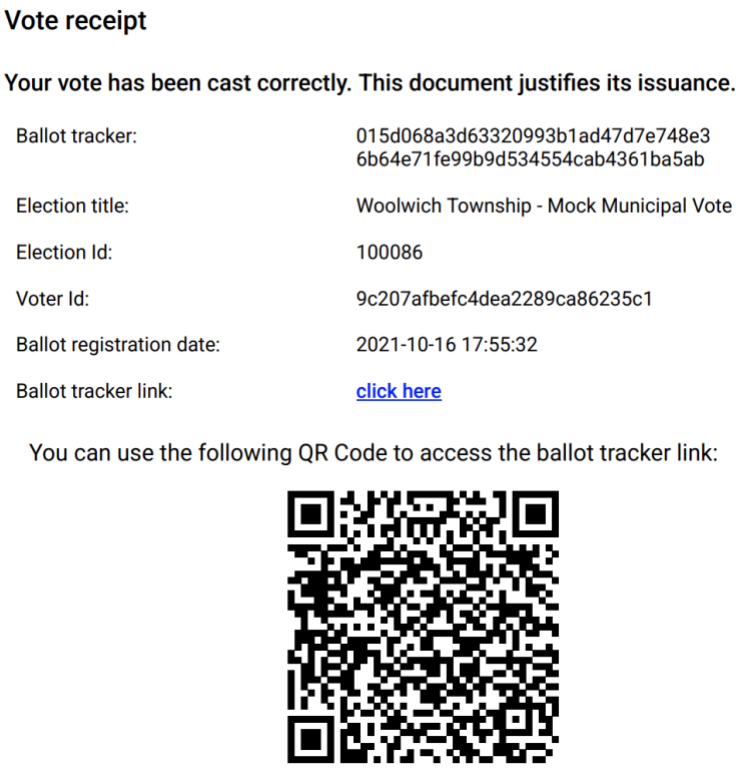
Verification. Verification is important for auditing and confirming that votes have been received and counted as meant. This element is an essential component in confirming the accuracy of election outcomes. In electronic voting systems verification refers to the ability for voters to verify that their ballot was cast and counted correctly. These two principles can occur in three phases whereby voters can confirm that their ballots were cast as intended, recorded as cast, and tallied as recorded (Goodman, 2017).

Cast as intended refers to the ability of a voter to confirm that their encrypted ballot reflects their voting intentions often by way of a code or vote receipt. Next, voters can confirm that encrypted votes are *Recorded as cast* by viewing their encrypted code on a public list which accounts for the ballots that have been cast. Finally, *Tallied as recorded* refers to the ability of anyone to check that all recorded votes are published in the tally. This list is encrypted so that people are unable to know how one another voted (Benaloh, 2014).

In Canada voting systems currently offered by private sector vendors offer a range of verification abilities. At one end, some systems provide voters with no verification options. In these cases, when voters cast a ballot, they are prompted with a 'thank you' page that thanks them for voting and informs them that their ballot has been successfully cast. Beyond that, however, voters have no way of knowing whether their ballot was cast and counted as intended. This has been the predominant model that has been used in Canada to date at the community level (in Indigenous communities and municipalities).

Approaches are now evolving that enable *individual verifiability*. This term refers to the principle of being able to ensure that one's vote is *cast as intended.* Voters are provided with a unique alphanumeric code which allows them to confirm that their vote cast accurately captures their voting intentions. In some cases, voters can print a paper receipt with this information to keep and refer to. Figure 2 provides an example of a printable pdf vote receipt from a mock election organized with Woolwich Township in Ontario where voters could track their encrypted ballot.

Figure 2. Printable Vote Receipt with Verification Code



Vote receipt

Your vote has been cast correctly. This document justifies its issuance.

Ballot tracker:	015d068a3d63320993b1ad47d7e748e3 6b64e71fe99b9d534554cab4361ba5ab
Election title:	Woolwich Township - Mock Municipal Vote
Election Id:	100086
Voter Id:	9c207afbefc4dea2289ca86235c1
Ballot registration date:	2021-10-16 17:55:32
Ballot tracker link:	click here

You can use the following QR Code to access the ballot tracker link:

Finally, cybersecurity experts note that the gold standard of verifying election outcomes when deploying electronic voting is the ability to have *universal verifiability*. This principle encompasses all the elements of verification articulated above. It means voters can ensure their ballots reflect their voting intentions (cast as intended), confirm that the tally reflects the votes cast (recorded as cast), and check that the votes are included in the tally without knowledge of the vote content (tallied as recoded) (Benaloh, 2014; Goodman, 2017). These latter two verifications are open to the public and not limited to any one voter (Castello, 2016). Ensuring

that votes are tallied as recorded is achieved by way of mathematical calculations that can ensure the ballots were counted correctly without giving away information about individual voters. Some companies offer end-to-end verifiable technology that allows for universal verifiability although it has yet to be used in a binding election in Canada, it has been trialed in other jurisdictions.

While specific system suggestions are outlined in the recommendations below, the Nunatsiavut Assembly should opt for an approach that is easy to use and understand and balances the principles of security and accessibility. As technology continues to evolve it will be possible to change or upgrade approaches in the future depending on the needs of beneficiaries in the Canadian Constituency.

