

Digital Policy Hub – Working Paper

Pathways to the Sound Use of Border Security Technologies in North America

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About the Hub

The Digital Policy Hub at CIGI is a collaborative space for emerging scholars and innovative thinkers from the social, natural and applied sciences. It provides opportunities for undergraduate and graduate students and post-doctoral and visiting fellows to share and develop research on the rapid evolution and governance of transformative technologies. The Hub is founded on transdisciplinary approaches that seek to increase understanding of the socio-economic and technological impacts of digitalization and improve the quality and relevance of related research. Core research areas include data, economy and society; artificial intelligence; outer space; digitalization, security and democracy; and the environment and natural resources.

The Digital Policy Hub working papers are the product of research related to the Hub's identified themes prepared by participants during their fellowship.

Partners

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About CIGI

The Centre for International Governance Innovation (CIGI) is an independent, non-partisan think tank whose peer-reviewed research and trusted analysis influence policy makers to innovate. Our global network of multidisciplinary researchers and strategic partnerships provide policy solutions for the digital era with one goal: to improve people's lives everywhere. Headquartered in Waterloo, Canada, CIGI has received support from the Government of Canada, the Government of Ontario and founder Jim Balsillie.

Key Points

- North American nations are expanding the digitalization and incorporation of artificial intelligence (AI) at and around their borders amid record numbers of displaced people worldwide.
- The current situation is very much “do as we say, not as we do,” with nations that serve as both contributors and champions of international human rights standards funding and deploying increasingly invasive border security technologies that deter migrants and impede safe pathways to migration and asylum.
- Surveillance drones, sensors, radars, quadrupedal machines, biometric collection and identification systems and other technologies metastasize the militarization of North American borders and continue to change the face of global migration governance. These measures are reflective of a troubling rise in anti-immigrant movements currently sweeping the region and highlight the reverberations of historic institutionalized exclusionism.
- A delicate balance is essential for policy makers, as they conduct cost-benefit analyses of employing sophisticated border technologies, to ensure that internationally protected human rights are upheld, while prioritizing state security and public safety.
- To adequately address these concerns, rights-centred and migrant-informed policy changes are needed to mitigate the potential harms associated with the use of this emergent technology.

Introduction

Migration is a historically contentious issue in the communities of the Global North, where political and economic stability is highly coveted by those seeking refuge, security and a better life. In recent years, the rates of people on the move have continued to rise exponentially. According to the Office of the United Nations High Commissioner for Refugees (UNHCR), the estimated number of displaced people worldwide by the end of 2023 surpassed 117 million, with a record-breaking number of refugees (over 43 million) as a result of ongoing and escalated political and economic instability, persecution and human rights violations (UNHCR 2024). The number of those seeking international protection yet to obtain refugee status (asylum seekers) is fast approaching 7 million, with an estimated 1.2 million in Europe and 2.8 million in North America (ibid.).¹ As of 2022, a closer look at North America specifically uncovers that there were approximately 11 million immigrants in the United States without legal status (Passel and Krogstad 2024) and somewhere between 300,000 and 600,000 in Canada as of 2024 (Paas-Lang 2024).

These trends, in tandem with at times violent waves of anti-immigrant unrest seen recently in Europe (Brabant 2024; Kapelner 2024) and North America (Kustov 2024; Narea 2024; Silverstone et al. 2024), keep a spotlight on how migrant-receiving

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¹ See www.migrationdataportal.org.

nations of the Global North balance the intricacies of state sovereignty with their commitments to human rights, as well as the cultural norms and practices adopted by international organizations that they helped found and develop. These factors all intersect in the drafting and implementation of modern border security policy, where barriers to entry for some of the most vulnerable remain in a constant state of flux.

Modern discourse from migration studies scholars investigates and affirms the metamorphic nature of highly developed nations' restrictive practices.² These practices are manifest in barriers both physical and non-physical, territorial and legal, and generate dizzying push-and-pull factors for migrants. The rapid rollout of digital and other "smart" border security tools puts human dignity, freedom of movement and the rights to security, privacy and asylum in jeopardy, consolidating existing barriers to access and belonging in the border areas.³ It is within this intricate global policy space that this working paper is situated: it aims to elucidate the adoption of intelligent and invasive border security technologies by North American states, specifically Canada and the United States, that are intended to deter asylum seekers from reaching ports of entry, denying individuals their fundamental rights as enshrined in international law.

