

THE PLOUGHSHARES MONITOR

VOLUME 45 | ISSUE 4

WINTER 2024

Hope for a troubled world

CLIMATE SECURITY

Using technology
to fight climate change

OUTER SPACE

Laser-armed satellites
in outer space

ARMS TRADE

Scaling up the efficiency
of the ATT Conference
of States Parties

EMERGING TECH

- Meaningful human
control and AI-enabled
warfare
- Great Powers and AI
innovation



Second version of "Hope"

George Frederic Watts,
1886, oil on canvas, 56 x 44 in.
Tate Gallery, London

“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 Volume 45 | Issue 4

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From the Director's Desk

Hope for a troubled world



Written by Cesar Jaramillo

I often say that being an optimist is in my job description. Not always an easy task in today's world.

Civilians at risk

[*The Guardian*](#) has reported that as many as 150,000 people, many civilians, have been killed in the civil war in Sudan that began in 2023. Millions have been forced from their homes, most going to Chad, one of the poorest countries in the world. To add insult to injury, aid agencies are warning that the severity of the recent famine in Ethiopia could pale in comparison with the famine that is imminent in Sudan.

But the world does not seem to care. The states that could assist the displaced and injured are not stepping up. What a bleak picture – just one snapshot of our troubled world.

In Gaza, more than two per cent of the entire population (more than 43,000 of a total population of approximately 2.1 million) had been killed as of October. If this same level of disaster were to occur in Canada, the number of dead would be more than 800,000. It's very likely that each of us would know somebody who had died – or be dead ourselves.

The 1949 Geneva Conventions and their Ad-

ditional Protocols are the foundation of international humanitarian law (IHL). They should be deemed sacred and final, settling for all time what can and cannot be done during war. Their primary function is to protect noncombatants, not only innocent civilians, but military personnel who serve as medics or who have become prisoners of war, as well as aid workers.

Today these rules are being trampled into the ground. And it is not a matter of isolated violations. These laws are being systematically, persistently, shamelessly disregarded, with an alarming lack of accountability or restraint. And we know because these abuses are being documented to an extent never before known in the history of the world. Some violators are terrorists whom we know to be lawless; however, IHL is also being violated by states that, despite their committing truly barbarous acts in war, claim to be on the side of civilization.

The West, some elements of which are major arms manufacturers and exporters, is watching in silence or timidity or complicity as a sacred, hard-won regime of norms and laws about what is acceptable in times of conflict is crumbling before our eyes. It is truly troubling to watch both the carnage and the lack of caring from bystanders.

Nuclear war in our future?

There is no clarity on how the war in Ukraine will end. This conflict, with one nuclear-armed state facing another state backed by nuclear-armed allies, has brought the world perilously close to nuclear warfare. The risk of a nuclear detonation, leading to catastrophic escalation, cannot be overstated.

If the greatest threat today lies in the potential use of nuclear weapons in Ukraine, then stepping



Now is the time for all the people who desire a peaceful world, one that ensures basic human rights for all people on Earth, to work harder, smarter, and with greater determination.

back from this precipice is imperative. We must ask ourselves: under what conditions might these weapons be used, and how can we prevent that outcome? Alarming, current actions seem to move us in the opposite direction.

Nuclear deterrence is not a myth; it's a potent yet deeply flawed doctrine that permeates every aspect of this conflict. The West's commitment to a military victory in Ukraine, however understandable, fails to account for the realities imposed by nuclear deterrence. All parties must recognize that the very possession of these weapons dangerously reshapes the dynamics of the conflict.

We must accept that a decisive military victory in Ukraine is not likely – because the spectre of nuclear warfare looms too large. This conflict underscores the catastrophic risks that are intrinsic to any situation involving nuclear arms. The consequences of relying on the perilous doctrine of nuclear deterrence exceed what the world can bear.

The risks of AI-enhanced tech

Other developments also threaten our world.

Consider some recent advances in military technology, particularly certain applications of artificial intelligence (AI).

Some of the new AI-enhanced tech is truly marvelous. I have a friend who loves his new electric car, which can do most of the driving unassisted. Applications of AI are set to revolutionize medicine. And some of this tech may help us crack seemingly insurmountable problems related to our changing climate.

But even seemingly benign technology is being integrated into military systems. This is happening even as I write and as you read these words. Contemporary military systems, including uncrewed aerial vehicles and drones, while not fully autonomous, are still very advanced. And they're being [test-](#)

[ed and deployed](#) right now – in Gaza and Ukraine and elsewhere.

Soon these systems will be able to make critical life-and-death decisions without human intervention. They will select a target, zero in, and then execute deadly force – all without human instruction or control. The establishment of clear normative restrictions on the use of AI in military systems, defining what is acceptable and what must be prohibited, is imperative to prevent the unrestrained deployment of autonomous lethal force.

Space as a warfighting domain

Troubling developments are also taking place in [outer space](#). While space might seem too remote to cause us harm, activities in outer space have geopolitical implications right here on Earth.

Space has become a strategic domain for military purposes. Space-based capabilities are being used right now – in Ukraine and Gaza and elsewhere. This growing reliance on space for military operations escalates the risks of confrontation and highlights the urgent need for regulation.

The international community, with Canada's support and leadership, must prioritize the development of a normative regime for outer space – one that can safeguard this shared frontier, ensuring it remains a realm for peaceful and cooperative use rather than becoming another battleground. Establishing clear boundaries and rules for military activities in space is essential if we are to prevent crises with far-reaching impacts on Earth.

Failing to control the international arms trade

We can't escape the implications of a flourishing international arms trade. Before 2014, the arms trade was pretty much a free-for-all. Project Ploughshares and many others in civil society were advocating for the adoption of an international arms trade treaty. A popular slogan pointed to an essential truth when it claimed that there were more regulations for the trade in bananas than for the trade in guns, and more and better standards by weight, shape, and country of origin.

In 2014, the international community came together and, finally, created a regime that would ensure that there would be some risk assessment, some level of accountability: the Arms Trade Treaty (ATT). Its underlying rule: Countries don't sell weapons when they have good reason to believe that the weapons will be misused.

The theory was great.

However, a decade later, the 10th Conference of States Parties to the Arms Trade Treaty was held and revealed that the practice has not lived up to the promise (see article by Kelsey Gallagher in this issue). Arms dealers have been arming recipients that cannot be trusted. As we have shown in previous issues of *The Monitor*, they have sold weapons to human-rights abusers like the rulers of Saudi Arabia; to the government of Türkiye, which has diverted Canadian-made weapons to Libya and Nagorno-Karabakh; and to the government of Israel, which has destroyed large parts of Gaza and killed thousands of innocent civilians.

The flow of arms into conflicted regions continues even when we see that these weapons are being used to violate human rights and when the exporters have legal obligations under the Arms Trade Treaty and similar regimes.

The ATT regime has experienced an erosion in credibility, for good reason. The states with the loftiest rhetoric about promotion and protection of human rights are the same ones that are selling these weapons to these bad actors. More troubling signs.

No time to despair

So, what do we do? Throw up our hands in despair?

No. Now is the time for all the people who desire a peaceful world, one that ensures basic human rights for all people on Earth, to work harder, smarter, and with greater determination.