Comparing Vendors Offering Services in Canada

To provide electronic voting in Canada Indigenous, municipal, and provincial and territorial governments have opted to contract services through private sector vendors. While there is the possibility to establish a government-led technology, such an endeavour would take considerable time and resources to develop. Government-led technologies have been successfully developed and deployed in countries like Estonia and in the canton of Geneva in Switzerland. While this is a possibility for a long-term approach, in the immediate term the best solution to provide electronic voting is for the Nunatsiavut Assembly to contract the services from a third-party provider.

To get a sense of the types of services and approaches currently on the market we reached out to the eight primary companies supporting elections in the electronic voting space. These include, in alphabetical order: Dominion, Intelivote, Neuvote, OneFeather, Scytl, Simply Voting, Smartmatic, and Voatz. We selected these companies based on our knowledge of their experience running elections in Canada or because of the technologies they offer.[7] Companies were contacted by email and asked to sign up for a short interview. They were informed about the nature of the report and the goals of the Nunatsiavut Assembly to improve voter access and participation among beneficiaries in the Canadian Constituency. Company officials were also provided with a list of questions to discuss in the interview (see Appendix). Six companies participated.[8] More information about these vendors can be found in Appendix 3.

Selecting the correct vendor is critical for the success of an electronic voting system. The process should be regarded as looking for a partner rather than merely a service provider. By hiring a vendor to support binding elections, governments are entrusting these companies with democracy in their community. While the characteristics and experience of a company are important, their openness and willingness to work with and learn from the Nunatsiavut Assembly should be a key consideration in choosing an election technology partner. Table 2 below compares their services and suggested approach for the Canadian Constituency.

[7] We also asked the eight companies if there were any other vendors that we should speak to.
[8] One company declined to take part and the other did not respond before the report was prepared.

Of the six companies interviewed, four have experience working with Indigenous communities to various extents. Some companies have run a few votes with Indigenous partners, while others have conducted 30 contests, and one has partnered with over 200 First Nations, Inuit and Métis communities. Those that do not have direct experience either have staff that have supported Indigenous votes in the past or are willing to take on the online portion of an election free of charge to earn the experience.

Regarding language, five companies can offer online and telephone ballots in any language and one is restricted to French and English. An example of a translated ballot is included in Figure 3. While translation of online ballots is an easy adjustment for most, telephone translation is typically done via professional voice recording. To offer dual languages by telephone requires support from a translator, ideally a community member who speaks the language. All companies could support the mail component of an election for voters in the Canadian Constituency for an additional cost.

We also asked providers which model they would recommend for voters in the Canadian Constituency and which authentication credentials they would suggest. It is important to note that all vendors could offer any combination of these credentials, but their advice may be valuable as the Special Committee considers the options. Some more advanced authentication tools such as facial recognition are presently in development at some companies and will be an option in the future.

While there was widespread enthusiasm for online voting, some vendors pointed to concerns with telephone voting since it can be challenging for some to enter in the correct information. There have also been issues with voters selecting the wrong key and activating the language they did not mean to choose which can hinder their ability to cast a ballot and instances where voters were unsure which key is the ‘pound key’ to advance forward. While these concerns are valid, and telephone voting is typically less well received than online ballots, it can be important in areas where internet coverage is poor. In the interim we recommend a blended approach of all three voting methods, as outlined in the recommendations, below, and then a review of telephone ballots to see if they add value to voters in the Canadian Constituency.

A final point that differentiates the companies is the ability to offer and support help desks, which are crucial supports for electronic voting implementation. Most companies offer help desk support or training for the customer. Overall, customer-led help desks have worked best in the past to support voters, especially when dual language ballots are offered.

Table 2: Electronic Voting Vendors in Canada

Company Name	Proposed Model	Recommended Credentials	Language Offerings	Indigenous Experience	Mail?
Simply Voting	Online voting	Beneficiary Number + DOB	Any language	Yes, 30+ First Nations	Yes
Neuvote	Online voting	Voter ID + Pin Code + DOB	Any language	None yet, offering pro bono to gain experience.	Yes
Intelivote	Online + Telephone voting	Beneficiary Number + Pin Code + DOB	French & English	Yes, 30+ First Nations	Yes
Voatz	Hybrid: online + mail-in voting	Beneficiary Number + Pin Code + DOB	Any language	Staff has worked with First Nations, but the company has not.	Yes
OneFeather	Hybrid: online + mail-in voting	Beneficiary Number + DOB + Secure Link	Any language	Indigenous owned and operated. Conducted 153 Indigenous votes last year.	Yes
Scytl	Online voting	Pin Code + DOB + Secure Link	Any language in Vote Pro & Vote Gov Packages	Supported Nipissing First Nation and have been in talks with others.	Yes

Figure 3: Vendor Example of alternate languages on a ballot for Qarjuit Youth Council

Recommendations

The report presents concrete and actionable policy recommendations for the Nunatsiavut Assembly regarding voting options for voters in the Canadian Constituency. These recommendations were crafted with careful attention to two core values: maximizing accessibility and promoting electoral integrity. Maximizing accessibility refers to reducing barriers to accessing, casting, receiving, and counting ballots by the deadline. This principle focuses on improving voter convenience, boosting the inclusion of community voice in votes, and increasing voter turnout. The latter value refers to ensuring the integrity of the vote not only by promoting voting equality through additional voting options but also through safety measures to promote voter privacy and security when voting technology is adopted.

