THE
PLOUGHSHARES MONITOR

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SPRING 2026

Canada in the Crosswinds

Arms Trade, Nuclear Weapons, AI, and the Strain on Middle Powers

ARMS TRADE
Top Canadian Suppliers to the United States

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ARCTIC SECURITY
Geopolitics, AI, and Climate

"and they shall beat their swords into ploughshares, and spears into pruning hooks; nation shall not lift up sword against nation; neither shall they learn war any more." Isaiah 2:4

The Ploughshares Monitor
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The Ploughshares Monitor is the quarterly journal of Project Ploughshares, the peace research institute of The Canadian Council of Churches. Ploughshares works with churches, nongovernmental organizations, and governments, in Canada and abroad, to advance policies and actions that prevent war and armed violence and build peace. Project Ploughshares is affiliated with the Kindred Credit Union Centre for Peace Advancement, Conrad Grebel University College, University of Waterloo.

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A conversation with Ploughshares Director Paul Heidebrecht

‘Built for this moment’

Written by Jessica West

Project Ploughshares is entering a new chapter through a partnership between the Canadian Council of Churches and Conrad Grebel University College. Dr. Paul Heidebrecht joins as part-time Director for a transitional period of up to two years. He brings academic expertise, community peacebuilding experience, and strong church and civil society ties.

This transition comes as Project Ploughshares marks its 50th anniversary—a moment for reflection, renewal, and recommitment. In the conversation that follows, Ploughshares Senior Researcher Jessica West speaks with Paul about the partnership, his role during this transition, and the evolving peace and security landscape.

Jessica: The Canadian Council of Churches has entered into a new partnership with Conrad Grebel University College during a period of transition for Project Ploughshares. What prompted this collaboration now?

Paul: Conrad Grebel has been a stakeholder in Project Ploughshares from the outset. In 1976, Grebel provided space and support to Ernie Regehr and church-led peace and disarmament efforts, while also launching Canada’s first peace and conflict studies program at the University of Waterloo. Those early connections between researchers, educators, advocates, and students helped shape both PACS and Ploughshares.

In 2014, Ploughshares returned to the Grebel community when it joined the newly opened Kindred Credit Union Centre for Peace Advancement. Ploughshares’ mission remains closely aligned with Grebel’s, and its ongoing impact is deeply valued across the Grebel community.

Jessica: How does this arrangement support Project Ploughshares’ mission and long-term sustainability?

Paul: Grebel has a clear stake in Ploughshares’ long-term success and brings strengths that can support its next phase. Thanks to the support of a generous donor, this new arrangement provides additional capacity for organizational leadership and operations over the next two years.

As Director, I bring experience relevant to organizational renewal, having supported over thirty new peace and justice initiatives through the Grebel Peace Incubator since 2014. The broader Centre for Peace Advancement community also offers valuable expertise and opportunities for collaboration in the areas of peace education, research, and systems change.

Jessica: You are employed by Conrad Grebel University College while serving as Director of Project Ploughshares. How do you understand your

role and responsibilities in this moment?

Paul: The leadership of Project Ploughshares is ordinarily more than a half-time role, so I will be focusing on priorities identified by the Management Committee. This includes relating to partners, enhancing financial sustainability, revitalizing governance, and supporting the staff team. I will be putting my energy into strategic and relational priorities rather than getting directly involved in program work.

I will continue to serve as the Director of the Kindred Credit Union Centre for Peace Advancement on a half-time basis over the next two years. That means I will be stepping back from from classroom teaching and some research activities. This arrangement also creates opportunities for collaboration between Ploughshares and the Centre for Peace Advancement. For example, the Grebel Gallery will host an exdhibit celebrating Ploughshares' 50th anniversary later this year.

Jessica: You've also worked across both academic and community spaces. How do those experiences inform the way you approach leadership at Project Ploughshares?

Paul: My appproach to leadership has also been also shaped by directing MCC Canada's Ottawa Office and serving on the steering committee of KAIROS Canada. At MCC, I saw how trust with government policymakers is built over time. I worked to sustain that credibility through careful research and strong relationships on behalf of our program partners. I also learned that collaboration unlocks potential—within organizations and across coalitions. That lesson has been reinforced through my work in the University of Waterloo's innovation ecosystem: with the right leadership, institutions can be more than the sum of their parts.

Jessica: As Project Ploughshares marks its 50th anniversary, what does success look like in this transitional period, and how are you thinking about renewal and growth?

Paul: Project Ploughshares has a remarkable history and continues to play a significant role in peace and disarmament efforts at a time when the world is re-arming. I am convinced that Ploughshares was built for this moment. This is also a moment to renew the organizational foundation that supports that work. Over the next two years, my goal is to clarify our model and secure the leadership Ploughshares needs for its next fifty years. Major anniversaries are wonderful opportunities to reflect and celebrate, but also to reinvigorate an organization. Milestones create space not only to reflect on the past, but to listen to the next generation of partners and supporters. My ambition for 2026 is that we listen carefully and emerge with renewed clarity and purpose.

“Project Ploughshares has a remarkable history and continues to play a significant role in international disarmament at a time when the world is re-arming. I am convinced that Ploughshares was built for this moment. This is also a moment to renew the organizational foundation that supports that work.

Jessica: Stepping back from the organizational questions for a moment, what do you see as the most pressing peace and security challenges facing Canada and the world right now?

Paul: Many of today's most pressing peace and security challenges stem from technological change. Technology has transformed society, but it has also introduced profound risks. This includes the reliance on fossil fuels that is accelerating climate change, technological shifts that reshape labour markets and deepen inequality, and digital communication systems that are eroding trust in institutions and social norms. We are losing our capacity to work together at precisely the moment when collective action is most urgent.

Dr. Paul Heidebrecht joins Project Ploughshares as part-time Director for a transitional period of up to two years. He brings academic expertise, community peacebuilding experience, and strong church and civil society ties. *Conrad Grebel University College*

Jessica: Where do you think civil society organizations like Project Ploughshares add distinctive value in responding to those challenges?

Paul: For five decades Ploughshares has worked to restrain the development and use of new technologies of warfare. We bring a critical lens to the intersection of peacebuilding and technology—contributing to global movements that have influenced government policy. As countries pursue new generations of nuclear weapons, expand military activity into domains such as space, and integrate AI into warfighting, this work is more urgent than ever. It requires collaboration—with long-standing and new partners—to identify practical levers for change in an increasingly fragmented policy environment. It also means strengthening engagement with grassroots supporters within and beyond our sponsoring churches and agencies.