Canadians need to focus on Canada. We need to figure out how to re-energize Canada's security diplomacy. We need to ensure that our government uses Canadian resources as a force for good in the world.

We need to think about creating effective peace operations. We must examine the flaws of current operations and determine how they can be improved. We need to design peace forces that can respond to a changing, multifaceted conflict environment. We need to deploy technologies that protect people.

We need to remain optimistic and preserve hope in a process that will restore peace and promote human security for us all.

At Project Ploughshares, we remain steadfast. Despite the formidable challenges, we will not succumb to despair. We will continue working tirelessly to find solutions, however vexing the challenges before us may be.

But we cannot do this alone. Now, more than ever, we need the support of those who believe in our mission – those who understand that building a more secure and just world requires commitment, resilience, and solidarity. We invite all friends of Ploughshares to stand with us as we continue this essential work, undeterred and united in hope. □

Cesar Jaramillo is the Executive Director of Project Ploughshares. He can be reached at cjaramillo@ploughshares.ca.

Jessica West interviews Burgess Langshaw Power

Using technology to fight climate change



Burgess Langshaw Power is a PhD candidate in Global Governance at the [Balsillie School of International Affairs](#). Before he began his PhD studies, Burgess was a Policy Analyst with Natural Resources Canada.

Jessica West: Burgess, your research at the Balsillie School explores the governance of “atypical technologies” such as geoengineering. But what exactly is geoengineering?

Burgess Langshaw Power: Geoengineering explores the idea that we can artificially modify the global climate. Often this involves solar geoengineering – changing the reflectivity of certain parts of the planet to send a little bit more light (and therefore heat) back into space, thus cooling the planet by a small amount. The most discussed solar geoengineering technology is [stratospheric aerosol injection](#).

JW: Why the current interest in geoengineering?

BLP: Geoengineering began to get attention in 2006 when Nobel prize-winning atmospheric chemist Paul Crutzen popularized the idea. But it was controversial.

In the last few years, the idea has taken off, probably because of the increasing effects of climate change. Now we consider geoengineering a potential part of climate solutions.

JW: Have we reached the point that geoengineering is necessary?

BLP: Answering this question needs some context. [The Paris Agreement](#) committed countries to hold “the increase in the global average temperature to well below 2°C above pre-industrial levels” and pursue efforts “to limit the temperature increase to 1.5°C above pre-industrial levels.” Two degrees is the point at which we expect large climate feedback changes will happen. Once these changes happen, we will see much more extreme weather events.

Data suggests that we may have already passed the level of 1.5 degrees of warming. Cleaning up our skies by reducing pollutants may cause more warming, maybe even over two degrees, because some forms of air pollution reflect sunlight and therefore cause cooling.

Thus, it may be impossible to prevent two degrees of warming unless we take radical action. While I think that geoengineering should be considered only in a worst-case scenario, we might already be in that situation. In short, geoengineering is a bad idea, but we might not have any alternatives. However, we need more information.

JW: Who is interested in developing geoengineering technology? Why?

BLP: Academicians are interested in researching the risks of geoengineering. We want to make an informed decision based on better knowledge.

To my knowledge, no academics are developing the technologies required for the deployment of solar geoengineering. However, private companies, such as Israel-based startup Stardust, are doing such work. I'm also concerned about what is being developed secretly.

JW: What geoengineering technologies or effects are being pursued?

BLP: Direct air capture and carbon dioxide removal are well established but work slowly and are extremely expensive.

A small project is trying to [spray sea water over the Great Barrier Reef](#) to create low-lying sea clouds that could cool the water in the area. Some small projects are trying to increase the [reflectivity of the Arctic seas](#). In these cases, the effects would be only regional.

In 2012, the [Haida Salmon Restoration Corporation](#) dumped iron filings into the ocean to increase salmon populations and condense carbon dioxide (CO₂) from the ocean. This increased the number of plankton, which likely consumed a lot of CO₂ from the ocean and moved it into the biological food chain. It is not clear that the project worked or is safe at scale.

In 2020, the International Maritime Organization implemented [rules](#) to cut the sulfur content of ships' fuel to improve global air quality. However, we now know that ships burning heavy sulfur fuel have been creating clouds behind them. These clouds have cooled the ocean by a measurable amount.

JW: Project Ploughshares recently hosted a workshop on climate, peace, and security in the

Arctic. Is geoengineering relevant to the future of Canada's Arctic? Are there other potential applications/benefits unique to Canada?

BLP: Here are a few relevant points:

- The Arctic is warming as much as four times as quickly as the rest of the world. These changes impact all Arctic life-forms, including Indigenous peoples, and threaten some of the most fragile ecosystems on Earth.

- The melting of the Greenland ice sheet alone could cause a global sea level rise of between 13 and 33 centimetres by 2100.

- As Arctic sea ice melts, countries will compete for Arctic resources, including oil, minerals, and fish. They will adopt Arctic trade routes. Conflict, possibly violent, will likely result.



Burgess Langshaw Power

Canada is key to the deployment of marine geoengineering technologies because we control some of the Arctic's largest bodies of water. The stratosphere is at a much lower altitude over the Arctic and Antarctic and can be reached by aircraft large enough for

large-scale deployment of stratospheric aerosol injection. So, while Canada's North is one of the locations most threatened by climate change, it is also one of the most promising for deployment of most forms of geoengineering.

JW: What are some of the risks involved in geoengineering activities?

BLP: You can't just cancel out the effects of climate change with geoengineering. Playing with global temperatures will have unexpected side effects.

The Haida Salmon Restoration project got so much public blowback and hasn't been pursued

because it caused ocean eutrophication; it removed so much oxygen from ocean waters that it created a dead zone.

The International Maritime Organization's rules on freighter fuel remain because removing sulfur improved air quality and undoubtedly saved lives. However, as noted above, they also adversely affected global warming.

Solar geoengineering will change precipitation patterns. Computer models can help us to predict

“When we play with the global temperature, we change regional weather patterns. Some areas will cool more than others; some might warm even more; some will see more or less rain, etc. The use of geoengineering will produce winners and losers, positive and negative effects.

some of the side effects but, until we do atmospheric testing, we won't know for sure what they are. And testing at large scale also has side effects.

Now add unknown risks and moral/ethical hazards.

JW: Are there rules about who, how, and when geoengineering capabilities can be used?

BLP: There really aren't any rules. Some people claim that the United Nations (UN) Convention on Biodiversity has a resolution that applies but it has no authority.

We need a global agreement to prevent large-scale deployment until we know more. We need international cooperation on open and transparent research. What we don't need is a non-use agreement like the one circulated by some academics, which is misguided because it seeks only to prevent public funding and public research and would drive research into the private sector or military organizations, where there would be no transparency.

JW: What peace and security implications are as-

sociated with geoengineering activities?

BLP: When we play with the global temperature, we change regional weather patterns. Some areas will cool more than others; some might warm even more; some will see more or less rain, etc. The use of geoengineering will produce winners and losers, positive and negative effects. Some negative effects, such as extreme weather, will be serious. I expect that those on the receiving end of more floods, or droughts, or extremes of any kind will feel that they've been attacked. The result could be a war of words, but violence is possible.

JW: So, the use of geoengineering capabilities by a single actor can have global effects. Are there attempts to regulate such use?