Recommendations were informed by:

- Interviews with Nunatsiavut officials and staff. These discussions provided a great deal of insight into the particular challenges faced by the Canadian Constituency and what types of solutions would be appropriate.
- We also conducted interviews with technology vendors to ascertain the capabilities of providers and to develop an understanding of the state of electronic voting offerings in Canada that could apply to the Canadian Constituency. All these discussions supported the development of our recommendations.
- A survey of beneficiaries. To obtain feedback from beneficiaries, we launched an online survey. Survey responses were helpful in ascertaining the opinions of electors towards the prospect of using online voting in Nunatsiavut.
- Academic research. There is a vast and quickly growing academic literature on the benefits of drawbacks of electronic voting. Our report draws upon the work of researchers from around the world.
- Other experiences. We carried out a deep dive of jurisdictional experiences with electronic voting in Wasauksing First Nation, the municipality of Kawartha Lakes, and in the country of Switzerland to delineate lessons learned. Some of this analysis comes from original data collected by the authors. These experiences were selected based on important similarities to Nunatsiavut - either because some voters lived off of community lands or because mail voting was predominately used.

It is important to mention that although online voting has worked well in many First Nation, municipal, and other country contexts, that does not mean it will necessarily have the same result in Inuit elections. Election reforms work differently in jurisdictions depending on pre-existing institutions and history, community culture, technological capacity, digital literacy and other factors. While we advance the following recommendations, we do so with the understanding that only the Nunatsiavut Assembly and associated communities can make the best decision for beneficiaries and the future of votes for the Canadian Constituency.

Recommendations and steps forward:

Legislative recommendations

1. **Amend the Nunatsiavut Elections Act to allow for the use of electronic types of voting for Canadian Constituency voters in presidential elections, ordinary member elections, referendums, plebiscites and any other types of votes.**

   Amending the Nunatsiavut Elections Act would provide the legislative basis to use electronic ballots in different types of elections and votes. The specific language of this amendment should be broad enough to not limit future innovation, while being rigid enough to outline the types of methods the Assembly envisions being the best option for beneficiaries of the Canadian Constituency. 'Alternative voting methods' or 'electronic voting methods' are popular references that encompass a range of voting options. We would suggest including the specific subtypes the committee decides to proceed with or would seriously consider using in the future (e.g., online voting, telephone voting).

2. **Amend relevant legislation to allow for a longer mail ballot return period.**

   Currently the election period - to send out, receive and count ballots - is 5 weeks in total. Sometimes, ballots arrive after the stated deadline and can no longer be counted towards the total. In some cases, ballots have been returned a full election later. To allow more time for postal delivery and return the period in which mail-in ballots are sent out and can be received should be increased to 7 or 8 weeks. For voters in the Canadian Constituency this would involve amending the Nunatsiavut Elections Act.

Voting recommendations

3. **Expand voting methods for voters in the Canadian Constituency to allow for the use of online and telephone voting.**

   To maximize accessibility for voters in the Canadian Constituency we recommend expanding the mail-in ballot program to allow for remote online and telephone voting. Online voting will allow faster access for voters and has been shown in studies to support accessibility, convenience, and voter turnout. However, online voting requires that voters have good access to the internet. Moderate levels of digital literacy (the skills and confidence to use the internet) are also helpful for uptake. Given that connectivity may not be available or optimized for all voters in the Canadian Constituency and taking into account the challenges of internet connectivity in rural and remote areas, telephone voting could be offered as a complementary voting method to ensure that all, or at the very least, most Canadian Constituency voters can cast a ballot electronically (by internet or phone) if they choose to.

While it is important to acknowledge that telephone voting usually has low uptake and can have more user experience issues than online voting, it is the best option available to promote accessibility for all voters in the Canadian Constituency. After the first one or two votes in which these new methods are offered, we suggest looking at uptake and consulting voters in the Canadian Constituency for feedback about their user experience. It may be that voters will be pleased with, and feel sufficiently enabled to vote from, the combination of online and mail voting.

In terms of specifics, a web-based online voting platform would be ideal over an application-based model since there is less for voters to download. The Assembly should consider using beneficiary numbers as a means of authenticating voters in addition to another credential (e.g., uniquely generated PIN, date of birth). As noted, the beneficiary number is a piece of personal information that voters are unlikely to share with others since it personally identifies them and is therefore a superior identifier to date of birth, which may be more widely known or accessed by others.

Regarding steps, the Assembly could opt for a one-step approach to online and telephone voting that would allow voters to cast a ballot with the required credentials. This could be, for example, their beneficiary number and the unique PIN located on the Voter Card in their Voter Package. An alternative is a two-step process that requires voters to register first using an email address after which voters are directed to cast their online ballot. This latter approach offers an additional layer of authentication, but it requires voters to have a valid email address which may be a barrier for some. Studies of online voting have shown that there is lower uptake of online voting when a two-step process is used (Goodman and Stokes, 2020). While we often recommend the one-step process in this context for ease, there is the option with the two-step process to build an email list and work with an Indigenous owned service provider. The potential to build a centralized email list that could be used to reach voters might override the downside of the email requirement. Both approaches will enable accessibility more than the current mail voting system. Our recommendation is that the Assembly weigh the value of an email list against the trade-off in accessibility.