Drawing from existing literature, databases and legislation that delineate global migration trends, technological developments in contemporary border security, and migration governance patterns and pitfalls, this paper expands on the outcomes for migrants at points of entry within the broader migration cycle (with the acknowledgement that advanced technologies are now part and parcel of *all* stages of the migration cycle in nations of the Global North). By concluding with policy recommendations based on findings, this paper adopts a prescriptive approach, arguing that the incorporation of migrant voices, multilateral collaboration and greater clarity around processes and technologies in use are needed for sound border security policy changes.

² See Akhmetova (2020); Brubaker (1992); Ellermann (2020); Gordon (2020); Greenhill (2016); Molnar (2024); Molnar and Gill (2018); Orgad (2010); Shachar (2020).

³ In this paper, "digitalization" refers to "the automation of...processes in the name of efficiency," whereas "digitization" is the underlying "conversion of physical or analog data into digital data to eliminate paper, easily store information, and reduce human errors" (Microsoft 365 Team 2022). At times, the two terms are used interchangeably; however, this usage is contested by scholars who posit that digitalization is centred on the societal impacts of digitization and automated systems (Schumacher, Sihm and Erol 2016), a view also adopted here. While definitions of "artificial intelligence" are also subject to debate (Maas 2023), this paper adheres to the definition provided by Yanqing Duan, John S. Edwards and Yogesh K. Dwivedi (2019), also referenced in the International Organization for Migration's *World Migration Report 2022* (McAuliffe and Triandafyllidou 2021): "the ability of a machine to learn from experience, adjust to new inputs and perform human-like tasks" (Duan, Edwards and Dwivedi 2019). It is important to note that the digitalization of border governance processes is necessary for the adoption of AI; as a result, AI is not as widespread in these spaces and is largely dependent on nations' information and communications technology (ICT) infrastructure (McAuliffe and Triandafyllidou 2021).