Jessica: In the face of all this, what gives you hope?

Paul: I've had the privilege of working with remarkable changemakers through the Centre for Peace Advancement: students discovering how they can make a difference beyond the classroom, founders of start-ups in the Grebel Peace Incubator, artists sparking community conversations, and, of course, the dedicated staff of Project Ploughshares. I know that change is possible because I have seen it happen. Sometimes the impact is small, sometimes it is profound—but the fact that it happens gives me hope.

Jessica: As we close, what is one message you would like every *Ploughshares Monitor* reader to take with them from this conversation?

Paul: Project Ploughshares was built for this moment. In recent conversations, I've heard partners affirm the unique and important contributions the Ploughshares team is making. I've heard the same from sponsors and supporters who believe this voice is needed more than ever. As we mark this anniversary year, I'm committed to listening carefully and engaging widely. I welcome your reflections, ideas, and questions as we move forward together. □

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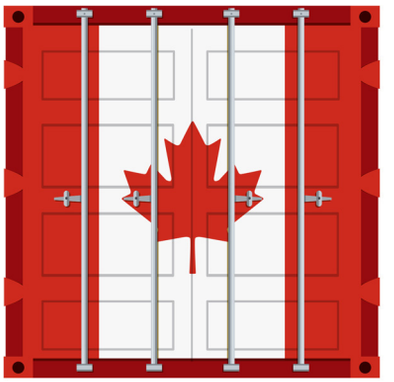
A Record Year

Canada's Largest Defence Suppliers to the US: FY2025



Written by Kelsey Gallagher

The Canadian Commercial Corporation (CCC) plays a central, if often overlooked, role in Canada's defence trade with the US. As a federal crown corporation, it acts as the government-to-government contracting authority through which Canadian firms secure export contracts with foreign states. Defence and aerospace dominate the CCC's portfolio, and the recently rebranded US Department of War (DOW) is, by a wide margin, its most significant customer.

Under the Defence Production Sharing Agreement between Canada and the US, Canadian military exports to the US valued at more than US$350,000 must be channelled through the CCC. In practice, this makes the corporation a key conduit for much of Canada's defence sales to the US government.

In fiscal year (FY) 2025 (April 1, 2024 to March 31, 2025), the CCC concluded contracts with the US DOW worth $2.07 billion,* breaking all previous records for annual CCC-brokered defence sales to the US. This staggering number marked a 91.3 per cent increase over FY2024 sales, and a 134 per cent increase over FY2023.

The following are the leading Canadian military suppliers to the US DOW through CCC-brokered contracts in FY2025 by total value of all reported awards. The data is drawn from annual Access to Information and Privacy requests submitted by Project Ploughshares to the CCC, supplemented by government disclosures, US Treasury Department federal spending data, US government announcements, and secondary reporting.

Although the data is received annually through the CCC, many of the contracts represent subawards under larger, multi-year US procurement programs that were signed in prior years. As each award may also be modified over the course of its life cycle, this data is time-bound and therefore subject to change at any time.

1 General Dynamics Ordnance and Tactical Systems (GD-OTS) – Canada Valleyfield Inc. - $744,576,028

General Dynamics Ordnance and Tactical Systems (GD-OTS) is Canada's largest manufacturer of munitions, producing everything from small-calibre ammunition to tank shells for both domestic use and export markets. The company's Valleyfield, Quebec facility specializes in the production of propellants that generate the controlled explosive force required to launch these munitions, and has seen a significant increase in

Top 20 Canadian suppliers of military goods to the US via the CCC (FY2025)

SUPPLIER	SUM OF CONTRACTS
General Dynamics OTS - Canada Valleyfield Inc.	$744,576,028
General Dynamics Land Systems - Canada Corporation	$418,494,447
Wescam Inc.	$207,977,018
General Dynamics OTS - Canada Inc	$99,456,614
AirBoss Defense Group Ltd	$58,323,182
CMC Electronics Inc.	$46,912,219
Ultra Electronics TCS Inc.	$40,865,608
Indal Technologies Inc.	$39,434,093
Emergent BioSolutions Canada Inc.	$36,259,967
MTU Maintenance Canada Ltd.	$30,879,685
Rolls-Royce Canada Ltd	$25,950,196
EMS Technologies Canada Ltd.	$24,848,793
Liftking Manufacturing Corp	$24,834,016
Reivax North America Inc.	$24,596,890
Canadian Helicopters Limited	$20,546,052
Standard Aero Limited, Winnipeg	$18,838,376
Patriot Forge Co.	$16,130,452
W.R. Davis Engineering Ltd.	$14,618,941
Coulson Aircrane Ltd.	$13,854,330
J.A. Larue Inc.	$13,721,104

artillery-related exports since Russia's 2022 invasion of Ukraine.

In particular, GD-OTS Valleyfield is a leading supplier of M31 propellants for the 155mm Modular Artillery Charge System. In FY2025, the facility contributed to a major multi-year prime contract valued at $2.43 billion to supply M31 triple-base propellant for 155mm artillery charge systems to the US Department of the Army. This prime contract was originally signed by the CCC in July 2019, with an ordering period ending in July 2026.

The high value of individual awards to GD-OTS Valleyfield under this agreement was a significant driver of the record-breaking total of CCC contracts awarded to the US DOW throughout FY2025.

2 General Dynamics Land Systems - Canada - $418,494,447

General Dynamics Land Systems - Canada (GDLS-C), based in London, Ontario, is a major producer of armoured combat vehicles and is another of several Canadian subsidiaries of the US-based defence giant General Dynamics.

GDLS-C has long produced light armoured vehicles (LAVs), 8-wheeled combat vehicles available with different armaments in numerous configurations. Since the 1980s, GDLS-C has exported thousands of LAVs to foreign clients, with most destined for either the US or Saudi Arabia.

In FY2025, GDLS-C's largest single contract,

> The Canadian Commercial Corporation concluded contracts with the US Department of War worth $2.07 billion, breaking all previous records.

valued at $381 million, was issued by the US Department of the Army through the Foreign Military Sales (FMS) program for the supply of Stryker armoured vehicles to Bulgaria. While the initial approval covered 183 vehicles, recent reporting suggests this figure has increased to 198.

The FMS program is a US government mechanism for selling defence articles to foreign governments and serves as a primary channel for arming allies and partners. The Stryker sale to Bulgaria occurs amid broader European rearmament efforts following Russia's invasion of Ukraine.

3 L3Harris Wescam - $207,977,018

L3Harris Wescam is a world-leading manufacturer of electro-optical/infra-red (EO/IR) sensors used across multiple US military branches for surveillance, target acquisition, and, in some cases, airstrike coordination.