4. **Maintain the use of mail voting.**

While online and telephone voting may attract many Canadian Constituency voters, some may be hesitant to use the technology at first. In other countries, uptake of electronic voting methods has grown with successive elections as voters became more comfortable with, and accustomed to the use of, technology in elections. For situations of personal choice (when a voter prefers to vote by mail), in cases where a voter may not have access to the internet or reliable phone service (e.g., working on a mine), or in instances where a prospective voter may not feel sufficiently digitally literate at voting time to cast an electronic ballot, it is important to maintain mail-in ballots as a voting option. The availability of all three methods in complement with one another will ensure maximum accessibility for voters in the Canadian Constituency. Longer term, the

Assembly could consult with voters in the Canadian Constituency to obtain feedback regarding which combination of voting methods best enables their access to ballots and serves their needs.

Administrative recommendations

5. **Create and regularly update an email contact list, specifically for the purpose of elections.**

   The establishment of an email list would greatly aid in communication with beneficiaries. Members should be encouraged to register, reminding them that their voting rights may rely upon having an up-to-date email address on file. Efforts should be made to make it as easy as possible for beneficiaries to register an email address with Nunatsiavut and to update address or other voting information (see Recommendation 6 and 7, below for some ways of facilitating this). An email list could be built through a variety of ways. One option would be to link the building of the list to the implementation of online and telephone voting. This would ensure that those who wanted to use those voting methods provided new or updated email information, but it would not capture those that chose to vote by mail. Additional steps would need to be taken to gather emails for those electors, if they had them.

6. **Create a web application that allows beneficiaries to update their contact information online.**

   Presently, a beneficiary must contact the Registrar of Beneficiaries office at Nunatsiavut Affairs to change their contact information or add a new address. We recommend creating a web application that allows beneficiaries to update and add information online. This would support the continued creation and maintenance of an email list as well as keeping other contact information up to date. For those who do not have online access or who are not comfortable updating information online, it would be important to keep the option to phone the Registrar of Beneficiaries office.

7. **Suggest that members encourage friends and family to update voter contact information.**

   Officials should engage in an education and outreach campaign to encourage eligible voters to update their voter contact information (i.e., address, phone number, email address if applicable), and to inform voters of any changes enacted after reviewing and discussing this report. Voters should be informed about changes in, or the addition of, voting methods, the implementation of new ways through which to update voter information, and requests to provide their email address. Encouraging voters to spread the word to family and friends should have a mobilizing effect - attracting those that are more engaged and then ideally spreading the message to contacts who may be less inclined to follow up regarding changed information or cast a ballot during election time.

The greater the amount of updated voter information, the easier it will be to reach eligible voters, which will hopefully have a positive effect on voter engagement.

8. **Undertake efforts to boost digital literacy and capacity in the community and at the Nunatsiavut Election Office.**

   Interviews with Nunatsiavut officials communicated the importance of promoting online literacy. While this is more challenging to facilitate for beneficiaries living in the Canadian Constituency, one option is to create short videos about technology use, including those that would focus on how to vote online and by phone. Educational videos could be posted on the Assembly website and shared via the Assembly and candidates' Facebook pages. Using Facebook as a medium to communicate information is important given its popularity among beneficiaries. Another option is to host a live webinar or workshop perhaps on Facebook where beneficiaries could ask questions in real time. The recording could be posted on appropriate channels to refer back to.

   A second complementary option to video content is to include information about voting and digital literacy in the voter information packages, which could also direct voters in the Canadian Constituency to the videos.

   Down the road, if the Nunatsiavut Assembly decides to extend online and/or telephone ballots to voters in the other constituencies, suggested activities to boost digital literacy could include workshops or digital skills training, mock votes, or opportunities to trial the technology as part of a demo.

   Finally, presently the office of the Nunatsiavut Elections Officer (NEO) is equipped with two computers and a fax machine. While many electronic voting services are now provided and stored on the cloud, requiring only one computer to run an electoral event, some additional resources may be helpful such as having additional technical expertise on staff to review vendor reports during and after a vote, additional support for a telephone help line, and laptops and devices to test voting and troubleshoot. While these additions may be helpful, they are not required.

9. **Equip the Nunatsiavut Election Office with adequate training on the electronic voting system, including common problems and solutions.**

   Once a new system is implemented, the Election Officer and her staff must be able to aid constituents in need. Necessary training should be carried out with current employees and any new staff hired to provide election support. All staff should be trained on how the technology works, how to use it, and how to support someone to use it. Depending on the model chosen and whether Nunatsiavut wanted the election to be more hands on other necessary education could include training regarding the set-up of the service, how to monitor the service, how to close off the service, understanding what

to do if a ballot or election is challenged, and how to conduct a recount. All private sector providers that we spoke with offer training support for clients.

Another key element we recommend is ensuring a robust voters' assistance centre is set-up to support voters who encounter challenges when casting an electronic ballot. Challenges could range from accessing the system, to having difficulty with one of their authentication credentials, or having pressed the wrong telephone key. We recommend facilitating most of the voter assistance in-house, if possible, with additional support from the chosen vendor if needed. All vendors we spoke with would provide training to facilitate voter assistance, few of them, however, offer a full external voter assistance service to clients. It was mentioned that voters typically feel more comfortable interacting with community members. Another consideration is offering support services in Inuktitut. Offering voter assistance services in both English and Inuktitut is best facilitated by community members who speak the language. Community members may also be more able to identify and support any cultural barriers that arise when voting online or by phone.