BLP: Ah yes, “unilateral deployment.” The bad news is that most geoengineering is relatively cheap, compared with climate mitigation and adaptation. Independently wealthy billionaires could probably launch programs. The good news is that any large-scale deployment would likely require restricted military equipment, and the signs of such activity would be obvious, easy to spot, and, we hope, to stop.

Many current efforts address governance and some have significant potential. For instance, the [World Climate Research Programme](#) has launched a Lighthouse Activity on [climate intervention research](#). The European Union has launched a project to investigate strategies for responsible research called [Co-CREATE](#). The [Degrees Initiative](#) was launched to ensure that the Global South has the resources and information needed to be heard in “the SRM [solar radiation modification] conversation.” The [Alliance for Just Deliberation on Solar Geoengineering](#) is trying to bring many of these efforts under one roof.

JW: You were awarded the [Cadieux-Léger Fellowship](#) at Global Affairs Canada (GAC) this year.

Ploughshares signs on

Project Ploughshares was one of 19 Canadian civil society organizations to sign an [open letter](#) dated August 30, 2024, sent to Canada's Foreign Affairs Minister Mélanie Joly. It urged "the Government of Canada to take immediate action to cease all exports of arms and arms components to Israel, as well as any and all transfers for which Israel will be the end user."

This letter was referenced in a September 13 CBC News report by Janyce McGregor, "[The government's stance on military exports to Israel is anything but clear-cut](#)." According to McGregor, the letter reminded Joly "of some relevant factors," including Canada's obligations under the Arms Trade Treaty, an order by the International Court of Justice to halt an offensive on Rafah by the Israel Defense Forces because of a "plausible risk of genocide," as well as an ICJ advisory opinion from this past July that "found the Israeli occupation of Palestinian territory was 'unlawful.'"

Project Ploughshares was singled out for special notice in the CBC article: "Groups like Project Ploughshares argue the IDF has demonstrated in this conflict that it can't be trusted not to commit war crimes."



Congratulations! What does this mean for you?

BLP: My goal has always been to provide information to governments so that they could better understand issues around geoengineering, and to support processes like public engagement, open and transparent research, and evidence-supported decision-making. Having a fellowship at GAC is huge for me.

JW: How will you fit into the work that GAC is doing on climate change?

BLP: My understanding is that I am coming in as a junior expert. I'll contribute to the knowledge and understanding of geoengineering, as well as the importance of the Arctic to climate change, and some conflict and security issues related to climate change. I will step in to raise questions that have not been considered.

JW: What are your goals for this position?

BLP: There are four.

1. Ensure that departments like GAC are aware that geoengineering is an emerging concern that needs urgent consideration.
2. Make available my own research expertise

and insight into some of the important problems that need to be tackled.

3. Build networks within GAC and with other departments like Environment and Climate Change Canada, so that other people are thinking and acting on these issues.
4. Figure out what I want to do with myself after I finish my doctorate.

JW: What governance priorities should Canada set for geoengineering?

BLP: With a limited window of opportunity, Canada should immediately establish an open and public education and engagement program on geoengineering. At the same time, it must fund open and transparent research.

Because Canada is a middle power and is generally well liked and respected internationally, it has the potential to be the mediator in a global discussion about geoengineering. Such a role will be challenging and fraught with controversy, conspiracy theories, and strong disagreement, but it is important. No one can say yet what should happen, because we don't know enough. But Canada could get the whole world to come together for a vital conversation on what must be done. □

Jessica West is a Senior Researcher at Project Ploughshares. She can be reached at jwest@ploughshares.ca. Jessica's work on Climate, Peace, and Security is partly made possible by the generous support of one of our donors.

Laser-armed satellites add to security dilemma in outer space



Written by Jessica Stewart

The [Toutatis asteroid](#), discovered by French astronomers in 1989, is known for its irregular shape and chaotic rotation, with a near-Earth orbit that makes a collision with Earth a real possibility. How fitting, then, that France's latest space defence initiative, unveiled this past September, is also named "Toutatis" – an acronym for the French phrase meaning "In-Orbit Test of Action Techniques against Attempted Spatial Interference." This initiative mirrors the asteroid's unpredictability and our growing concerns about the militarization of modern space security. It symbolizes a new kind of technological threat to space and to Earth.

The next level of space warfare

A project of [Operation ARES](#) (Space Action and Resilience), Toutatis is an attempt by France to address the growing threat of interference and potential attacks on its satellites in low Earth orbit (LEO) – the most important orbit for both military and commercial space projects. Developed by startup U-Space in partnership with leading missile manufacturer MBDA, Toutatis is expected to launch within the next [12 to 24 months](#).

Toutatis will feature a "watchdog" satellite for space surveillance ("LISA-1") and a "low-orbit action" demonstrator satellite for defence ("Splinter"). Together, these satellites will cata-

logue all orbital objects, detect potentially malicious activities, and effectively counter any threats that arise.

In a [presentation video](#) shown at an industry conference in September, France showed Splinter targeting and dazzling another satellite with a green laser beam. Dazzling – the directing of high-intensity laser beams – temporarily blinds or disrupts the target satellite's optical sensors, thereby impairing its ability to collect or transmit data. According to MBDA's head of new markets, [Nicolas Lefort](#), this technology will "bring space warfare to the next level."

A cause for concern

Presently, no known satellites are equipped with lasers designed to blind targets. But this technology is gaining more attention as countries develop new space defence strategies.

Space-based laser dazzlers, which are generally considered defensive [countermeasures](#) rather than weapons, would temporarily impair satellite sensors but not cause permanent damage. However, no international framework agreements, including the [Outer Space Treaty](#) (OST), clearly define space weapons. United Nations (UN) meetings on [Prevention of an Arms Race in Outer Space](#) (PAROS) have yet to reach consensus on how to distinguish between offensive and defensive capabilities.

There is also no one-size-fits-all manual on the

The “Ernie Method”

At the University of Ottawa In late October, Project Ploughshares’s founding Executive Director, Ernie Regehr, was awarded the 2024 Distinguished Achievement Award by Canadians for a Nuclear Weapons Convention, a project of Canadian Pugwash Group. As part of the celebration, Ernie presented a lecture, “[The Arctic and the East-West Nuclear Confrontation](#).”

Here are some key points from the talk:

- Ernie’s work has benefited from the support of an active civil-society community, a community that is only possible with donor support. He was generous in his praise for Doug Roche, Jennifer Simons, Bev DeLong, and, especially, his wife Nancy.
- Until recently, the Arctic was a zone of international cooperation. This is no longer true. The reason for the change will not be found in the Arctic, however, but in current East-West confrontations in other parts of the world.
- There is space for Canada to assume a leadership role in regulating the presence of nuclear weapons in the Arctic.
- Some military operations are exacerbating East-West tensions and undermining prospects of disarmament.
- Measures exist that could reduce the risk that nuclear weapons will be employed.

After the lecture, Ploughshares’s current Executive Director, Cesar Jaramillo, analyzed the lecture, which he called “classic Ernie,” to explain “the Ernie Method.” Here are some of its features:

- Don’t believe the prevailing hype.
- Do your research.
- Persist in laying the groundwork for positive action, even if conditions for change are not yet ripe.
- Make a long-term commitment to the change you want to bring about.
- Write well.
- Share knowledge.
- Think global; act national.
- Look for and explore the nuances of situations and problems.
- Replace the “sticks” of armed conflict with the “briefcases” of diplomacy.
- Always be prepared with alternatives to armed conflict.