In FY2025, the company's largest single award to the US DOW, valued at $182 million, was issued under a multi-year agreement with the US Department of the Navy. Originally signed in December 2023, the contract runs through late 2028 and concerns the supply of multiple EO/IR sensor systems, including the MX-10, MX-15, and MX-20, as well as repair and sustainment services for existing units.

In October 2025, Project Ploughshares identified the use of L3Harris Wescam EO/IR sensors during US-led airstrike operations against alleged narco-terrorists in the Caribbean Sea. Human rights monitors and United Nations officials characterized the operations as extrajudicial killings.

4 General Dynamics Ordnance and Tactical Systems (OTS) - Canada Inc. - $99,456,614

In addition to its Valleyfield production line, GD-OTS operates three other facilities in Canada. Its Repentigny, Quebec facility oversees munitions manufacturing, including the production of casings and the assembly of military-grade ammunition, commonly referred to as Load, Assemble, and Pack (LAP) services.

In FY2025, the company performed work under a contract originally signed through the CCC with the US Department of the Army in August 2022. The contract covers LAP services for 60mm, 81mm, and 120mm High Explosive mortar cartridges, as well as 120mm M931 full range practice cartridges. The agreement remains in effect through September 2029 and is funded by the US Army's Joint Munitions Command, headquartered at Rock Island Arsenal, Illinois.

5 AirBoss Defense Group Ltd. - $58,323,182

AirBoss Defense Group (ADG) is the Canadian arm of the US-based AirBoss Defense Group and manufactures protective equipment for military end-users, particularly Chemical, Biological, Radiological, and Nuclear (CBRN) gear.

In 2025, ADG, through the CCC, secured a major contract with the US DOW for the procurement of lightweight molded overboots (MALOs) designed to protect against chemical and biological threats. The contract was awarded through the Troop Support division of the Defense Logistics Agency, which acts as a supply hub for US military service branches.

6 CMC Electronics Inc. - $46,912,219

CMC Electronics of Montréal, Quebec, is a major manufacturer of avionics systems used in both commercial and military aerospace platforms. According to the company, more than 130 different aircraft platforms active in 80 countries rely on CMC-produced technology, spanning fixed wing, rotary wing, and uncrewed systems.

In FY2025, CMC Electronics received a subaward under a broader US DOW contract issued in FY2024 to supply flight control computers for the UH-60 Black Hawk helicopter. This follows earlier contracts supporting the Black Hawk program, including the provision of Flight Management Systems for the US Army, US Air Force, and several unspecified international customers.

According to *The Military Balance* (2025), the Black Hawk remains a cornerstone of the US rotary-wing inventory, with the US Army alone currently operating 1,755 aircraft.

7 Ultra Electronics TCS Inc. - $40,865,608

Ultra Electronics TCS produces electronic systems for military end-use with a particular focus on tactical and strategic radio and communications equipment. It is a subsidiary of Ultra Electronics, headquartered in Middlesex, United Kingdom.

In FY2025, through the CCC, the company produced ORION radio systems for the US Army's Terrestrial Transmission Line of Sight (TRILOS) Radio Program, which extends battlefield communications when satellite connectivity is unavailable. This work represents the later stages of a multi-year contract valued at up to US$500 million, signed through the CCC in 2019. □

**Unless otherwise noted, all values are in Canadian dollars.*

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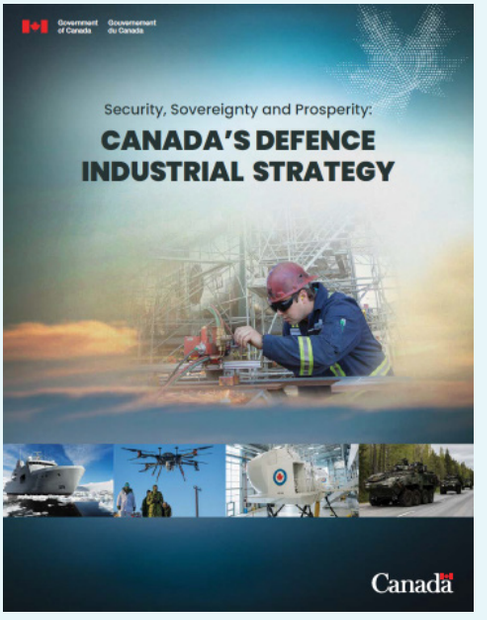
Canada's Defence Industrial Strategy: Seeking Security Through Arms Sales?

On February 17, 2026, the Government of Canada released its new Defence Industrial Strategy. The strategy outlines a substantial reorientation of the Department of National Defence's procurement policy, with a goal of sourcing 70 percent of defence procurement domestically within ten years.

To meet this goal, the strategy also calls for a 50 percent increase in Canadian arms exports, to be achieved in part by streamlining export permit approvals.

This initiative comes at a time when Canadian arms exports are already at some of their highest levels in decades, and when the government faces ongoing scrutiny regarding its underimplementation of the Arms Trade Treaty, which requires consistent and non-discriminatory human rights assessments for all arms transfers.

Whether these ambitious targets can be met remains to be seen. Canada's treaty obligations, however, are not optional. – *Kelsey Gallagher*



Reflections from Global Affairs Canada Consultations

After the Rupture: Disarmament, Risk, and Canada's Search for Agency

By Jessica West

January's civil society consultations on disarmament, non-proliferation, arms control, and space, convened by Global Affairs Canada, offered something more candid than many formal disarmament meetings: a shared recognition that the debate has shifted. The central challenge is no longer how to prevent rupture in the global security order, but how to operate—and act—in its aftermath.

Across discussions on nuclear risk, emerging technologies, humanitarian disarmament, and multilateral institutions, a consistent theme emerged. Long-standing arms control frameworks are eroding. Humanitarian norms that Canada has worked for decades to build and sustain are being sidelined—or openly abandoned—by some states. The result is not only heightened risk, but a deeper sense of disorientation: familiar tools no longer work as intended, and established pathways for meaningful action feel increasingly constrained.

Yet the discussions did not stop there. They also pointed to opportunity.

As traditional mechanisms falter, space is opening for middle powers to play a renewed diplomatic role. Countries like Canada may not be positioned to dictate outcomes, but they are well placed to convene, connect, and help rebuild common ground among actors navigating the same uncertainty. This includes forging new partnerships across regions and issue areas and advancing practical measures that reduce risk even when consensus is thin.