10. Establish the technical and functional requirements expected from a voting system before selecting a vendor.

Each government that adopts electronic voting will be looking for different technical and functional considerations and determining these should be a discussion that takes place prior to issuing an RFP to select a vendor. An example of a technical consideration is ensuring the selected technology is compliant with any accessibility guidelines so that the voting system is accessible to as many voters as possible. Likewise, a requested functional requirement could be ensuring that each voter has the ability to decline their ballot. This latter consideration is constitutionally required in some jurisdictions such as France. Deciding on these requirements up front will better communicate the unique needs of the Nunatsiavut Assembly and ensure both administrators and voters are better served through the process.

11. Consult with cybersecurity experts prior to drafting the RFP.

The language in the RFP is important for several reasons. It is how the government will attract the right vendor to form a partnership with, it will communicate all desired requirements and establish the parameters of the services to be provided, and it will work to protect Nunatsiavut Assembly data (see Recommendation #12, below). The development of proper language and inclusions are necessary to minimize risk exposure. The technical requirements included in the RFP should be given great thought and these are best advised upon by an expert in the area of cybersecurity. Many jurisdictions (i.e., Switzerland, City of Toronto, City of Markham etc.) have collaborated with academics to curate this foundational language. Ideally once the initial RFP is developed, similar versions and language could be used in future RFPs and contracts with minimal updates, notwithstanding any changes in the Nunatsiavut Assembly's

needs or in the technology available. Finally, it is recommended that the process of engaging an expert be a delicate balance of incorporating good practices in technical security and privacy while being mindful that voter access is a top priority. Any official the Assembly works with needs to understand the unique considerations of the Canadian Constituency and the necessity of access for those voters as a primary principle.

12. Ensure community ownership of election data.

Vendors support governments with elections but should not have more than one-time use access to data per electoral event (depending on contract length and frequency of elections). A best practice for electronic voting adoption among other Indigenous communities has been to ensure ownership of all data generated through the election belongs to and is retained by the community. Appropriate language should be included in any third-party contracts that data sovereignty for all elections rests with the Nunatsiavut Assembly.

13. Ensure stakeholders are a part of the process.

Successful implementation of any reform or policy change requires buy-in from stakeholders. Candidates are an important stakeholder in the election process not only because they are seeking office but also because they can often serve as a key source of voter information. We recommend including candidates from the Canadian Constituency as early as possible in the electronic voting process. This includes holding a meeting to inform them of any changes to ballots and the voting process, allowing them to see a demo of the technology and try it out before the election, and providing them with all necessary voting information to pass on to constituents.

Likewise, it is also a good practice to include any local media in the process early and often. Bringing the media in by inviting them to a technology demo, for example, and encouraging them to ask questions can either counter or mitigate any potential concerns they may raise. Partnering with the media to write short articles to better inform electors can be useful for public education. A series of articles in advance of the election could help explain items such as: the rationale for the reform, how electronic voting will work, and to address commonly asked questions that electors may have.

Future recommendation

14. Consider adopting electronic voting for all constituencies.

Though the need for electronic voting may be greatest in the Canadian Constituency, electors in all constituencies should be afforded the same opportunities to participate using electronic voting. This will make elections as accessible as possible to all electors,

and lead to voting equality across constituencies. The marginal cost to expand voting to the other constituencies should be minimal. After learning from the experience of voters in the Canadian Constituency with electronic voting it is recommended that the Assembly consider expanding the option of electronic voting to voters across its constituencies.

Conclusion and Next Steps

In conclusion, online and telephone voting offer a solution to improve accessibility for voters in the Canadian Constituency when offered in combination with the existing mail-voting approach.

In the interim the Special Committee on Voting Alternatives will need to deliberate regarding the recommendations advanced in this report and decide which items the Assembly will focus on in the interim. While working toward all recommendations may not be possible at this time, the Assembly should prioritize those that are most needed in their view along with those that are most easily achieved. Discussions are also needed regarding which elements an electronic voting system will have. These considerations should be communicated in the RFP

A second step is to begin drafting an RFP ideally with the support of a cybersecurity expert that will form the basis of finding a solution provider to partner with.

Finally, once an initial vote has been run using electronic voting methods, the Assembly and its staff will want to review how the vote went and potentially hear from members of the Canadian Constituency. Gathering this information will support refining the approach used for future elections. At some point after a first or second trial, the Assembly could deliberate on whether to expand voting options to other constituencies.

References

Abu-Shanab, E., Khasawneh, R., & Alsmadi, I. (2015). Authentication Mechanisms for E-Voting. In *Public Affairs and Administration: Concepts, Methodologies, Tools, and Applications* (pp. 766-781). IGI Global.

Ahmad, M., Rehman, A., Ayub, N., Alshehri, M., Khan, M., Hameed, A., & Yetgin, H. (2020). Security, Usability, and Biometric Authentication Scheme for Electronic Voting Using Multiple Keys. *International Journal of Distributed Sensor Networks, 16* (7), 155014772094402.

Alvarez, R. M., Hall, T. E., & Trechsel, A. H. (2009). Online Voting in Comparative Perspective: the Case of Estonia. *PS: Political Science & Politics 42* (3), 497-505.

Ansolabehere, S., & Stewart III, C. (2005). Residual votes attributable to technology. *The Journal of Politics*, *67*(2), 365-389.

Bargh, M., & Rata, A. (2020). Voting in Māori governance entities. *The International Indigenous Policy Journal*, *11*(3), 1-19.

Benaloh, J., Rivest, R., Ryan, P. Y. A., Stark, P., Teague, V., & Vora, P. (2014). End-To-End Verifiability. Pamphlet prepared for the *Overseas Vote Foundations End-to-End Verifiable Online voting: Specification and Feasibility Assessment Study (E2E VIV Project)*.