The Ernie Method is the “guiding principle” for Ploughshares researchers.



Ernie Regehr, left, and Cesar Jaramillo in Ottawa last month.

use of laser dazzlers. The power needed to dazzle without causing damage and the threshold between “dazzling” and “damage” vary according to numerous factors, including the laser’s manoeuvrability and wavelength, and the target satellite’s internal design and protection mechanisms. As well, some or much of this information will likely be unknown by the operator of the targeting laser.

It is not hard to see how the development of de-

fence technologies like space-based laser dazzlers is contributing to insecurity in space. As states seek to protect their [high-value space assets](#), they unintentionally create more insecurity for others, prompting escalations in arms development. In this case, French actions imply that the risks posed by adversaries necessitate the development and deployment of new defence technologies. But such [militarized and inflammatory](#) responses

to perceived threats are propelling an arms race that could lead to violent confrontations.

Militarizing space policy

France has emerged as one of the West's most vocal proponents of counterspace weapons development. In 2019, it published its [Space Defence Strategy](#) (SDS), outlining a commitment to defend a "new front" in outer space.

The SDS classifies space as the "fifth domain of military operations," along with land, sea, air, and cyberspace. It emphasizes the need to develop capabilities to defend its space assets and deter hostile actions against its space infrastructure. It focuses particularly on improving space situational awareness and implementing active defences against threats by 2030.

Other countries and organizations are beginning to develop new space defence capabilities. The United States aims to attain "[combat readiness](#)" in space by 2027. The European Defence Fund is investing in advanced stealth "[body-guard](#)" satellites that will be equipped with lasers and robotic systems designed to neutralize potential threats. Russia and China are believed to be advancing their own space weapons, although little is known for certain.

France's transparency regarding space defence technologies should not be demonized, but rather encouraged, since many states operate behind a veil of secrecy. However, we can't ignore the fact that the framing of space as a warfighting domain and the creation of weapons designed to "[deter](#)" could promote escalatory hostile behaviour and contribute to an arms race.

Blurring the line between defensive and offensive behaviours

France specified that the Toutatis project will align with international law, including the right to [self-defence](#). According to the [UN charter](#), a state has the right to defend itself – to exercise force in response to an armed attack. But where to draw the line between defence and offence?

France's policies on space defence and the creation of the Toutatis program blur the line be-

tween peaceful and aggressive behaviours in outer space. Splinter's high manoeuvrability and dazzling lasers could be interpreted in positive and negative ways by adversaries and allies. While Splinter is not explicitly weaponized, its role in military operations highlights a shift in how outer space is viewed – from a peaceful domain accessible to all to the next battlefield.

Even if accepted as defensive, dazzlers in outer space could increase the likelihood of misunderstandings, miscalculations, and misperceptions among spacefaring nations. Protective actions could be misread as offensive and threatening. And, as militaries begin to mobilize in space, their behaviours often test the limits of international agreements, creating an environment in which deterrence and aggression become increasingly difficult to distinguish and even define.

A focus on defence must include efforts to prevent conflict escalation and the rapid deployment of weapons or defensive capabilities. Moving forward, it is essential that international frameworks recognize the narrow distinction between offensive and defensive actions in space, and the potential harms and unintended consequences such actions may produce.

A unique domain

Outer space is fundamentally different from any terrestrial domains, with no boundaries or defined territories. Conflict in space will inevitably involve not only military but also commercial and civilian assets. Moreover, it could easily contaminate an already delicate space environment to the extent that vital services on Earth will be threatened or lost. Thus, it is crucial to respond to growing concerns in the international community about the characterization of space as a military and warfighting domain, even if the advertised focus is on defence.

International diplomacy must do a better job of defining what constitutes a space weapon and acknowledge the implications of applying the right to self-defence in outer space. Such understanding needs to be supported by agreements that encourage transparency and incorporate confidence-building measures to support space security. □

Jessica Stewart is a Fall 2024 Balsillie Technology Governance Intern at Project Ploughshares.

Scaling up the effectiveness of the ATT's Conference of States Parties

By Kelsey Gallagher

This past August, States Parties of the Arms Trade Treaty (ATT) marked a milestone when they gathered in Geneva, Switzerland for the 10th Conference of States Parties (CSP10). But celebrations were subdued.

The conflict in Gaza had wrought destruction across most of the Strip, killing thousands of [civilians](#). Russia's invasion of Ukraine had ground on for more than two and a half years, with few prospects for a peaceful resolution. UN bodies warned of a looming genocide in Sudan as [millions fled](#) the civil war. Other conflicts [raged](#) in Ethiopia, Myanmar, and the Sahel. Some states in the room were openly arming some of the belligerents to these conflicts – sometimes in flagrant violation of core ATT obligations.

CSP10, therefore, offered an appraisal of both the ATT's achievements after 10 years and its obvious limitations in reducing the humanitarian toll of the international arms trade. If ATT States Parties cannot work to remedy such a significant shortcoming in the coming years, the ATT risks losing credibility.

Achieving universality

CSP10 provided an opportunity to take stock of what has been achieved over the decade since

the Treaty came into force. During this time, the ATT has gained 116 States Parties, almost two-thirds of the world's nations. [Malawi](#), [The Gambia](#), and, most recently, [Colombia](#) are the latest to join.

However, some major players are missing. [According](#) to the Stockholm International Peace Research Institute (SIPRI), the United States is the largest arms exporter in the world, shipping 42 per cent of all weapons between 2019 and 2023; Russia, in [third](#) spot, shipped 11 per cent. Neither country is currently a State Party to the Treaty. The absence of these two states alone means that approximately 53 per cent of global arms transfers are not subject to the ATT's human-rights risk assessments, which States Parties are obligated to perform.

It is also the case that, while states continue to join the ATT each year, the rate of accession has [slowed](#). Two regions – the Asia Pacific and the Middle East – are seriously [underrepresented](#). One of the tasks of the incoming President of CSP11, Argentina, will be to plot a course to boost membership, with universalization the thematic focus for the 2025 conference cycle.

It is important to recognize that bringing more states into the ATT fold is not simply a metrics game. Increasing ATT membership contributes



Kelsey Gallagher attending CSP10 in Geneva in August.

Ploughshares researcher participates in civil society panel

On September 18, Senior Researcher Kelsey Gallagher was a panelist in a [webinar](#) about ending all Canadian arms exports to Israel, organized by the Canadian Friends Service Committee (CFSC) and Peace Brigades International-Canada. The other panelists were Noam Perry of the American Friends Service Committee Action Center for Corporate Accountability and Rachel Small of World BEYOND War Canada. Sandra Wiens of CFSC moderated.

Kelsey outlined the history of Canadian exports of arms to Israel, which reached an all-time high of more than \$30 million in 2023. He also explained Canada's official permit process for arms sales, as well as Canada's responsibilities as a State Party to the Arms Trade Treaty.