The Current State of Affairs

The Move Toward Digitalization and Incorporation of AI

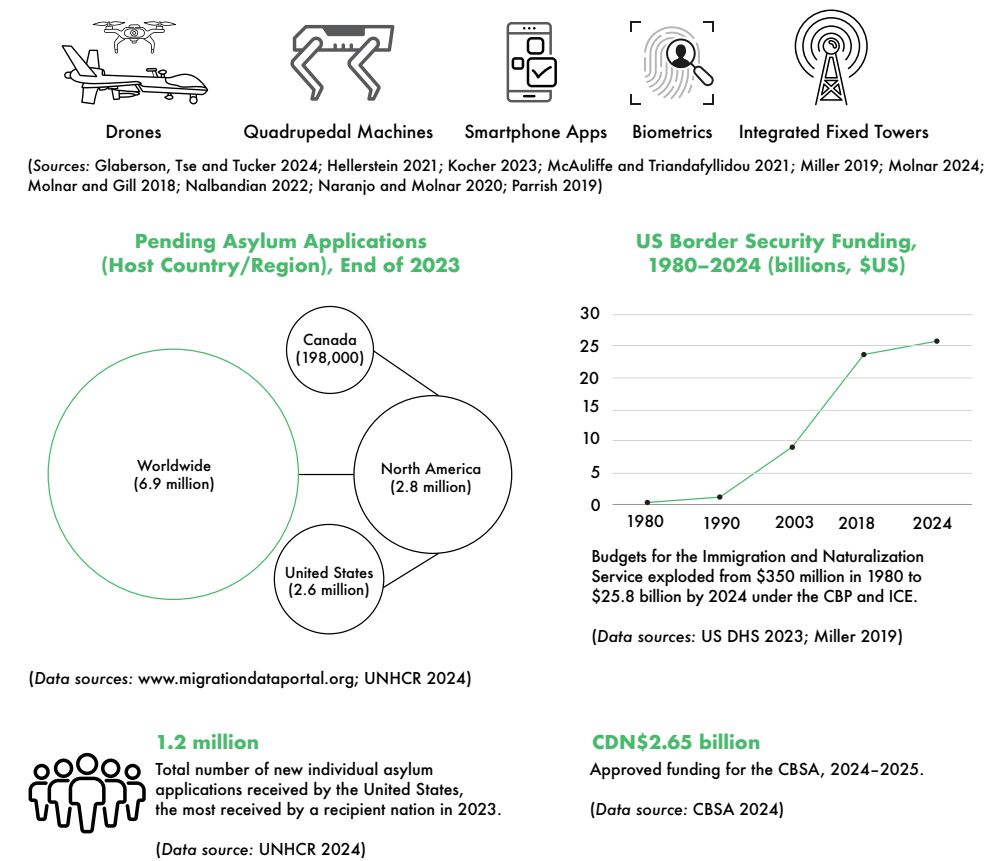
Canada and the United States introduced the digitalization of border controls (see Figure 1) during the last several decades, with collaborative efforts to develop cross-compatible systems for their shared border (Adamson 2006; Koslowski 2005; McAuliffe and Triandafyllidou 2021; Molnar 2024). To address post-9/11 security concerns, the United States proposed an Action Plan for Creating a Secure and Smart Border in December 2001 (Koslowski 2005). The plan outlined the use of biometric identifiers by collecting and verifying digital fingerprints and photographs of visitors and immigrants at ports of entry; the creation of interoperable immigration databases with Canada; and increased data-sharing on asylum claims and "immigration-related issues" (The White House 2002). These aims were reiterated in the 2005 Security and Prosperity Partnership of North America between the United States, Canada and Mexico (Koslowski 2005). The initiatives resulted in the widespread adoption and normalization of biometric collection, screening and verification. Examples of this trend include the Canada-US NEXUS program; the polarizing US National Security Entry-Exit Registration System; the Visitor and Immigrant Status Indicator Technology program; and more recent initiatives such as the US Customs and Border Protection's (CBP's) CBP One mobile application (Chishti and Bergeron 2011; Kocher 2023; Koslowski 2005; US Department of Homeland Security [DHS] 2009). The digitalization of border processes at North American ports of entry developed in tandem with the build-up of digital borders backed by AI, comprising of surveillance towers, drones and ground-patrolling quadrupedal machines (also referred to as "robot dogs"), as well as motion sensors and cameras, among other emergent security technologies (Akhmetova 2020; Miller 2019; Molnar 2024; Vincent 2022).

With each passing year, the pervasiveness, sophistication and invasiveness of border security technologies rises exponentially. This is especially the case in the Global North, where states possess the wealth, ICT infrastructure and expertise to develop and launch systems informed or automated by AI (McAuliffe and Triandafyllidou 2021; Molnar 2024). While the majority of the world's refugees and asylum seekers are hosted by low- and middle-income nations (McAuliffe and Oucho 2024), the wealthy and highly developed nations of the Global North remain the most equipped to spearhead the development and use of these border security technologies, while also having the capacity to observe the repercussions of these systems. This solidifies international migration governance power imbalances and limits the viability of migrants' freedom of movement (Beduschi 2021; McAuliffe and Oucho 2024; McAuliffe and Triandafyllidou 2021; UNHCR 2024).

It is from this position that Canada and the United States trumpet the benefits of new technologies at their borders. Advantages that are typically highlighted include the increased efficiency of entry/exit screening processes and augmented security and threat assessment, and the ability to predict migratory trends and better prepare for these trends (Akhmetova 2020; Bircan and Korkmaz 2021; Nalbandian 2022; McAuliffe and Triandafyllidou 2021; Molnar and Gill 2018). However, existing literature reveals that these benefits are shadowed by repeated and egregious violations of migrants' human rights, including freedom of movement, the right to asylum, the right to privacy, and more. The reality of these outcomes has a particularly deleterious impact on asylum seekers, who

arrive at North American borders in vulnerable conditions that are compounded by the complexity of, and lack of transparency around, technologies that directly impact their lives. With experts asserting that we may be drastically underestimating the consequences of future advancements in AI (Cass-Beggs et al. 2024), the scaling back or reworking of smart border security technologies by policy makers would prevent documented harms and inequalities in this space from becoming entrenched and exacerbated. To better understand this convoluted implementation of digital border technologies, an overview of the current policy setting in North America is necessary.