Budd., B., Gabel, C., & Goodman, N.J. (2019). Online Voting in a First Nation in Canada: Implications for Participation and Governance. In *International Joint Conference on Electronic Voting*. Springer, Cham, 50-66.

Cardillo, A., Akinyokun, N., & Essex, A. (2019, October). Online Voting in Ontario Municipal Elections: A Conflict of Legal Principles and Technology? In *International Joint Conference on Electronic Voting* (pp. 67-82). Springer, Cham.

Castelló, S. G. (2016). *Individual verifiability in electronic voting* (Doctoral dissertation, Universitat Politècnica de Catalunya (UPC)).

Chevallier, M. (2010, November). *The Geneva Online Voting System*. Geneva: Geneva State Chancellery.

Elections BC. (2014). Independent Panel on Online Voting: Recommendations. *Report to the Legislative Assembly of British Columbia*, Victoria.

ERRE. (2016). Strengthening Democracy in Canada: Principles, Process and Public Engagement for Electoral Reform. Ottawa: Parliament of Canada. https://www.ourcommons.ca/DocumentViewer/en/42-1/erre/report-3/page-ToC

Essex, A. (2016). Online voting in Canada: A Cyber Security Perspective. *Online Voting Roundtable, Centre for e-Democracy.* Ottawa.

Gabel, C., Bird, Goodman, N., & Budd, B. (2016a). The Impact of Digital Technology on First Nations Participation and Governance. *The Canadian Journal of Native Studies 36* (2), 107-127.

Gabel, C., Goodman, N., Bird, K., & Budd, B. (2016b). What Does Online Voting Mean for First Nations? A Case Study of Whitefish River First Nation. *The International Indigenous Policy Journal 7* (3), 3.

Gabel, C., and Goodman, N. (2021). Indigenous Experiences with Online Voting. McMaster University and Brock University. http://www.digitalimpactfn.com/wp-content/uploads/2021/05/FN_DIGITAL_REPORT_DIGITAL_FNL6.pdf

Garner, P., & Spolaore, E. (2005). Why chads? Determinants of voting equipment use in the United States. *Public Choice*, *123*(3), 363-392.

Gerlach, J., & Gasser, U. (2009). *Three Case Studies from Switzerland: E-Voting*. Berkman Center Research Publication No, 3.

Germann, M. & Serdült, U. (2017). Online Voting and Turnout: Evidence from Switzerland. *Electoral Studies 47*, 1-12.

Goldsmith, B., & Ruthrauff, H. (2008). Case Study Report on Electronic Voting in the Netherlands. *National Democratic Institute, IFES. USAID*, *259*.

Goodman, N. J. (2017*). Online Voting: A Path Forward for Federal Elections.* A report for the Privy Council Office, Ottawa. https://www.canada.ca/en/democratic-institutions/services/reports/online-voting-path-forward-federal-elections.html.

Goodman, N. J., McGregor, M., Couture, J., & Breux, S. (2018). Another Digital Divide? Evidence That Elimination of Paper Voting Could Lead to Digital Disenfranchisement. *Policy and Internet, 10* (2), 164-184.

Goodman, N. J., & Pyman, H. (2016). *Online voting Project Report: Results From the 2014 Ontario Municipal Elections.* Toronto, ON: Centre for e-Democracy.

Goodman, N. J., Pammett, J. H., & DeBardeleben, J. (2010). *A Comparative Assessment of Electronic Voting.* Ottawa, ON: Elections Canada.

Goodman, N. J. & Smith, R. (2017). “Electronic Voting in Canadian and Australian Sub-National Elections.” R. Krimmer, M. Volkamer, J.Barrat et.al. (Ed.): *Proceedings of the First International Joint Conference on Electronic Voting 2016 (E-Vote-ID 2016)*, LNCS, Springer, Berlin, 164-177.

Goodman, N. J., & Stokes, L.C. (2020). Reducing the Cost of Voting: An Empirical Examination of Online Voting’s Effect on Turnout. *British Journal of Political Science 50* (3), 1155-1167.

Gritzalis, D. A. (2002). Principles and Requirements for a Secure E-voting System. *Computers & Security 21* (6), 539-556.

Gronke, P., Galanes-Rosenbaum, E., Miller, P. A., & Toffey, D. (2008). Convenience voting. *Annu. Rev. Polit. Sci.*, *11*, 437-455.

Halderman, J. A., & Teague, V. (2015, September). The new south wales ivote system: Security failures and verification flaws in a live online election. In *International conference on e-voting and identity* (pp. 35-53). Springer, Cham.

IDEA. (2011). *Introducing Electronic Voting, Essential Considerations: Policy paper, The International Institute for Democracy and Electoral Assistance*.

Mendez, F. (2010). Elections and the Internet: on the difficulties of 'Upgrading' elections in the digital era. *Representation 46* (4), 459-469.

Nasser, Y., Okoye, C., Clark., J. & Ryan., P. Y. A. (2016). *Blockchains and Voting: Somewhere Between Hype and a Panacea*. Available at: http://users.encs.concordia.ca/~clark/papers/draft_voting.pdf.

Nunatsiavut Assembly. (2018). *Nunatsiavut Elections Act*. Hopedale, NL. Retrieved from https://www.nunatsiavut.com/wp-content/uploads/2019/03/CIL-N-4-21-09-2018-Nunatsiavut-Elections-Act.pdf.