Participants also emphasized the growing entanglement across nuclear, cyber, space, and emerging technologies. Rather than treating this complexity as a barrier, it can serve as a point of convergence: shared vulnerabilities create shared interests in restraint, transparency, and crisis prevention.

The task ahead is not simply to preserve what remains of the existing disarmament architecture, but to adapt it to a changed world. For Canada, this moment offers a chance to help shape new forms of cooperation, grounded in realism, focused on harm reduction, and capable of rebuilding trust where it has been lost.

Reading the Room: Canada's Arms Control Consultations

By Branka Marijan

"What is one surprising thing about this year's consultation on arms control and disarmament?" one participant at the annual Global Affairs Canada meeting asked me. It was an important question to reflect on. This year's gathering, notably convened in January rather than the usual late spring or fall, provided an early signal of shifting dynamics.

Reflecting on the meetings I had attended in November in Brussels, and on subsequent conversations, I noted that I was struck less by what was said in the room than by what was felt only indirectly: the full extent of urgency in these discussions is still not always immediately visible. Yet the urgency is undoubtedly there.

The consultation took place just days after Prime Minister Mark Carney's widely discussed speech at the World Economic Forum in Davos, and many participants remarked on the unusually unsettled moment in international security. The Prime Minister's stark assessment, that the rules-

Ploughshares staff past and present (from left: Cesar Jaramillo, Kirsten Mosey, Branka Marijan, Paul Heidebrecht, and Jessica West) are pictured in Ottawa at the Global Affairs Canada consultation on disarmament, non-proliferation, arms control, and space in January, convened by Global Affairs Canada. *Project Ploughshares*

based international order can no longer be taken for granted, hung in the background of many exchanges. His sense of rupture was difficult to ignore for anyone observing the continued erosion of the arms control architecture. Only days later, on February 4, the New START treaty between the United States and Russia reached its expiration deadline, underscoring the fragility of the current moment.

What was perhaps most notable in the discussions was the degree of shared concern, and, in many cases, empathy, across communities. Civil society actors and government officials alike are grappling with the convergence of new and emerging technologies even as long-standing security risks, particularly nuclear weapons, remain unresolved and in some respects become more dangerous.

A central question throughout was the role that Canada, and middle powers more broadly, can realistically play in advancing arms control and disarmament. Looking around the room, one conclusion was difficult to avoid: for Canada to exercise meaningful influence, it will need to invest more seriously in diplomacy and in building the specialized capacity required to address the challenges posed by emerging technologies in arms control. This includes strengthening expertise within both diplomatic institutions and civil society.

Whether the Canadian government will fully recognize the scale of this need remains uncertain. □

After Containment

Canada in an Expanding Nuclear Era

Written by Jessica West

Nuclear order rarely collapses in a single dramatic moment. It shifts gradually, until the old boundaries no longer hold.

For more than sixty years, nuclear stability rested on a fragile but recognizable architecture: mutual deterrence, arms control agreements, and an uneasy but real commitment to restraint. That architecture is now under visible strain. Nuclear weapons are being woven into broader strategic competition at the very moment the agreements and habits that once constrained them are weakening.

The immediate signals of this transition are increasingly visible. Russia's repeated nuclear allusions and signalling in the context of its war against Ukraine have strained long-standing taboos around nuclear use. The lapse of the last remaining bilateral limits on U.S. and Russian strategic forces has removed a central pillar of predictability. Accusations of renewed nuclear testing and pledges to respond in kind suggest a competitive dynamic many believed had been contained.

But the underlying transformation extends beyond treaty erosion or rhetorical escalation. Strategic missile defence initiatives such as Golden Dome challenge the logic of mutual vulnerability that underpinned deterrence stability. Emerging technologies—space systems, cyber capabilities, artificial intelligence—are increasingly integrated into the systems that detect threats and guide nuclear decision-making. Decision cycles are shortening. Uncertainty is becoming embedded within deterrence itself.

Nuclear weapons are no longer a distant abstraction, even in non-nuclear-weapon states like Canada. Public debate has reopened questions once thought settled.

How Nuclear Stability Was Actually Sustained

The nuclear age is often remembered through defining moments: Hiroshima and Nagasaki as acts of foundational violence, and later crises—most notably the Cuban Missile Crisis—as catastrophes narrowly averted.

But these stories center brinkmanship. They obscure the longer story in between.

Stability was sustained not by crisis management alone, but by institutions, routines, and shared expectations designed to ensure that nuclear weapons were not used again. Arms control agreements, verification regimes, diplomatic channels, and habits of communication acted as shock absorbers—constraining rivalry without eliminating it.

Countries like Canada rarely appeared in crisis narratives. Their influence lay in reinforcing this quieter architecture of restraint: supporting non-proliferation, verification, transparency, and the norm that security for middle powers did not

The Moon Is Back. Can Peace Keep Up?

Artemis II marks the return of humans to lunar flight for the first time in more than half a century. Among the four crew members is Jeremy Hansen, reflecting Canada's long-standing role in human spaceflight and its commitment to lunar exploration.

Beyond its symbolism, Artemis II marks a deeper shift: the normalization of cislunar space—the region between Earth and the Moon—as an operational environment for human spaceflight, operations, and sustained presence. This shift carries implications that extend well beyond exploration.

Under international law, the Moon itself is reserved for exclusively peaceful purposes—a principle that remains widely accepted. The challenge today lies not on the lunar surface, but in the space around it. Cislunar space is becoming more active and more strategically significant, supporting tracking, communications, navigation, and mission assurance for human and robotic exploration. Many of these functions are provided by state-backed systems, because growing national interest and strategic competition are shaping how lunar activity is organized and secured.

Operating between Earth and the Moon places a premium on cooperation. The lunar environment is unforgiving: extreme temperatures, radiation, abrasive dust, and distance mean that failures are difficult to manage and rescue options are limited. Safety depends on timely information-sharing, clear communication, and shared situational awareness—especially as more states plan lunar missions.

There is no military conflict on or around the Moon. But the conditions that sustain peace are under quiet pressure from competition, fragmentation, and the absence of shared practice. Experience in Earth orbit shows that cooperation can erode gradually, not through confrontation, but as ambiguity and mistrust take root.

For Canada, where lunar exploration is a pillar of national space policy, Artemis II is not only a milestone mission, but an early test of how peaceful use can be translated into practice as human activity expands beyond Earth orbit.
– Jessica West

require nuclear ownership.

That scaffolding made deterrence survivable.

Deterrence Without Boundaries

What distinguishes the emerging era is not simply renewed competition. It is the simultaneous thinning of stabilizing mechanisms and the expansion of nuclear deterrence into new domains and new purposes.