Figure 1: Asylum Seekers and Border Security in North America



Source: Author (with data sources as indicated).

The Policy Landscape: Sanctuary on Paper

In migration governance, states are subject to international treaties, conventions, norms and standards that outline human rights protections and accountability in the digital era. These obligations are interwoven with social, political and economic concerns at the domestic level, forming a perpetual tightrope act for policy makers to navigate. Waning liberal democratic dominance, prolonged interstate conflict and black swans such as the COVID-19 pandemic further complicate the migration governance space and the global

burden-sharing regime.⁴ It is then perhaps of little surprise to some political observers (and those cognizant of growing pools of anti-immigrant sentiment in the West) that states in the Global North have met these challenges with targeted exclusionary measures, fortifying their borders with the help of specifically designed legal tools and advanced technologies. For others, however, it is difficult to reconcile how nations that are both proponents of and contributors to international human rights standards have adopted such approaches.

Key documents outlining human rights and liberties for migrants are listed in Table 1:

Table 1: Key Documents Outlining Human Rights and Liberties for Migrants in North America

Title of Document	Adoption Date	Binding?
Universal Declaration of Human Rights (UDHR)	1948	Non-binding
Convention relating to the Status of Refugees	1951	Binding
Protocol relating to the Status of Refugees	1966	Binding
International Covenant on Civil and Political Rights (ICCPR)	1966	Binding
International Covenant on Economic, Social and Cultural Rights (ICESCR)	1966	Binding
American Convention on Human Rights (ACHR)	1969	Binding
Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment (UNCAT)	1984	Binding
United Nations Guiding Principles on Business and Human Rights (UNGPs)	Endorsed 2011	Non-binding
Global Compact on Refugees (GCR)	2018	Non-binding
Global Compact for Safe, Orderly and Regular Migration (GCM)	2018	Non-binding
Los Angeles Declaration on Migration and Protection (LAD)	2022	Non-binding

Source: Author.

As these efforts have spearheaded, human rights for all migrants at North American borders include the right to life, liberty and security; protection from inhumane treatment; the right to privacy; freedom of movement; the right to seek asylum (ACHR; UDHR; UNCAT); the right to self-determination (ICCPR); equal access to economic, social, and cultural rights (ICESCR; UDHR); and humane treatment at borders (GCM; GCR; LAD), among other critical safeguards. These documents are only part of the greater migration governance landscape and work in conjunction with national and provincial/state-level protections. Each document's framework informs and guides the implementation of migration and border security policies that are primarily determined at the national level (McAuliffe and Oucho 2024).

⁴ The global burden-sharing regime is in reference to UN member states' agreement to take collective action in the hosting of refugees and asylum seekers and providing humanitarian aid for host nations when needed, as outlined in the 2018 Global Compact on Refugees (UNHCR 2018). For more information, see www.unhcr.org/media/burden-and-responsibility-sharing-factsheet.

The Canada-US Border

To better protect the longest land border in the world — spanning nearly 5,524 miles⁵ — Canada and the United States launched Integrated Border Enforcement Teams (IBETs) in 1996. Composed of each nation’s border security agencies, IBETs conducted joint surveillance activities intended to secure both land and sea borders with the use of technologies such as ground sensors, cameras, global positioning systems and personnel and vehicle locators (National Law Enforcement and Corrections Technology Center 2002). These teams were heralded as a success in their early days through thwarting drug-smuggling operations and barring entry for undocumented migrants across the Canada-US border.⁶

Shortly thereafter, on December 12, 2001, Canada and the United States signed the Smart Border Declaration and the Associated 30-Point Action Plan in Ottawa (The White House 2002).⁷ This directive aimed to solidify a shared, more secure “North American Perimeter” through enhanced and interconnected border security technologies, research initiatives, and the continuation of IBETs (Koslowski 2005; The White House 2002).⁸ This relationship remains intact today, supporting both countries’ economic and political linkages.