Nunatsiavut Assembly. (2005). *The Labrador Inuit Constitution*. Hopedale, NL. Retrieved from https://www.nunatsiavut.com/wp-content/uploads/2014/03/IL-2005-02-Nunatsiavut-Constitution-Act_.pdf.

Pammett, J. H., & Goodman, N. J. (2013). *Consultation and Evaluation Practices in the Implementation of Online voting in Canada and Europe.* Available at: https://www.elections.ca/content.aspx?section=res&dir=rec/tech/consult&document=index&lang=e.

Sciarini, P., F. Cappelletti, A. Goldberg, A. Nai & A. Tawfik. (2013). *Étude du Vote par Internet dans le Canton de Genève: Rapport Final.* Geneva: University of Geneva.

Schwartz, B. P., & Grice, D. (2012). Establishing a legal framework for e-voting in Canada. *Man. LJ*, *36*, 301.

Shocket, P. A., Heighberger, N. R., & Brown, C. (1992). The effect of voting technology on voting behavior in a simulated multi-candidate city council election: a political experiment of ballot transparency. *Western Political Quarterly*, *45*(2), 521-537.

Serdült, U., Germann, M., Harris, M., Mendez, F., & Portenier, A. (2015). Who Are the Internet Voters? *Innovation and the Public Sector, 27,* 27-41.

Serdült, U. (2016). The Swiss Experience with Internet Voting. Technology & Elections Policy Brief Series. Toronto: Centre for e-Democracy.

Solvak, M & Vassil, K. (2018). Could Online voting Half Declining Electoral Turnout? *Policy and Internet, 10* (1), 4-21.

Special Committee on Voting Alternatives for the Canadian Constituency. (2021). *Request for Proposals: Research Assistance – Electronic Voting Alternatives*. Hopedale, NL. Retrieved from https://www.nunatsiavut.com/wp-content/uploads/2021/06/RFP-Electronic-Voting-Consultant-Final.pdf.

Thompson, J. R. (2018). Email Voting in Indiana Elections. *E-Vote-ID 2018*, 98.

Trechsel, A. H. & Vassil, K. (2010). *Online voting in Estonia: A Comparative Analysis of Five Elections since 2005*. Strasbourg, France.

Appendices

Appendix 1: Lines of Inquiry

1. Based on your knowledge of, or work with, the Canadian Constituency, what is your sense of attitudes among voters toward electronic types of voting (online and telephone)? (for example: receptiveness, hesitation etc.)

2. To what extent do you think voters are satisfied with the current ways to vote?

3. How would you characterize overall political participation and engagement amongst members of the Canadian Constituency compared to other constituencies?

4. What does a typical election look like in terms of voting, procedures and organization? Do you have advance voting, how long is it?

5. What qualities would a remote voting system (online, telephone, paper) to best serve voters? What about administrators?

6. What factors or issues have motivated the Assembly to consider online voting and other types of remote voting?

7. What are some of the primary benefits of the Assembly adopting online voting?
    - What about telephone voting? Mail voting?

8. What challenges or barriers does the Assembly face in adopting online voting?
    - What about telephone voting? Mail voting?

9. In your view, how important is voter privacy and security?

10. Are there any groups in addition to the Canadian Constituency that should be targeted in considering online voting (for example: youth, elders, members of another Constituency)? What about telephone voting?

11. If online voting were adopted by the Assembly, would you support seeing it adopted for all members and constituencies?

12. What types of programs, infrastructure, or services (digital skills training or workshops) would be needed for online voting to be successful?
    - What about telephone voting?

13. How would you characterize the role that the internet and social media play in the community?

14. In your view, are electronic types of voting (online and telephone voting) compatible with traditional Inuit decision-making processes and cultural values?

Appendix 2: Vendor Lines of Inquiry

1. Do you have experience with Inuit or Indigenous elections? If so, please give some examples.

2. What voting methods and approach would you recommend for voters in the Canadian Constituency and why?

    a. Can you offer online, phone, and mail-in ballots?

    b. Do you have the ability to offer online and/or telephone ballots in Inuit languages if translation is provided?

3. What would the estimated cost of an election be for voters in the Canadian Constituency? Note: there are 2,128 voters in the Canadian Constituency.

4. What verification options do you offer and/or suggest for online and/or telephone voting for voters in the Canadian Constituency?

5. How do you propose achieving a balance between security and accessibility for the Nunatsiavut Assembly?

Appendix 3: Vendor Information Summaries

SimplyVoting Inc. is a full-service provider of secure, hosted online elections headquartered in Montreal, Canada.

Simply Voting has served over 4000 organizations across the customer spectrum, from municipalities to universities to unions to associations to first nations -- all these customers rely on Simply Voting for safely executing their elections. Our voting system is constantly evolving with technology and security innovations, and many reputable third parties have audited our voting system, technical infrastructure, and corporate infrastructure. These audits confirm that Simply Voting possesses the integrity and security which we promise.

Our company's success is powered by technology but driven by people. We take pride in the fact that our customers rave about our voting system and the excellent support that we provide in helping them achieve their democratic goals.
Neuvote

Intelivote Systems Inc. (ISI) a Canadian owned and operated company, is the recognized Canadian leader in the successful implementation of eVoting; electors casting their ballots using the Internet, wireless devices and mobile or landline telephones.