Nuclear threats are used to shield conventional aggression. Missile defence is framed not as a limited safeguard, but as a way to escape the logic of mutual vulnerability; a move that upends the fragile stability of deterrence. New delivery systems and renewed testing accusations reinforce competitive momentum.

Not every nuclear reference signals imminent use. Collapsing all rhetoric into "threat" amplifies fear and distorts judgment. As George Perkovich argues, distinguishing allusion from preparation is itself a stabilizing discipline.

At the same time, the technological environment surrounding deterrence is changing. Nuclear command and warning systems increasingly rely on space-based sensors, digital communica-

tions networks, and data-processing tools that are not exclusively military in origin or control. Early-warning information moves through complex infrastructures.

This is where the risk shifts. The central question is no longer only how many weapons exist, but how interconnected systems behave under stress.

In this environment, deterrence is no longer confined to a narrow nuclear domain. It intersects with conventional conflict, cyber operations, space systems, and emerging technologies. Boundaries that once separated nuclear and nonnuclear risks are thinning. Deterrence is being repurposed, sometimes deliberately, sometimes by default.

Canada in the Next Nuclear Era

Canada cannot insulate itself from this transition. It does not possess nuclear weapons, but it is embedded in the political, technological, and industrial systems that now shape nuclear risk. The question is not whether Canada directs great-power arsenals, but whether it helps contain the expansion of nuclear roles before that expansion becomes normalized.

Nuclear weapons remain the only weapons capable of inflicting immediate, large-scale devastation across borders and generations. What is changing is the context in which they operate, and the number of pathways through which error or escalation could reach that destruction. As deterrence becomes more tightly coupled to space-based sensors, digital networks, missile defence initiatives, and emerging technologies, the margin for error narrows. Escalation may arise not only from deliberate aggression, but from misinterpretation within compressed and technologically mediated decision cycles.

In this environment, leadership lies not in rhetorical escalation, but in defining and defending limits—and in building the updated guardrails this era requires.

Canada has long supported the goal of nuclear disarmament. Preserving that goal now requires preventing further normalization: if nuclear weapons are increasingly invoked to shield conventional operations or anchor technological competition, their role will expand by default and become harder to reverse.

Canada can act to resist that drift. Reaffirming that Canada will not seek nuclear weapons of its own is only the starting point. It must also defend clear limits on nuclear roles, encourage disciplined interpretation of nuclear signalling, reinforce that these weapons remain exceptional and dangerous, and ensure that decisions in space governance, cyber resilience, artificial intelligence oversight, and defence industrial policy do not quietly expand deterrence by default. Risk reduction measures, transparency, and confidence-building should not be treated as endpoints, but as part of a sequence that preserves space for renewed constraint.

Such measures are not a concession to permanence. It is a strategy for preserving the possibility of constraint. Abolition becomes plausible only when nuclear weapons remain politically costly, clearly bounded, and embedded within frameworks of restraint.

Political Conditions and Public Responsibility

Policy choices do not unfold in a vacuum. They are shaped by public expectations about what is normal, necessary, and inevitable. The earlier architecture of nuclear restraint endured not only because of treaties and diplomatic channels, but because nuclear use remained politically unacceptable.

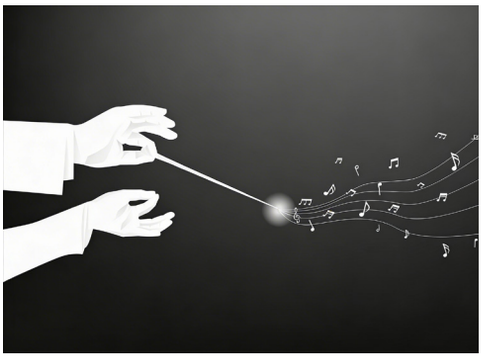
As technological change accelerates and nuclear rhetoric re-emerges, pressures to expand deterrence roles will intensify. Without countervailing scrutiny, normalization can occur incrementally, and almost invisibly.

Civil society sustains the political boundaries within which governments operate by keeping nuclear use publicly unacceptable. Risk reduction, restraint, and eventual disarmament do not endure without that political foundation.

Canada cannot determine the trajectory of global nuclear competition. But it can influence whether nuclear weapons become more deeply embedded in emerging security architectures or remain constrained while space for future reductions is rebuilt. In a period of transition, leadership will not be measured by expansion, but by discipline—by the willingness to define limits before they disappear. □

The Autonomous Conductor?

AI and the Future of Command



Written by Branka Marijan

Few people outside defence circles spend much time thinking about military command and control, or C2. Yet the way new technologies are transforming command and control should concern a much wider audience than defence analysts alone.

To avoid a jargon-heavy explanation of C2, a useful analogy is that of an orchestra. The conductor acts as the commander, setting the tempo and style of a piece, while relying on the musicians—the units—to execute specific notes. Successful performance requires both centralized direction and decentralized skill. At times, if conditions allow, the conductor may delegate greater autonomy, enabling musicians to innovate within the broader framework of their guidance. Unlike a concert hall, however, military contexts involve life-and-death decisions, and increasingly, countries are directly or indirectly introducing artificial intelligence (AI) into front-line decision-making.

As these technologies migrate from research and development into active theatres of operation, the "orchestra" of command faces a profound systemic shift. The drive for algorithmic speed—the ability to process sensor data and designate targets in seconds—threatens to compress the space available for human judgment and moral deliberation. While military planners argue that AI is necessary to manage the data-saturated "hyperwar" of the future, this evolution risks decoupling the chain of command from the chain of accountability and may heighten escalatory dynamics.

In the future battlespace, if the conductor's role is increasingly sidelined, they risk becoming a spectator to a lethal process they can no longer effectively lead or interrupt. For the international community, the challenge is therefore not purely technical. It requires deeper understanding of how decision-making, human agency, and contextual human judgment are transformed when AI-enabled tools and decision-support systems are integrated into military operations. As international discussions on responsible military AI and autonoous weapons struggle amid geopolitical uncertainty, the need for a broader suite of governance responses is growing more urgent.

Russia's "Svod" System

Part of the urgency surrounding international discussions stems from the rapid evolution of battlefield management systems in contemporary conflict zones, most notably Ukraine. Analysts have pointed to Russia's reported roll out of the "Svod" Tactical Situational Awareness Complex as an illustration of how digital integration is reshaping command structures in practice.