Kelsey focused on Article 7(3) of the ATT, which states that officials of States Parties "shall not authorize an arms export" that presents "an overriding risk" that it will "undermine peace and security" or "be used to commit or facilitate a serious violation of international humanitarian law or international human rights law."

Nevertheless, Kelsey said, Canada had continued to export arms to Israel after Israel launched a military campaign in Gaza in October of 2023. There was some evidence that a call by many civil society groups for a total embargo on arms sales to Israel might be having some effect, however. Kelsey reported that Canada had recently suspended approximately 30 of around 200 export permits to Israel and moved to block the sale of Canadian-made mortar shells to Israel via the United States.

Kelsey pointed to weaknesses in Canada's current policy on arms exports to Israel. It was neither "formal" nor "transparent" in "denying the authorization of arms exports to Israel"; it did not "revoke" "all existing export permits to Israel," but merely suspended them; and it did not effectively "close the loophole" that allowed arms to be transferred through the United States and then to their final destination.

Kelsey insisted that Canada could and must do more to keep Canadian weapons out of Israel. After Russia invaded Ukraine in 2022, Canada quickly stopped all arms exports to Russia. It could do the same with Israel.

Rachel Small praised the research conducted by her two fellow panelists, which provided her own organization with accurate, reliable data on arms production and sales that was being used in a Canadian campaign to stop arming Israel.

A final word from Kelsey: many weapons systems do nothing to advance human security.

to positive norm development, which extends even to those states that have not acceded (and perhaps will never accede) to the ATT. As norms develop, the irresponsible transfer of arms is subjected to greater stigmatization (as happened, for instance, with [cluster munitions](#) and [anti-personnel landmines](#)), reducing the likelihood that conventional arms can be procured by human-rights abusers or bad actors.

Focusing on key concerns

Civilians continue to bear the brunt of the violence in today's conflict zones. Findings published by the United Nations (UN) show a [record number](#) (32,990) of serious violations were committed

against children across 26 conflict zones last year. Much of this violence was wrought with the conventional arms that the ATT is meant to control.

Despite the very real humanitarian costs of the global arms trade, the ATT's conference cycles have become increasingly devoid of substantive discussion on actual arms transfers and are instead bogged down in endless discussions on process and protocol. Little time or space is left for the ATT community to address the real crises to which arms exports are contributing. Indeed, it has become taboo to mention these catastrophes in the conference room.

Also rarely discussed by States Parties, until recently, were the problematic recipients of arms exported by ATT States Parties. However, in the

most recent CSP cycle, the war in Gaza played a significant role.

February's Working Group meetings included a [special panel session](#) to discuss arms exports to Israel, which UN bodies have said "[must end immediately](#)." This session was unique in ATT annals; it explicitly focused on an ongoing conflict for which a host of States Parties were providing weapons, with a key belligerent – Israel – in the room as a signatory state. However, little time was allotted to this special session, with a number of States Parties and signatory states, including some European countries and Canada, not able to take the floor and offer official government positions on the matter. It was rumoured that some powerful States Parties in the room – including some of Israel's major arms suppliers – were relieved when the conversation was cut short.

Instead of something to be avoided, such sessions are exactly what the ATT community needs. The ATT was designed to provide a forum to address problematic arms transfers that exacerbate human rights abuses. And it remains the only appropriate forum to discuss potential violations of the ATT itself, which would include arms transfers to any parties to the current conflict in Gaza.

Allotting adequate time to priorities

At CSP9 in 2023, the ATT's [Management Committee](#) pushed to alter the time allotted to Working Group meetings during the CSP10 cycle. The main reason offered: efficiency.

Typically, States Parties would participate in two weeks of meetings of Working Groups in advance of the one-week Conference of States Parties in August. But during 2024, the time allotted for Working Groups was [reduced](#) to one week in February and two days of informal preparatory meetings in May.

While there were legitimate reasons to maximize efficiency, it became clear during the CSP10 cycle that this trial arrangement did not allow enough time for States Parties, let alone civil society and other stakeholders, to further the goals of the Treaty. As well, it is not clear that the conference cycle has become more efficient, with no indicators provided to determine this. The current Working Group configuration will stay in place for the CSP11 cycle, on a trial basis, and a formal assessment will then be conducted.

Achieving transparency

A key objective of the ATT is to increase transparency in the global arms trade. This is achieved, in part, through the submission of annual reports by States Parties to the ATT Secretariat, detailing arms exports and imports. States Parties can opt to provide private reports, which are only viewed by other States Parties, or public reports that are accessible to the public. Civil society has consistently called on governments to publish public reports to fully realize the Treaty's objective of transparency.

The ATT builds upon other transparency mechanisms of the conventional arms trade, such as the UN Register of Conventional Arms ([UNROCA](#)). But while reporting to UNROCA is voluntary, annual reporting to the ATT Secretariat is required under Article 13.3.

There are [benefits](#) to annual reports. First, they shine a light on the international arms trade, which is notoriously opaque. Although most states import or export at least a few weapons each year, significant secrecy still clings to this segment of the international economy and contributes to, inter alia, illicit transfers, corruption, and arms diversion.

Second, transparency builds confidence. The proactive and transparent reporting of arms transfers reduces suspicion among potential adversaries and diminishes the likelihood of arms races among actors.

Even with mandatory reporting, transparency is hard to achieve among ATT States Parties. At the time of writing, less than two-thirds of States Parties had submitted annual reports for 2023, and many that did submit missed the de facto June 7 deadline, with a number also opting to report privately.

Remaining credible

What can States Parties do to further the mission and ensure the viability of the ATT? Here are some suggestions.

The ATT's Management Committee must provide clear benchmarks for the CSP11 cycle so that the effectiveness of reducing the allotted time for Working Groups can be judged. While no stakeholder would argue against ensuring an effective and efficient ATT, during CSP10, some

states argued that the reduction in time for Working Groups was a resounding success, without providing the criteria or justification on which to base these assessments.

It is clear that the world currently needs more of the ATT, not less. During CSP11, the ATT community must determine the best configuration of Working Group days, with a view to maintaining as much time for them as possible. It would also be helpful to consider introducing a formal ATT review mechanism to determine the effectiveness of annual CSPs as currently configured. Such a review mechanism is missing from the ATT but is common in other disarmament processes.

For the ATT process to remain credible, States Parties should be encouraged to engage in frank and candid conversations on controversial arms transfers that breach the ATT's core principles. In this way the Treaty will continue to be relevant in a world that is still awash with conventional arms

that fuel human-rights abuses. These discussions can be conducted in special sessions, like the one in February; in a new sub-working group; or as a standing agenda item on the application of ATT Articles 6 ("Prohibitions") and 7 ("Export and Export Assessment").

To further the Treaty's goal of transparency and ease the reporting burden on states, the ATT Secretariat should continue to build links with other reporting mechanisms, including UNROCA. Even though reporting to UNROCA is voluntary, some ATT States Parties opt to report only to the Register – even though they would meet the ATT's transparency obligations by simply providing the ATT Secretariat with their UNROCA reports. Regional reporting workshops and direct engagement with states that fail to provide information to the ATT Secretariat on their annual arms exports and imports would help to encourage submissions to all appropriate bodies. □

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Meaningful human control and AI-enabled warfare



Written by Branka Marijan

‘What’s in a name?’ Shakespeare’s Juliet famously asked, reasoning that a rose would smell as sweet whatever it was called, and so the name was of no importance. However, if we ask “What’s in a term?” and the term is “[meaningful human control](#)” (MHC), the answer might be the future of arms control and the regulation of artificial intelligence (AI).