In addition to the Declaration and Action Plan, the Canada-US Safe Third Country Agreement (STCA) is a bilateral policy measure to oversee the movement of asylum seekers at the shared border. Signed in 2002, it dictates that asylum seekers in Canada or the United States must apply for refugee status in the first safe country that they arrive in, with few exceptions.⁹ The intention of the agreement, and its subsequent revamping in 2023, is to manage the flow of asylum seekers across the northern border, especially through irregular points of entry such as Roxham Road in Quebec. However, the corollary of the STCA, as well as regularized use of advanced border-security technologies with the Smart Border program, has been the redirecting of asylum seekers to other unofficial paths. In the north, this has meant navigating life-threatening conditions, given that Canadian winters hit sub-zero temperatures and that alternate routes pose health and safety risks year-round. These outcomes have been documented by rights activists as blatant violations of asylum seekers’ freedom of movement and right to asylum (Amnesty International 2023; Molnar and Gill 2018). Although the northern border is significantly less militarized than the US-Mexico border, exclusionary policy measures that are in place in both regions have resulted in the continual infringement on the rights of migrants.

The US-Mexico Border

In the United States, the modern conception of border security shifted from simple fences at its southern border in the 1940s and 1950s, to the integration of technologies developed and used in the Vietnam War in the 1970s, through Operation Intercept.

This included the installation of ground sensors that could detect movement, heat and acoustics (Hellerstein 2021; Mendoza 2023; Miller 2019). The mapping of the virtual wall continued with the “Border Patrol Strategic Plan 1994 and Beyond” (US Border Patrol 1994), which outlined a “realistic” plan for border control, bridging migration and national security policy. Funding, resources and personnel at the 1,933-mile¹⁰ southern border with Mexico was ramped up to deter irregular migration, notably around long-standing border-crossing routes with the aim to redirect these individuals to “more hostile terrain, less suited for crossing and more suited for enforcement” (ibid., 7). While this “prevention through deterrence” plan was primarily geared toward the southern border, the Strategic Plan also encompassed areas situated at the northern border, such as the Great Lakes region (ibid., 8). The Strategic Plan was followed by the post-9/11 formation of the DHS in 2002, as well as the CBP and Immigration and Customs Enforcement (ICE) in 2003. Under the DHS and its agencies, a marked escalation of border control technology use took place via the Secure Border Initiative, the Secure Fence Act in 2006 and the launch of the Homeland Advanced Recognition Technology (HART) system in the 2010s (Mendoza 2023; Miller 2019).

These policy approaches and programs, under the purview of both Democratic and Republican administrations during the past several decades, paved the way for rampant border militarization and the dystopian use of intelligent border technologies that push asylum seekers to dangerous terrain in the south. What is more, rates of migrant encounters along the US southern border — including apprehensions and expulsions, as well as repeat encounters — continue to break records (Gramlich 2024; Gramlich and Scheller 2021), contributing to increased migrant disappearances and deaths (Chambers et al. 2019; Gordon 2020; Hellerstein 2021; Miller 2019; Verini 2020).

Private Sector Partners and the Intensification of Border Militarization

The North American “policy wall of fear” (Miller 2019, 60) is cemented by the use of border security technologies that are continuously evolving to gather more data, while also becoming more autonomous and ubiquitous. This would not be possible without the participation of private sector partners and ample funding. In the United States, the budget for the Immigration and Naturalization Service skyrocketed from US\$350 million in 1980 to US\$25.8 billion by 2024 under the CBP and ICE (US DHS 2023; Miller 2019). Funding for the Canadian Border Services Agency (CBSA) pales in comparison. In the Canadian context, approved CBSA funding for the 2024–2025 period dipped slightly from the previous fiscal year, from CDN\$2.74 billion to CDN\$2.65 billion (CBSA 2024). Padded by the billions of dollars in budgetary cash injections, these border security agencies contract private sector actors specializing in the production and innovation of intelligent systems. What may be most troublesome to human rights advocates is not necessarily the amount of funding that these private actors receive, but rather the fact that recipients do not need to be based in the same state; there is also a lack of adequate transparency as to whether wartime technologies are being utilized in a non-military context.

It has been revealed that North American border security agencies contract international corporations in the development of these formidable technologies (Hellerstein 2021; Molnar and Gill 2018; Naranjo and Molnar 2020; Parrish 2019). For instance, Elbit

⁵ See www150.statcan.gc.ca/n1/pub/11-402-x/2012000/chap/geo/geo-eng.htm#.