Svod appears designed to bring together data from multiple sensors, drones, reconnaissance assets, and battlefield reporting, into a more unified operational picture for commanders and forward units. Russia is not a pioneer in this area. Indeed, the United States and several other advanced militaries have even more sophisticated systems that they are using and developing.

In theory, such systems promise faster targeting cycles and improved coordination across dispersed forces. Promises of greater civilian protection and more accurate targeting are also often made. In practice, however, they also reflect a broader shift toward more distributed and digitally mediated forms of command. As analyst Kateryna Bondar notes, Svod is less centralized than some of the systems the United States and other Western countries have sought to build under so-called joint concepts, that is, efforts to connect all military branches into a unified AI-enabled network for mission execution.

This evolution is partly adaptive. Russian forces have faced significant battlefield pressures that exposed weaknesses in traditional, highly centralized command models. Notably, military analysts point to Russian officers' inability to make timely decisions in individual engagements as one of the motivating factors for the introduction of technical solutions. Systems like Svod aim to shorten the sensor-to-shooter loop and enable faster tactical responsiveness at lower echelons. Yet the same features that enhance speed and responsiveness also introduce new risks.

First, greater automation and data fusion can create automation bias, where human operators over-trust machine-generated outputs, particularly under time pressure. Researchers Marta Bo and Jessica Dorsey also point to a cognitive action bias, that is the "human tendency to take action, even when inaction would logically result in better outcome." Second, the fragmentation of decision-making authority across networked units can blur lines of responsibility when AI-enabled tools shape targeting or operational recommendations. Third, highly networked command systems may create new vulnerabilities to spoofing, cyber intrusion, or data manipulation, risks that are amplified in contested information environments. In short, systems like Svod make command faster and structurally different.

Moreover, the Ukrainian context continues to demonstrate the accelerating role of technology in warfare, with new systems being tested and deployed even as efforts to end the conflict, which has devastated the country and its population, repeatedly falter. In such a context, the sustained operational tempo and cognitive load placed on commanders, often over years of continuous conflict, introduce additional human and organizational challenges that are contributing to the seeking of technical solutions for the pressures the commanders carry.

The Human Role Under Pressure

Much of the policy debate on autonomous weapons as well as military AI has focused on whether machines will make lethal decisions independently. This remains a critical concern. However, AI-enabled decision support systems as discussed above add another subtler layer that influences rather than formally replaces human decision-makers.

Decision-support tools can narrow perceived options, prioritize certain targets, or shape situational awareness in ways that materially affect the human commander's judgment. As researchers at the Center for War Studies at the University of Southern Denmark note, "when a system presents a human with one option of a set of limited options, it makes it challenging to choose other pathways." Over time, this can produce what might be described as a form of cognitive compression, where the human remains nominally in charge but operates within increasingly machine-shaped parameters.

Reporting from Gaza has illustrated the risk of human rubber-stamping of AI-enabled decision-support systems. Some targeting decisions were reportedly made in as little as 20 seconds, and in practice reduced human decisions to confirming.

The orchestra analogy again becomes instructive. The risk is not only that the conductor disappears, but that they continue to stand on the podium while the tempo, score, and cues are increasingly set elsewhere.

For militaries operating under intense time pressure and information overload, the appeal

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of AI-enabled systems is clear. But the cumulative effect may be to erode human agency not only through a single handover to autonomy, but through incremental shifts in how decisions are framed, accelerated, and executed.

Implications for International Security

These developments carry significant implications for strategic stability and responsible military AI governance.

Faster targeting cycles and compressed decision timelines can increase the risk of inadvertent escalation, particularly in crises where ambiguity is high and human verification windows shrink. Distributed, AI-enabled command systems may also complicate traditional accountability frameworks under international humanitarian law, especially where responsibility becomes diffused across human-machine teams.

For middle powers such as Canada, states that often emphasize responsible technology use, the challenge is twofold. First, they must understand the operational realities driving AI adoption in military contexts and how various systems interact, especially in coalition environments. Second, they must help shape norms, confidence-building measures, and governance frameworks that preserve meaningful human agency in increasingly automated battlespaces. The latter is particularly necessary given that, for now, the United States and China appear disengaged from many of the governance efforts aimed at establishing guardrails on the expanding role of AI in military contexts.

Keeping the Human Conductor in Control

The future of military command is unlikely to be fully autonomous, nor will it remain comfortably human-centric. Instead, it will be defined by increasingly complex human–machine partnerships.

The central policy question, therefore, is not whether AI will enter command and control (it already has), but whether governance frameworks, operational doctrine, and system design will evolve quickly enough to ensure that human judgment remains both meaningful and accountable.

If the orchestra is already playing faster, the task ahead is to ensure the conductor can still shape the music, and, when necessary, bring it to a halt. Or indeed to consider whether the change in tempo is actually necessary in a particular context, or is a result of what Professor Zena Assaad calls a "fabricated fear of falling behind." As research on orchestras found, a conductor who has greater control also produces superior results. Ultimately, it is government decisions that determine the score and decision-makers must be clear-eyed about how their choices will shape societal outcomes. □

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When Trust Breeds Vulnerability

AI, Disinformation, and Security in the Grey Zone

Written by Ishmael Philip Carrey*

On a morning in May 2023, an AI-generated image depicting an explosion near the Pentagon circulated widely online, prompting brief confusion in global information and financial markets before being debunked by U.S. authorities and major media outlets. Although entirely fake, the image appeared credible enough to demonstrate how quickly synthetic content can trigger real-world reactions before verification mechanisms can respond.

The incident lasted only minutes, but it exposed a deeper national security vulnerability—one that matters not only to the United States but to all open, digitally connected democracies, including Canada. AI-generated falsehoods can spread doubt among citizens faster than institutions can verify, correct, or respond. In today's security landscape, speed matters. It allows influence operations to operate in the space between peace and war—often described as the grey zone—where actors pursue advantage through ambiguity, deniability, and manipulation rather than overt force.

AI-driven mis- and disinformation intensify these dynamics. By generating realistic text, images, audio, or video at scale, AI enables deceptive content to spread faster than responsibility can be assigned or trust restored. For Canada, this means that threats to national security increasingly emerge not through direct attack, but through the erosion of trust during moments of uncertainty.

A Defence Issue: Influence, Speed, and Instability

In Canada and around the world, mis- and disinformation are no longer merely social media nuisances. They have become security threats, undermining public trust precisely when institutions need it most. When people cannot distinguish verified information from intentional manipulation, trust in elections, emergency alerts, scientific advice, and public leadership erodes, creating fertile ground for grey-zone competition in which uncertainty itself becomes a strategic weapon.