As AI technology advances and developers achieve greater tech autonomy, the need also grows for robust human oversight of critical decision-making to ensure that legal accountability and ethical standards are upheld. MHC has become a focal point in international discussions on new developments ranging from [autonomous weapons](#) to [self-driving cars](#) and [AI in medicine](#), reflecting mounting concerns about the relationship between AI systems and human operators – and who is ultimately accountable for decisions influenced by these systems.

The word “meaningful” in MHC also points to a broad agreement that having a human simply approve decisions suggested by AI is not sufficient, especially when lives are at stake. However, as AI-enabled technologies become increasingly integrated into both civilian and military operations, the demand for meaningful human control is growing more urgent and more complex.

The meaning of “meaningful”

The concept of “meaningful human control” emerged out of discussions on lethal autonomous weapons at the United Nations Convention on Certain Conventional Weapons (CCW). First coined by [Richard Moyes](#), the Director of Article 36, a disarmament nongovernmental organization, it was later refined by Moyes and [Heather Roff](#), an academic and researcher. Roff and Moyes encouraged states to contribute to the defining of the term, particularly by highlighting key factors that enhance human oversight. The following are essential:

- predictable and reliable technology,
- transparent systems,
- users in possession of accurate information,
- the opportunity for timely human action and intervention, and
- mechanisms for accountability.

Indeed, at the CCW discussions that I have attended over the years, Moyes has reiterated that MHC defines a starting point for a commitment by states to some measure of human control over

How the Canadian government should respond to the threat of nuclear war

On October 24, Project Ploughshares, along with the Canadian Pugwash Group, the Canadian Network to Abolish Nuclear Weapons, and Canadians for a Nuclear Weapons Convention, convened an expert roundtable, "Nuclear Disarmament in Times of Unprecedented Risk." The goal of the gathering was to encourage the Canadian government to "urgently reassert its voice and leadership in the global disarmament arena." Ultimately the roundtable produced a report to the Canadian government that offered following five recommendations.

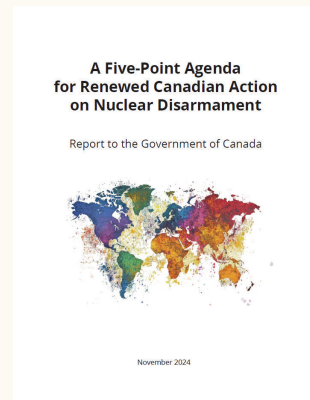
Recommendations

Canada should:

1. **Prioritize nuclear disarmament in its foreign policy.**
Canada should "reaffirm its commitment to nuclear disarmament" by "publicly endors[ing] nuclear abolition" and working to "achieve it through its alliances and international relationships."
2. **Promote a shift in NATO's nuclear doctrine.**
Canada should "initiate a dialogue within NATO" that results in a reduction of the alliance's "reliance on nuclear deterrence." Canada should encourage policies that "diminish the role of nuclear weapons in NATO's strategic doctrine."
3. **Engage in urgent diplomatic and risk-reduction efforts.**
Canada is advised to "take an active diplomatic role in de-escalating nuclear risks arising from the Ukraine conflict." As well, it should "advocate for No-First-Use policies and support de-alerting nuclear arsenals within NATO."
4. **Prevent further erosion of the NPT regime.**
Canada should support efforts that strengthen the Nuclear Non-Proliferation Treaty (NPT) by establishing "concrete targets, benchmarks, and timelines for progress on nuclear disarmament." As well, it should "encourage constructive dialogue" with States Parties to the Treaty on the Prohibition of Nuclear Weapons.
5. **Advance a framework for alternative security arrangements.**
Canada is advised to "advocate for a paradigm shift in security policy that moves beyond nuclear deterrence." The recommended approach "should encompass measures such as risk reduction, greater transparency, and reductions in conventional military spending."

The report concludes with a final urgent call for "the Government of Canada to reaffirm its role as a constructive middle power by embracing these recommendations."

The full report can be found on the Project Ploughshares website.



critical functions of autonomous weapons, including selection and engagement of targets, and to proper accountability.

Understanding U.S. opposition

While MHC is a popular idea with many states, several influential countries, particularly the United States, fear that it could invite scrutiny of their existing military systems and weaken their competitive edge, especially against China. They believe that the MHC requirement could require human checks that would slow down response times, when speed is a key selling point of

military AI. At the same time, there is a belief in the West that China and Russia will not abide by restrictions, putting the United States and its allies at a military disadvantage.

Roff notes in a recent [blog post](#) that MHC has come to mean a level of physical control over weapon systems that is not expected or even possible over weapons in general. She observes that "there are ways we can try to maintain 'control' over the use of force, but these too are processes, rules and institutions, and do not in any way require physical control." Roff expresses concern that the push to keep humans in physical control means that older systems, which can cause

more harm, are seen as preferable simply because a human is pushing a button. Finally, Roff notes that, while MHC remains key to many discussions, there is still a great deal of confusion about what it would entail.

The United States has proposed alternative terms such as “appropriate context-informed judgments” and “appropriate care” in the [Political Declaration on Responsible Military Use of Artificial Intelligence and Autonomy](#) that it is spearheading. While these terms aim to convey a degree of human oversight of AI-driven systems, they are vague, lacking specific requirements for implementation.

On appropriate care

As part of this U.S.-led effort, Canada and Portugal are co-chairing a working group on accountability that aims to clarify the meaning of “appropriate care.” In a recent paper for the Centre for International Governance Innovation, [Leah West](#), a lawyer and associate professor at Carleton University, examines the declaration’s requirement that commanders “exercise appropriate care.”

West explains that this term emphasizes the need for commanders and operators to make informed, context-specific decisions about AI systems. Such decisions should be based on the system’s function, their training, their understanding of the target and environment, and the requirements of international humanitarian law (IHL). She argues that autonomous weapons and military AI can align with existing IHL principles; rather, the issue is the willingness of commanders to depend on autonomous weapons and AI decision-support systems, which could expose them to criminal liability.

To responsibly deploy these systems, military commanders must, according to West, ensure that they adhere to key IHL principles. Thus, AI systems must be predictable, training must exceed a basic understanding of the technology, and commanders must exercise discipline by showing restraint in deploying systems that might violate IHL, even if not deploying increases risks to their own forces. West intends this proposal to be

a starting point that states can elaborate.

How can the concept of “appropriate care” be strengthened? First, additional constraints on militaries are needed on which decisions can be delegated to autonomous weapons or influenced by AI systems. Even when extensive training and a certain level of system predictability are in place, states will need to consider how AI could impact human judgment, especially in life-and-death situations that could involve large military operations.

Roff and Moyes have argued that states should also establish processes to check for potential malfunctions or errors, ensuring that human intervention is possible if needed. Drawing from [healthcare](#), where “appropriate care” focuses on the patient, the emphasis here should be on protecting civilians.

What remains to be done

The challenge for states is to ensure that “appropriate care” is not interpreted too loosely. A broader concern is the potential for autonomous weapons and AI systems to escalate conflicts and normalize autonomous warfare, raising significant concerns for global peace and security.