⁶ See <https://web.archive.org/web/20060506021925/http://www.psepc-sppcc.gc.ca/prg/le/bs/ibet-en.asp>.

⁷ *Agreement Between the Government of Canada and the Government of the United States of America for Cooperation in Science and Technology for Critical Infrastructure Protection and Border Security* (2001), E105000, December 12, online: <www.treaty-accord.gc.ca/text-texte.aspx?id=105000>.

⁸ *Ibid.*

⁹ See www.canada.ca/en/immigration-refugees-citizenship/corporate/mandate/policies-operational-instructions-agreements/agreements/safe-third-country-agreement.html.

¹⁰ This figure is provided by the Congressional Research Service (Beaver 2006). The actual length of the US southern border is disputed, with some sources estimating it is as long as 1,989 miles (*USA Today* 2017).

Systems, the largest Israeli military contractor, has played an increasing role in North American border security development. The CBP contracted Elbit Systems to the tune of tens of millions of dollars to fortify the southwestern border with integrated fixed towers, equipped with high-definition night-vision cameras, thermal sensors and radars intended to identify irregular border crossings (Hellerstein 2021; Parrish 2019). The deployment of technologies contributing to the pushback and human rights violations of asylum seekers is also facilitated through contracts with Northrop Grumman, the developers of the DHS HART database; Palantir Technologies, Inc. (spearheading the facial recognition systems used by ICE to detain and deport migrants); Amazon Web Services (providing cloud services for DHS and hosting the HART system); Microsoft (enhancing AI use for with ICE); Lockheed Martin (overseeing the functionality of surveillance planes); and many others, all at an exponential rate matching the ballooning of funds each passing year (Miller 2019; Molnar and Gill 2018; Nalbandian 2022; Naranjo and Molnar 2020).

AI Regulation: A Remedy?

The institutionalization of exclusionism in the region is multi-faceted and rooted in overlapping, decades-old border security policies and programs. The widespread repercussions have been deadly and have worsened over time as the number of people on the move worldwide continues to rise. Digital systems deployed at the borders and backed by private-sector titans are plagued with privacy breaches, errors, and race and gender biases driven by algorithms, and are protected by an inexcusable lack of clarity regarding data collection, storage and use (Molnar and Gill 2018; McAuliffe and Triandafyllidou 2021). For example, it is not abundantly clear what risks have been assessed when determining which corporations receive contracts or how data obtained by their systems may be abused or compromised (Bircan and Korkmaz 2021; McAuliffe and Triandafyllidou 2021).

Infringements on fundamental human rights and liberties, which also contravene corporations' responsibilities as outlined in the UNGPs and several domestic instruments,¹¹ arise from long-standing anti-immigrant measures seen across the Global North. Here, the discourse has been fuelled over time by disinformation, inflammatory rhetoric and the politicization of migration governance. Another key contributing factor is the absence of migrant-informed policy initiatives, opening pathways for the dehumanization of asylum seekers and reducing their plight to border interaction statistics.

Some potential hope for improvement may rest in the creation and ratification of comprehensive policies governing the development and use of AI at both domestic and international levels. A set of national frameworks have been produced, such as Canada's Artificial Intelligence and Data Act (introduced in 2022 as part of Bill C-27, the Digital Charter Implementation Act); the US White House Executive Order on Safe, Secure, and Trustworthy Development and Use of Artificial Intelligence (2023); and the White House Blueprint for an AI Bill of Rights (2023). On the international stage, efforts linked with North America include the Organisation for Economic Co-operation and Development's

Recommendation of the Council on Artificial Intelligence (2021) and the subsequent Group of Seven Hiroshima AI Process Comprehensive Policy Framework (2024). These initiatives focus on developing responsible and trustworthy AI by collaborating with citizens, governments and technologists to secure data privacy, generate more transparent systems, prevent algorithmic bias and discrimination, and ensure that human rights are at the fore of tech development. While promising, these frameworks remain non-binding and are therefore insufficient in protecting against the creation and use of rights-infringing advanced technologies. As the world waits for collective, binding action from North American leaders on AI governance, international human rights instruments remain in place to guide the sensible oversight of border security technologies and the actors involved.