Misinformation and disinformation have long been part of international competition, from Cold War-era propaganda broadcasts to covert "active measures" campaigns. What has changed is the speed and scale. Artificial intelligence has dramatically reduced the cost, time, and effort required to conduct influence operations, enabling hostile actors to overwhelm information environments faster than institutions can respond. Cana-

Spain Hosts the Third REAIM Summit

Photo by Manoj Harjani

A critical international meeting on the responsible application of AI in the military domain took place from 4–5 February in A Coruña, Spain. This marked the third gathering of the multistakeholder REAIM (Responsible AI in the Military Domain) initiative, originally spearheaded by the Netherlands and the Republic of Korea. The first meeting was held in The Hague and the second in Seoul.

Spain, as a gracious host to a wide range of representatives from states, industry, academia, and civil society, sought to place ethical concerns at the centre of the discussion while acknowledging the need for a clearer understanding of the norms and regulatory frameworks guiding the research and development of military AI systems.

There is a growing recognition that states and militaries must take a life-cycle approach to weapon systems, embedding responsible use from research and development through deployment and ultimately to decommissioning. This recognition is important. It reflects an understanding that accountability cannot be confined to the point of use, but should extend across the full operational life of AI-enabled systems, including ongoing monitoring and periodic reassessment.

Still, the path toward more formal rules remains long. Both the United States and China were largely absent from the discussions. A Chinese delegate speaking from the audience during one panel reiterated Beijing's position that it does not view itself as engaged in an AI arms race with any country. The United States, meanwhile, maintained a low profile and, for the first time, did not sign the REAIM outcome document, having endorsed the previous two.

States will have another opportunity in June to continue the dialogue and consider next steps when they convene in Geneva for a three-day meeting. – *Branka Marijan*

da's intelligence agencies, including the Communications Security Establishment, have repeatedly warned that hostile states employ digital influence operations to undermine democratic processes, a concern reflected in recent national cyber threat assessments.

Generative AI models can rapidly produce synthetic videos, voices, or written materials that mimic official news or policy announcements, generating thousands of tailored variants in the time it takes institutions to issue a single correction. During the early stages of Russia's war against Ukraine, a widely reported deepfake video falsely showed President Volodymyr Zelensky calling on Ukrainian troops to surrender, illustrating how future operations may seek to blur the line between truth and fiction rather than relying solely on force.

For national defence, the risk lies not only in deception itself but in the instability it creates. Mis- and disinformation distort the information environment precisely when decisions must be made quickly, information is incomplete, and the costs of error are high. Fake alerts, fabricated military movements, or deepfake government statements can delay decision-making, complicate coordination with allies, and increase the risk of miscalculation.

A Human Security Issue: Environmental Crises and the Information Fog

AI-driven mis- and disinformation also pose significant threats to human security during environmental crises. The United Nations Development Programme has cautioned that artificial intelligence accelerates climate-related mis- and disinformation, weakening scientific consensus and distorting public discussions on mitigation and adaptation.

Environmental crises are inherently disorienting, and opportunistic actors are quick to exploit

that uncertainty. Government reporting emphasizes that deepfakes, synthetic audio, and fabricated expert commentary make it harder for the public to judge what is credible, undermining not only immediate safety but longer-term trust in environmental governance. As climate impacts intensify, AI-driven disinformation compounds risk not by harming ecosystems directly, but by weakening social and institutional resilience.

Canada is already confronting environmental disasters on a scale once thought exceptional. Recent wildfire seasons in Canada have triggered mass evacuations, degraded air quality across North America, and strained emergency services, underscoring the importance of trusted public information during crises.

An effective response during these moments relies on trusted information: evacuation notices, fire maps, air-quality alerts, and official guidance. When AI-generated falsehoods circulate alongside legitimate communications, public confidence erodes, compliance declines, and protective action may be delayed.

A Technology Governance Issue: Falling Behind the Pace of Change

While AI accelerates the spread of mis- and disinformation, governance responses remain slow and fragmented. Canada lacks a specific federal framework for AI-generated political content, and the proposed Artificial Intelligence and Data Act (AIDA) stalled when Parliament was prorogued in early 2025. Meanwhile, generative tools continue to evolve at a rapid pace.

Public concern continues to rise. Analysis by Policy Horizons Canada highlights growing public anxiety about AI misuse and skepticism about existing safeguards. At the same time, both government and civil society lack uniform standards for verifying AI-generated content, responding to deepfake incidents, or coordinating across jurisdictions. Detection tools lag behind increasingly sophisticated generative systems, widening the gap between technological capability and institutional response.

When Trust Becomes a Vulnerability

Canada's vulnerability lies less in institutional weakness than in institutional trust. High public confidence in government, science, and media means that false information designed to appear authoritative can spread quickly and cause harm before it is corrected. In a small, highly connected information environment—with responsibilities divided across multiple levels of government—uncertainty can slow response and complicate attribution. Canada's careful, evidence-based approach to public action, normally a strength, can in this context give disinformation campaigns time to take hold, particularly during crises when speed and clarity matter most.

Trust as the New Battleground

AI has not created misinformation, but it has transformed its strategic impact by accelerating its speed, expanding its reach, and intensifying its psychological effects. Across national defence, emergency response, and public decision-making, one lesson stands out: trust now erodes faster than institutions can verify, correct, or restore it.

This dynamic lies at the heart of grey-zone competition. AI-driven mis- and disinformation exploit ambiguity and doubt not only in geopolitical rivalries abroad, but also during domestic crises at home. The result is a weakening of public trust in elections, emergency response, and government decision-making, all without the use of open force.

In this landscape, the battleground is not territory but trust. Canada faces a choice: allow AI-driven grey-zone tactics to outpace institutional adaptation, or recognize that safeguarding trust is now a core component of national security. The challenge is not only defending facts, but maintaining the public's capacity to discern—and believe—when something is true. □

** Ishmael Philip Carrey was a Research Intern at Project Ploughshares through the Technology Governance Initiative at the Balsillie School of International Affairs, with support from Mitacs.* *This article forms part of a broader research collaboration supported by the Department of National Defence's MINDS (Mobilizing Insights in National Defence and Security) program, in partnership with the University of Guelph, focused on public engagement at the intersection of environmental risk and national security in the grey zone.*

Autonomous North

Geopolitics, AI, and Climate

Written by Kianna Low-A-Chee*

In the 1990s, the Arctic was widely framed as an exception to global geopolitics: a zone of peace, disarmament, and pragmatic cooperation. This idea of Arctic exceptionalism took hold in policy and academic circles alike. Yet climate change and renewed great-power competition have steadily eroded that narrative. What was once protected by ice, distance, and inhospitable conditions is now increasingly accessible and contested.