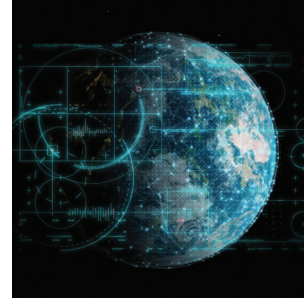
Once “meaningful human control” or “appropriate care” – or some other term – becomes generally accepted, states must establish robust governance frameworks that prioritize transparency, accountability, and oversight. Transparency builds public trust in AI systems by ensuring that the development and deployment of these AI-assisted weapons are subject to both domestic and international scrutiny. Clearly defining the roles and responsibilities of military commanders and including mechanisms for external review establish accountability. And comprehensive oversight ensures that AI in military contexts aligns with ethical standards and safeguards against misuse.

Whatever the term chosen, the end product must be a legally binding agreement or treaty that features both prohibitions and regulations. Systems that lack sufficient levels of human control or pose a serious risk to civilian populations should be prohibited. The stakes are too high to settle for anything less. □

Branka Marijan is a Senior Researcher at Project Ploughshares. She can be reached at bmarijan@ploughshares.ca.

Interdependence in the technological race

Great Powers and the complex reality of AI innovation



Written by Adam Ladha and Branka Marijan

In recent years, public discourse on national security has increasingly focused on fears that the United States and its allies are “falling behind” adversaries in a race to develop autonomous weapons and artificial intelligence (AI) capabilities for military applications. This sentiment is echoed by influential voices in technology and defence circles who argue that Western powers, including the United States, face imminent threats if they fail to adopt a [Silicon Valley-style](#) approach to military innovation.

This narrative oversimplifies the complex dynamics of technological advancement, in which interdependence, rather than straightforward competition, better characterizes the relationship among global powers. An examination of the competition in AI reveals a global network of innovation and reliance on [shared technological resources](#) that complicates any notion of “falling behind.”

Technological interdependence

The idea that the United States is lagging behind in autonomous weaponry says more about the motivations of those advancing this narrative than about gaps in technological capabilities. For example, Raj M. Shah of Shield Capital and Christopher M. Kirchhoff, formerly of the Pentagon’s Silicon Valley office, argue in a *New York Times* [piece](#) that the U.S. military is unprepared for the “new wave of warfare” represented by

AI-powered autonomous systems. Their concerns are supported by examples such as [Russia’s](#) use of AI-enhanced loitering munitions and the use by [Hamas](#) of drones for surveillance, suggesting that some non-Western nations and even non-state armed groups may be better positioned to leverage AI in conflict.

What such examples really underscore is a deeper truth about global technological interdependence. Russia, for instance, [relies](#) on Western-manufactured components to power much of its AI capability. According to the Institute for Science and International Security, Russia’s Lancet-3 AI decision-making modules and other key electronics are produced by [American companies](#) such as [NVIDIA](#), [Intel](#), and [Analog Devices](#). This dependence means that even as Russia appears to expand its autonomous weapon capabilities, it cannot sustain these developments without access to Western technology.

This interdependence reflects the reality that, in a globalized technological ecosystem, no single country can advance in isolation. The United States, with robust tech infrastructure and funding, contributes [significantly](#) to AI development worldwide, through direct collaboration, exportation, and complex global supply chains. Rather than viewing AI as a purely adversarial space, it is essential to recognize how technological advancements rely on collaboration and access to shared resources.

Delivering the facts on the Canadian arms trade

By Wendy Stocker

This autumn saw significant press coverage of the Canadian government's decision to halt arms exports to Israel, including exports to the United States that were later re-exported to Israel. Project Ploughshares is mentioned in several stories.

On September 10 and 12, *The Globe and Mail* published articles by Steven Chase. In "[Mélanie Joly says Canada will block U.S.-bound ammunition sale destined for Israel](#)," Chase reported that "arms-control experts welcomed Ms. Joly's announcement," citing Ploughshares Senior Researcher Kelsey Gallagher, who said that "suspending existing arms-export permits" "is the only sensible step forward to ensure Canadian weapon systems are not being used in the conflict in Gaza." In "[Federal government puts roadblock in front of ammo-supply deal for Israel](#)," Kelsey claimed that the sale of ammunition "only exemplifies the dangers associated with Canada's lack of controls on arms exports to, and ultimately through, the United States."

During this period, *The Breach* published "[Ottawa-based company is key to keeping Israeli warplanes bombing Gaza](#)." It reported that Canadian company Gastops was "the only company in the world that produces engine sensors that go into U.S.-made F-35 combat jets – including the ones dropping 2,000-pound bombs in Gaza." Kelsey is quoted as saying: "It's usually impossible to know whether parts made in Whitby or Winnipeg or Laval actually end up in the F-35s that Israel is using in its operations in Gaza, but in this case it's certain." The article explains how civil society groups use "the existence of such 'sole-source' manufacturers to petition domestic courts to recognize that exports of weapons parts violate international law." And *The Maple* quoted Kelsey in "[What Mélanie Joly said and didn't say about Israel arms exports](#)."

Takeaways

What can *Monitor* readers take from this summary? I would suggest the following:

- News sources and civil society organizations such as Project Ploughshares have made public significant reliable information that was NOT provided by the government or industry.
- When civil society and news organizations produce the same message, it reaches a broader audience.
- When a variety of sources provide similar information, audiences can assume they're getting the truth.
- Both the established and the "independent" press trust Project Ploughshares to provide accurate, unbiased information and analysis on the arms trade.
- The synergy between civil society and professional journalists strengthens both groups.

To build a peaceful, just, and secure society in which government is both transparent and accountable, we need a vibrant civil society and a free press. Both deserve support.

Silicon Valley and the new military-industrial complex

The "falling behind" narrative is partly fueled by technology entrepreneurs in Silicon Valley, who advocate for a rapid innovation model unencumbered by regulation. Shah and Kirchhoff [suggest](#) that the U.S. military should adopt a Silicon Valley-style ethos, which values speed and flexibility in innovation. This vision, however, has been criticized by people like Paul Lushenko and Keith Carter, who [argue](#) in the *Bulletin of the Atomic Scientists* that Silicon Valley's profit-driven mindset can distort the reality of technological capabilities and adver-

sarial threats. According to them, tech entrepreneurs often lack real-world military experience and offer a skewed version of future warfare that may not align with practical combat needs.

These critiques highlight the inherent tension between private sector motives and national security priorities. While Silicon Valley's approach promises technological agility and rapid development, it ultimately prioritizes commercial success, which may not always align with defence needs. This tension exemplifies the broader challenge of balancing innovation with ethical considerations and strategic stability.

The China factor: Advancements in research but mutual dependency

Much of the urgency about Western innovation centres on China's rapid advancements in AI and military technology. China is widely regarded as a formidable competitor, with significant [investment](#) in AI-driven applications for the People's Liberation Army. According to the Australian Strategic Policy Institute's Critical Technology Tracker, China [leads](#) in 57 of 64 critical technology categories, including AI algorithms, adversarial AI, and advanced data analytics. This dominance fuels concerns that China is closing the technological gap and will soon have a military advantage.