Looking Ahead

The border security policy-making environment remains a fragile space, given the power play between state sovereignty, security and dedication to human rights. In what some scholars have referred to as the "democratic dilemma" (Kapelner 2024), states of the Global North grapple with xenophobia and nativism that drive the politicking of migration and border security governance, while still seeking to adhere to the long-standing liberal democratic order prioritizing human rights (Adamson 2006; Kapelner 2024; Shachar 2020). This situation creates a "sanctuary on paper" that muddies any clear path forward, a codified promise made to asylum seekers worldwide yet denied in reality. Despite this, there are pathways to explore in order to change course.

It May Get Worse Before It Gets Better

Digitalization and the use of AI at North American borders has become omnipresent, with the adoption of smart technologies at virtually every stage in the broader migration process. Governments employing cutting-edge technologies tout the positive outcomes of their use; however, little attention has been paid to the detrimental impacts that these technologies have had — and continue to have — on some of the world's most vulnerable populations. The barring of outsiders in the Global North continues to be reflected in the legal space (namely, via legal hurdles or lack of access to citizenship), physical space (by way of border fences, walls and other tangibles) and digital space through biometric collection and screening, advanced data collection and surveillance systems. These realities are strikingly opposed to the human rights guarantees outlined in international law and drafted and agreed upon by the very states utilizing these rights-infringing technologies.

Unfortunately, the current situation may escalate before it is ameliorated. Canadian and US policy makers are backed by the normalization of the pervasive use and expansion of rights-encroaching border technologies from their allies abroad (Bircan and Korkmaz 2021; Platform for International Cooperation on Undocumented Migrants 2024; Solomon 2020). In addition, the lack of comprehensive binding agreements to guide the digitalization and incorporation of AI in government programs impedes progress. Recognizing this policy failure, private sector actors capitalize greatly on crafting digitally advanced tools for use at and around North American borders, and public sector actors continue to forge ahead with contracting their services. All the

¹¹ For instance, Canada's Personal Information Protection and Electronic Documents Act (see www.priv.gc.ca/en/privacy-topics/privacy-laws-in-canada/the-personal-information-protection-and-electronic-documents-act-pipeda/). There is no federal privacy legislation currently in place in the United States, only a series of state laws.

while, approximately 1.5 percent of people worldwide today are forcibly displaced (double the rate observed a decade ago), and the total number of displaced people has been consistently on the rise for the past 12 years (UNHCR 2024). Finally, politicians' promises of mass deportations and the barring of immigration pose additional threats to the stability of the migration governance regime in the region. These trends, met with accelerating technological development at and around borders, underscore the importance of securing safe pathways to asylum for those who cannot return to their nations of origin.

Opportunities for Course Correction

Even with record-breaking numbers of displaced people worldwide, experts claim that most international migration is “safe, orderly and regular” (McAuliffe and Oucho 2024, 6). Therefore, highly developed states with rising numbers of migrants seeking asylum, such as Canada and the United States, can aim to be models in navigating the landscape of protecting human rights while prioritizing national security at ports of entry. This leadership role can be realized through working closely with relevant actors (international counterparts, key private and public sector groups, human rights advocates and migrants themselves) to create safe pathways to asylum and to develop border security technologies that are both rights-cognizant and effective.

A human rights-centred approach requires hearing directly from migrants as to what characterizes their experiences in order to determine what would constitute appropriate use of technologies in the future. Creating and/or funding programs for recurring studies of migrants to gauge their experiences at borders can be used to inform policy makers as to how subsets of these populations (i.e., ones comprised of different genders, age groups and digital-literacy levels) are acutely impacted. To further empower migrants at North American borders, state-led programs to foster digital literacy among populations at home and abroad can be launched. For example, organizations such as the World Refugee Council have brought attention to initiatives such as “Techfugees,” which are hackathons structured to connect refugees with specialists to learn how the ever-evolving tech landscape impacts them and to co-design solutions (World Refugee Council 2019). North American policy makers can spearhead similar programs that are accessible and digestible for participants, such as a designated web program that anyone in the world can access, or information sessions or full courses, as part of integration processes. These services would shed light on existing technologies that individuals are likely to interact with throughout the migration cycle, as well as the supports that exist to help them throughout these stages.