The Arctic is warming roughly four times faster than the rest of the world. As glaciers retreat and permafrost thaws, new shipping routes and natural resources, including critical minerals, are becoming reachable. For now, Arctic shipping lanes are accessible only during the summer months and still costly to navigate. But scientists estimate that the Arctic Ocean could be largely ice-free by 2040. As navigation becomes feasible for longer periods each year, as much as 5% of global shipping could eventually be diverted northward.

This transformation has direct implications for Canada. Forty per cent of Canada's territory lies in the Arctic, making it central to the country's security, economy, and environmental stewardship. While geography once insulated the region, climate change is dissolving that buffer. At the same time, emerging technologies underpinned by artificial intelligence (AI) are becoming critical to how states monitor, manage, and compete in the North.

Why the Arctic Matters for Canada

The strategic importance of the Arctic is now explicitly reflected in Canadian policy. Canada's 2024 defence policy, *Our North, Strong and Free: A Renewed Vision for Canada's Defence* places the region at the centre of national security planning. Concerns are becoming realities as US President Donald Trump threatens Greenland's sovereignty and states that stand with it. Although Trump has rolled back proposed tariffs, world leaders have taken note of the United States' apparent disregard for the rules-based international order.

Canadian Prime Minister Mark Carney took notice of the decline at the January 2026 meeting of the World Economic Forum, acknowledging the emergence of a "new world order." Rather than treating China solely as an adversary, Carney and Chinese President Xi Jinping reportedly found common ground when discussing Greenland and the Arctic. This shift reflects what is being described as a 'new pragmatism' for Canadian foreign policy with implications for Canada's role within an evolving geopolitical and technological order.

Introducing AI to the Arctic

This recalibration of Canadian foreign policy sets the stage for a closer examination of how emerging technologies, particularly artificial intelligence, are contributing to Arctic governance

and security. AI is a foundational technology for modern economies, green transitions, and military operations. The Canadian Armed Forces and the Department of National Defence have committed to integrating AI across their operational capabilities, including maritime awareness and surveillance. The Royal Canadian Navy is currently trialing AI-enabled systems to enhance situational awareness in northern waters.

> The environmental shifts in the Arctic have positioned the region at the intersection of geopolitical competition and technological innovation. For Canada, the primary challenge lies in developing a framework for engagement that balances national security with environmental stewardship.

Yet AI's significance in the Arctic extends beyond defence. As a dual-use technology, it offers tools for environmental monitoring, climate prediction, sustainable resource management, and human security. In a region where physical presence is costly and often dangerous, AI-enabled remote sensing offers the promise of a means to "see" the Arctic continuously and at scale.

Capitalizing on Dual-Use AI

Private and community-driven initiatives demonstrate some of this potential. In 2021, PolArctic piloted software that blends Indigenous knowledge, scientific data, and remote-sensing techniques to identify previously undiscovered fishing locations. The system supports sustainable fisheries management while also improving navigation through sea ice, an example of how local knowledge and advanced technology can reinforce one another.

Such capabilities are of growing interest to militaries worldwide. The United Kingdom, for instance, has invested £544,000 in a project by the Alan Turing Institute to enhance Arctic detection capabilities. PolArctic's "digital twin" model creates virtual representations of physical environments offering insights not only for defence but also for shipping, environmental protection, and infrastructure planning.

Traditional approaches to domain awareness rely heavily on sustained human presence, which is uniquely challenging in the Arctic. Polar night, extreme weather, and vast distances limit patrols and surveillance. Canada's North Warning System currently consists of just 46 active radar sites across the entire northern region. Recognizing these constraints, Canada has committed $38.6 billion over the next two decades to modernize NORAD.

Expanding remote sensors and integrating them with AI could enhance defence capabilities while simultaneously advancing climate science. Doing so would allow Canada to establish comprehensive environmental baselines—something that does not yet exist for much of the Arctic. Without such baselines, it is difficult to measure or respond effectively to environmental change.

With better data, AI systems can also model impacts on wildlife and communities. As sea ice melts, migration patterns shift and encounters between humans and wildlife become more frequent. In Nunavut, AI-enabled radar systems now warn communities of nearby polar bears. Originally developed for military use, these systems automatically notify residents and can trigger non-lethal deterrents, such as lights or noise, to prevent dangerous encounters.

Environmental Costs and Trade-offs

Still, AI is no environmental panacea. Data centres consume vast quantities of water for cooling, while the chips that power AI systems depend on critical minerals often sourced from environmentally sensitive regions. AI's energy demands are also growing rapidly. In 2025, AI usage emitted roughly the same amount of carbon dioxide as New York City.

In the Arctic, this creates a vicious cycle. Rising global emissions accelerate warming, opening new shipping routes. Increased shipping then produces additional emissions—carbon dioxide, nitrous oxide, and sulfur oxides—that further degrade the environment. These gases contribute not only to warming but also to ocean acidification and declining oxygen levels, reducing the ocean's capacity to regulate the climate.

Strategic Outlook and Policy Priorities

The environmental shifts in the Arctic have positioned the region at the intersection of geopolitical competition and technological innovation. For Canada, the primary challenge lies in developing a framework for engagement that balances national security with environmental stewardship. While AI-enabled systems offer significant potential to enhance regional safety and resilience, their deployment must be guided by clear ethical and operational standards.

At the heart of Arctic exceptionalism was cooperation. Restoring a measure of that exceptionality will require deliberate policy choices. For example, Canada should work collaboratively through the Arctic Council to establish a comprehensive environmental baseline. By leveraging its long-standing leadership experience on the Council, Canada can foster the technical cooperation necessary to monitor climate impacts accurately and focus on shared scientific inquiry.

The Arctic is no longer insulated from global pressures. But with prudent governance, cooperative frameworks, and careful use of AI, Canada can help ensure that the High North remains a model for responsible adaptation and regional stability in an evolving world. Ultimately, the Arctic serves as the definitive testing ground for Canada's 'principled pragmatism'—a region where the nation must reconcile intensifying global competition with the stark realities of geography while proactively asserting its sovereign interests. □

**Kianna Low-A-Chee was a Research Intern at Project Ploughshares through the Technology Governance Initiative at the Balsillie School of International Affairs, with support from Mitacs. This article is part of a research project supported by funding from the Mobilizing Insights in Defence and Security (MINDS) program of the Canadian Department of National Defence, examining Canada's role as a middle power in a shifting geopolitical and technological order.*

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