However, China's notable advances do not eliminate the interdependence intrinsic to global tech development. China still [relies](#) on Western and U.S.-based technology firms for certain high-performance hardware; this reliance has slowed its progress in certain areas. Furthermore, U.S. defence spending far [exceeds](#) China's estimated expenditures. This economic power allows the United States to [sustain](#) a robust research and development pipeline across defence sectors, from AI to cybersecurity, and enables it to collaborate with allies that are key in the technological pipeline.

For example, Netherlands-based company ASML produces the machinery needed to make the most sophisticated chips for advanced AI applications. The Dutch government, with American encouragement, instituted export controls that prevented [ASML](#) from exporting machinery needed by Chinese semiconductor companies. These restrictions preserve China's two-generation [lag](#) in semiconductor chip technology and prevent, so far, China from developing advanced chip technology.

Moreover, the United States and its allies are also making significant [investments](#) in AI-enabled military systems. For example, the U.S. [Replicator](#) program, with nearly a billion dollars in funding over two years, aims to develop thousands of cost-effective, intelligent drones. Key [allies](#) have similar [programs](#) dedicated to AI-powered systems, fostering a collaborative framework that strengthens their common security.

It must be acknowledged, however, that China has a near [monopoly](#) in rare earth mineral extrac-

tion and processing, is the world's [leading](#) producer of many industrial metals, and will [control](#) most of the world's supply of refined [graphite](#), [cobalt](#), and [lithium](#) by 2030. China has attempted to target this key area of American vulnerability through [export controls](#). So far, American imports of these Chinese commodities have changed little, if at [all](#). However, additional sanctions and export controls could pose a serious threat to the United States.

A balanced perspective on technological competition

In our interconnected era, framing the advancement of AI and autonomous systems as a zero-sum game is simplistic. The global distribution of technology – whether in the form of shared research, cross-border collaborations, or multinational supply chains – demands a more nuanced perspective. Instead of seeing a race that the United States could lose, we should recognize that each state's advancements depend on access to shared resources and mutual collaboration.

Great powers today are not isolated competitors in a Cold War-style arms race but participants in a complex network of technology-sharing and regulatory efforts. The competition in AI, especially in military applications, must be viewed through the lens of interdependence, involving both competition and the need for cooperation. This interdependence redefines international security, shifting the focus from unilateral gains to a shared responsibility in developing safe, effective, and ethical AI technology.

This lens reveals a strategic balancing act in which the Great Powers not only compete but depend on one another to sustain and safeguard the technological ecosystems critical to modern security and international stability. According to the International Monetary Fund, protectionist policies on high tech trade between the United States and China could cost the global economy [1.2% of global GDP each year](#). Such a reality necessitates greater dialogue and regulation at the international level.

Ultimately, the only thing currently “falling behind” is much-needed regulation on autonomous weapons and military applications of AI. □

Adam Ladha is a Fall 2024 Balsillie Technology Governance Intern at Project Ploughshares.

Branka Marijan appears before Standing Committee on National Defence

On November 7, Ploughshares Senior Research Branka Marijan appeared, virtually, before a [defence committee](#) in Ottawa to contribute to discussions on Canada's defence policy update. Branka made an initial five-minute presentation and then responded to questions from six committee members from four political parties (Liberal, Conservative, New Democratic Party, and Bloc Québécois).

In her presentation, Branka emphasized three "key areas of concern":

1. Multiple and overlapping crises,
2. Climate change and the Arctic, and
3. The transformative role of technology in warfare.

She summed up the current state of the world:

The global security environment is increasingly volatile and is marked by Great Power competition and its ramifications. Conflicts such as those in Ukraine, the Middle East, and Sudan demonstrate that threats are rarely contained within boundaries of state or one region; they transcend borders and are more complex than ever before.

Moreover, some of these conflicts could lead to the use of nuclear weapons. And all are exacerbated by the effects of climate change.

Branka observed that the Canadian government's defence policy update "identifies climate change and Arctic security as key concerns." However, it does not "fully address the broader implications for global security and the well-being of Canadians." Right now, the key responders to climate-related disasters in Canada are the Canadian Armed Forces and the Department of National Defence, but it seems unlikely that either will have the capacity to continue to take on such a significant new responsibility. Branka urged the government to carefully consider which government department will need to assume this responsibility and to provide it with the necessary supports to carry out this new function.

Branka acknowledged that new "smart" tech will be incorporated into the Canadian military, but the armed forces must be carefully prepared for this transformation "to ensure that Canada's technological advancements meet ethical and legal standards." Such standards must be global; Canada was encouraged to play a leading role in ensuring that human control and legal accountability are enshrined in a binding international agreement.

Branka concluded her presentation by offering three recommendations:

1. Strengthen interdepartmental collaboration and diplomatic capacity.
2. Use a broader lens than security when examining climate change.
3. Provide more guidance on the deployment of new technologies in defence.

The questions posed by committee members reflected their serious commitment to keeping Canada safe, particularly from China and Russia. There was also some expressed concern about the new security environment that would exist when President-elect Trump takes office in January, and how Canada would navigate in that new world.

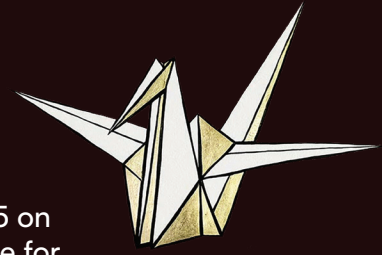
Branka was firm that solutions lay with diplomacy, not military might. Her response to Chinese interference with Canadian elections and cyberattacks against Canada was: "The challenge for Canada and other middle powers is to figure out a way to work diplomatically, because there are no military solutions." To deal with the effects of climate change in the Arctic, Canada will need to find ways to cooperate with Russia; otherwise, Branka believed that "we risk over-militarizing this region at the cost of effective responses."

The last question posed showed that it is not easy to turn away from a military solution to security concerns. The Liberal committee member wanted to know how to engage with Russia and China while supporting allies such as Ukraine. Branka responded that a diplomatic solution would be necessary to end the fighting in Ukraine, for a variety of reasons, including a possible change in foreign policy by a new U.S. administration. To be effective, such diplomacy would need to include thorough preparation and a range of options.



Efforts to rid Earth of nuclear weapons recognized – again – by Nobel committee

Project Ploughshares extends its heartiest congratulations to Nihon Hidankyo, awarded the 2024 Nobel Peace Prize “for its efforts to achieve a world free of nuclear weapons and for demonstrating that nuclear weapons must never be used again.”



Nihon Hidankyo, created by survivors of the atomic bombs dropped in 1945 on Hiroshima and Nagasaki, is the latest organization to receive the Peace Prize for anti-nuclear efforts. In 1985, the prize was awarded to International Physicians for the Prevention of Nuclear War; in 1995, to Joseph Rotblat and Pugwash Conferences on Science and World Affairs; and, in 2017, to the International Campaign to Abolish Nuclear Weapons (ICAN).

Project Ploughshares, with ties to Pugwash and as a long-time member of ICAN, has worked to abolish nuclear weapons since our founding nearly 50 years ago. We do this because nuclear weapons pose an existential threat to all life on Earth.

Help to end the threat of nuclear war! Support Project Ploughshares.



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