The Intelivote solution even provides a seamless integration of traditional in-person polling station voting and mail-in balloting, with an electronic voting solution which includes telephone and Internet voting. ISI's leadership position comes because of our extensive experience in conducting municipal, union, aboriginal, association, and political leadership elections in a secure and auditable fashion ensuring voter anonymity and ballot privacy.

Intelivote has delivered thousands of eVoting elections in Canada and in addition to our Canadian elections and events, we have gained international experience and credibility in the successful implementation of both Internet and telephone based voting applications used to deliver elections in the United States and the United Kingdom.

Voatz (pronounced "votes") is an award-winning online voting platform that provides election management solutions adapted to the needs of each election phase - Pre-Election, Election Day and Post-Election - including voter and candidate registration, online voting, election night reporting, and auditing capabilities. The Company offers its secure and accessible remote voting solution for use by authorized voters participating via compatible web-browsers, smartphones, tablets, and kiosks; all customizable depending on the jurisdiction's requirements. Election administrators can easily consolidate remote results and in-person results (including physical ballots) and take advantage of our unique audit features designed to facilitate independent auditing of the entire electoral process, hosted in a cloud based blockchain architecture. Voatz has been used in over 80 elections by national, state and local governments, unions, universities, nonprofits, and major political parties – including 30 counties across 5 US states, international implementations across multiple countries, and dozens of private elections.

OneFeather's cloud-based voting systems are used successfully across Canada for elections, ratification, and referendum votes. Our systems were developed in consultation with industry experts to ensure the highest standards of voter authentication and verification, along with other regulatory and audit requirements to ensure that voting event results are accepted by the federal government (AANDC) from First Nation governments deploying OneFeather. Our technologies and standards are fully secure and encrypted – delivering leading member registrar services and secret ballot voting services with immutable results, along with full real-time audit and verification channels.

OneFeather does not require any purchase or downloading of special software or applications by your eligible voters, and can be used across all operating systems and smart hardware which are able to sustain an internet connection. We pride ourselves on maintaining a very clean user interface that allows eligible voters to complete the entire voting process in about 1 minute. We are compliant with leading industry and necessary federal encryption and data transmission, protection, and storage requirements and standards, and employ a constant review and application of new best practices and technologies to ensure the highest standards.

We anticipate that there will be a proof of concept requirement prior to engaging OneFeather, and look forward to working directly with your team to ensure that specific needs and integrations are delivered as expected through a test vote demonstration.

OneFeather is a First Nation technology company, and has a full complement of subject matter experts and information technology professionals. We will work collaboratively and successfully with your team to deliver our proven community engagement solutions to your eligible electors.

Scytl is the worldwide leader in secure online voting, election management, and election modernization solutions. Scytl is based on strong scientific and research background. In fact, Scytl's founding research group has pioneered the research on online voting security in Europe since 1994 and has produced significant scientific results, including over 45 scientific papers published in international journals.

Scytl is part of the Paragon Group. Paragon Group is the leading provider of Identification, Customer Data Communications and Graphics Technologies, and has a total of CAD $1.9 billion turnover and more than 9,000 employees. In addition to election services via Scytl, Paragon Group also provides identification and ticketing services to municipal customers throughout Canada such as the City of North Bay, Vancouver, Winnipeg, Montreal, and Quebec.

Scytl is the most experienced and reliable online voting vendor, having delivered over 300,000 elections globally and managed 11M+ online ballots for public sector elections alone. Trusted by governments across the globe, Scytl Canada has been supporting municipal governments since 2012. Scytl's turnkey services and voting technology were used by over 100 municipalities for the Ontario Municipal Elections 2018, which accounts for more municipalities than all other vendors put together. Scytl also provided its technology in 2014 to more than 20 Municipal and School Board Elections, experiencing from 2014 to 2018 an increase of online voting adoption over 100 percent among municipalities in Ontario.

Appendix 4: Author Bios

Dr. Brian Budd holds a PhD in political science from the University of Guelph. His expertise lies in Indigenous-settler relations and digital governance. Along with Drs. Nicole Goodman and Chelsea Gabel, he served as a pre-doctoral fellow with the First Nation Digital Democracy project researching online voting adoption among First Nations in Ontario and Alberta. He has published 5 peer-reviewed studies on online voting and contributed to a recent report on online voting commissioned by CIRNAC. Details on his research and can be found at: https://uoguelph.academia.edu/BrianBudd?from_navbar=true.

Dr. Nicole Goodman is an associate professor of Political Science at Brock University where she holds the Chancellor's Chair for Research Excellence. Her research examines the impact of technology on civic participation and democracy, and she is an internationally recognized authority on electronic voting. Her work has appeared in top journals and is frequently consulted by Indigenous, municipal, and federal governments, not-for-profit organizations, parliamentary committees, and international governments. She has been commissioned to write reports on electoral management, including three for Elections Canada and one for the Privy Council Office of Canada. Nicole has led and co-led four projects focusing on electronic voting deployment in Canada, including: Internet Voting Project, Internet Voting Study, Electronic Elections Project and the First Nations Digital Democracy Project.

Dr. Michael McGregor is an associate professor in the Department of Politics and Public Administration at Ryerson University. His expertise lies in the field of elections and voting, and he is a recognized leader in the study of Canadian local elections. He has published on a variety of topics, including online voting, voter turnout, survey methodology, and political psychology. He has been involved in several large-scale academic projects and is currently the principal investigator on the Canadian Municipal Election Study (cmes-eemc.ca). Details on his previous and ongoing research can be found at (mmcgregor.ca).