Next, greater transparency regarding the ways novel border technologies are conceptualized, funded and implemented is needed. To facilitate greater oversight from the legal community, rights advocates and civil society, clear and comprehensive information on border technologies — including those that are new and forthcoming — should be easily accessible and open source. These records should also outline what data is collected by border technologies and how that data is stored and utilized. A database with this information would pave the way for honest processes and

discourse, replacing the current model in which researchers and civil society obtain much of this information via Requests for Information (in Canada) and Freedom of Information Act requests (in the United States).

At the international level, North American policy makers can work alongside other leaders of the Global North through hosting regular fora to learn from policy outcomes and generate shared standards and practices. Fora may also serve as opportunities to explore how these technologies can also be designed to benefit asylum seekers and refugees. Broadly speaking, systems can be used to gather improved data on which routes are most dangerous during a given time of year, to better prepare resources during these periods to ensure safe passage (in the form of additional personnel, food and water, and so on) or to redirect migrant flows from these regions entirely. Another potential outcome may include greater protections for human rights by using surveillance technologies to ramp up the detection of human trafficking activity at and around borders. Investigating the potential uses of these surveillance technologies may also be included in discussions on increased interoperability of systems between states to maximize rights-protecting and national security outcomes.

Finally, to assess existing and proposed policies and practices, an international group should be established to monitor border security technology. This group should be composed of diverse actors well-suited to hold governments and corporations accountable for the creation and use of sophisticated systems at borders, including specialists from the tech community, legal experts, rights advocates and those with experience at borders of the Global North. Participants could contribute to an international community that is up-to-date on the digitalization and incorporation of AI at today's borders, as well as the outcomes of the use of these technologies on both migrants and host-nations. This group could also assess the implications of reining in existing smart border technologies based on lessons learned.

These proposals, while not comprehensive, can serve as stepping stones to ensure that the use of border security technologies in North America are rights-centred and migrant-informed, while still serving to protect national security. Although there is no one-size-fits-all solution, open discourse and the exploration of innovative and collaborative approaches can support policy makers in their next steps.

Recommendations

- **Document and learn from the experiences of migrants at borders:** The lived experiences of migrants must be incorporated into future study and considered by actors involved in the use, and misuse, of new technologies at and around borders.
- **Launch programs to cultivate digital literacy among vulnerable populations at home and abroad:** Individuals should be cognizant of new and emerging technological developments at and around borders that directly impact their lives.
- **Create and maintain an open-source border security technology index:** Ensure that this is easily accessible and as comprehensive as possible.

- **Leverage the experience and expertise of others:** Host recurring multilateral fora to learn from missteps and improve processes
- **Establish a global border security tech monitoring group:** Foster accountability and shared learning through the creation of an international monitoring group of technology developers, legal experts, rights advocates and others with extensive experience of navigating today's borders.

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About the Author

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Reanne earned her master's degree from the Munk School of Global Affairs and Public Policy at the University of Toronto, where she also obtained a certificate for completion of the Harney Program in Ethnic, Immigration and Pluralism Studies, and a certificate in public policy writing. Reanne also holds a B.A. from the University of Toronto, as a graduate of the Specialist Program in Political Science.

Acronyms and Abbreviations

ACHR	American Convention on Human Rights
AI	artificial intelligence
CBP	Customs and Border Protection
CBSA	Canadian Border Services Agency
DHS	Department of Homeland Security
GCM	Global Compact for Safe, Orderly and Regular Migration
GCR	Global Compact on Refugees
HART	Homeland Advanced Recognition Technology
IBETs	Integrated Border Enforcement Teams
ICCPR	International Covenant on Civil and Political Rights
ICE	Immigration and Customs Enforcement

ICESCR	International Covenant on Economic, Social and Cultural Rights
ICT	information and communications technology
LAD	Los Angeles Declaration on Migration and Protection
STCA	Canada–US Safe Third Country Agreement
UDHR	Universal Declaration of Human Rights
UNGPs	United Nations Guiding Principles on Business and Human Rights
UNCAT	Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment
UNHCR	Office of the United Nations High Commissioner for Refugees

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