THE
PLOUGHSHARES MONITOR

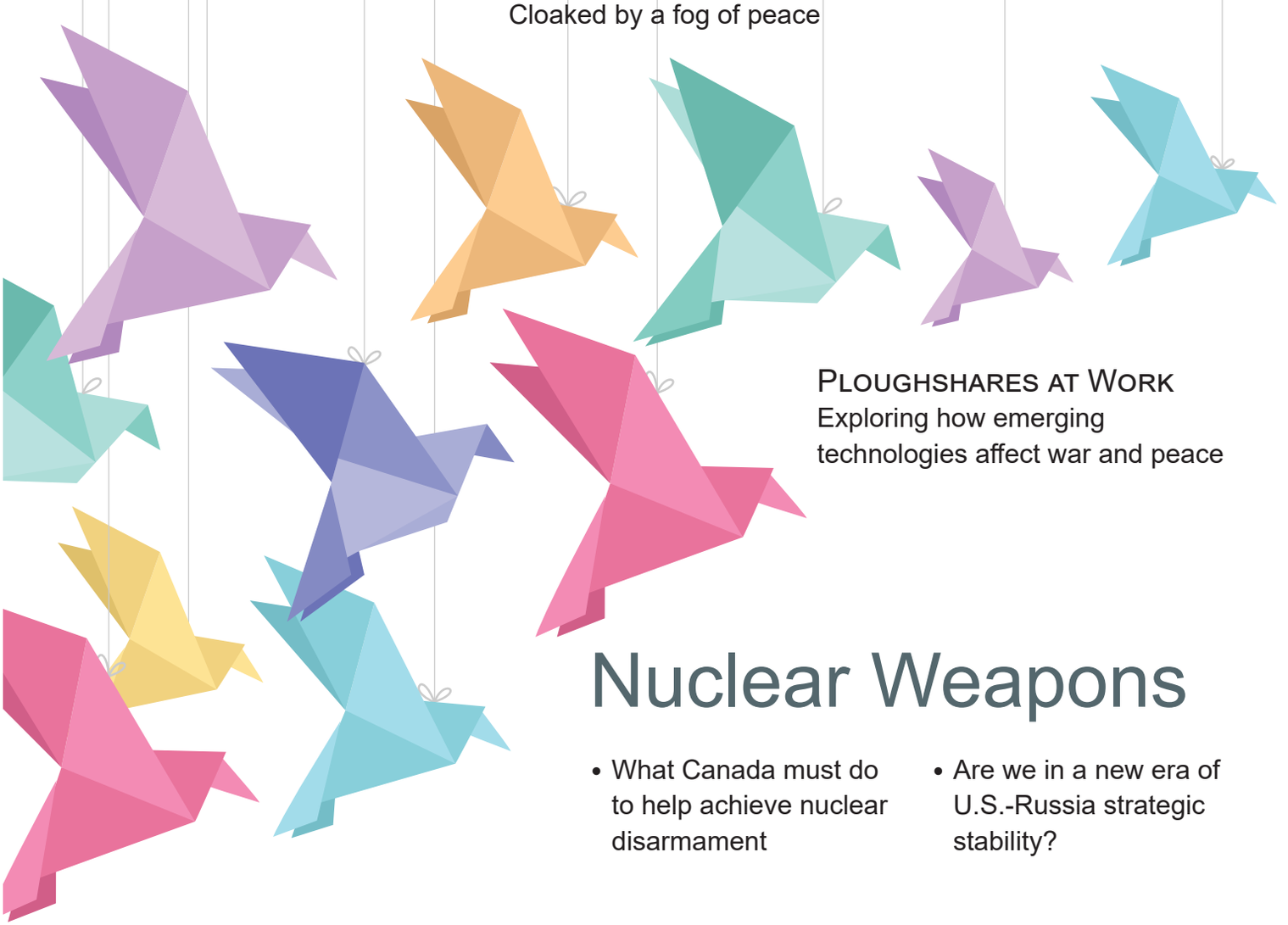
VOLUME 42 | ISSUE 3

AUTUMN 2021

Canada's Arms Trade
An analysis of 2020 arms export data

Arms control in outer space
Lessons from the Chemical Weapons Convention

Space Security
Cloaked by a fog of peace



Ploughshares at Work
Exploring how emerging technologies affect war and peace

Nuclear Weapons

- What Canada must do to help achieve nuclear disarmament
- Are we in a new era of U.S.-Russia strategic stability?

"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

Autumn 2021

The Ploughshares Monitor
Volume 42 | Issue 3

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.

Office address:
Project Ploughshares
140 Westmount Road North
Waterloo, Ontario N2L 3G6 Canada
519-888-6541, 1-888-907-3223
plough@ploughshares.ca; www.ploughshares.ca

Project Ploughshares gratefully acknowledges the ongoing financial support of the many individuals, national churches and church agencies, local congregations, religious orders, and organizations across Canada that ensure that the work of Project Ploughshares continues.

We are particularly grateful to The Simons Foundation Canada in Vancouver for its generous support.

All donors of $50 or more receive a complimentary subscription to *The Ploughshares Monitor*. Annual subscription rates for libraries and institutions are: $35 in Canada, $45 (U.S.) in the United States, $50 (U.S.) internationally. Single copies are $5 plus shipping.

Publications Mail Registration No. 40065122.
ISSN 1499-321X.

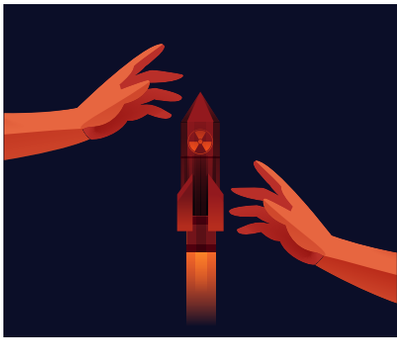
The Ploughshares Monitor is indexed in the Canadian Periodical Index.

Printed at Waterloo Printing, Waterloo, Ontario.
Printed with vegetable inks on paper with recycled content.

Funded by the Government of Canada | Canada

From the Director's Desk

Discarding deterrence: What Canada must do to help achieve nuclear disarmament



Written by Cesar Jaramillo

"You can ignore reality," said Russian-American author Ayn Rand. "But you cannot ignore the consequences of ignoring reality."

Canada needs to heed this warning. While it continues to support the policies of nuclear-weapon states, the multilateral policy landscape on which nuclear disarmament negotiations occur is being reshaped. And all parties that continue to shelter under a nuclear umbrella will be increasingly isolated.

Non-nuclear-weapon states are increasingly impatient over the disregard that nuclear-weapon states display for their obligation to disarm. They also want demonstrable progress toward nuclear abolition. The adoption (July 2017) and subsequent entry into force (January 2021) of the Treaty on the Prohibition of Nuclear Weapons (TPNW or Nuclear Ban Treaty) has come to embody the frustration of the majority of the world's countries with policies and actions that perpetuate nuclear weapons.

These include the multi-billion-dollar modernization of nuclear weapons and related infrastructure by virtually all nuclear-weapon states and the stationing of U.S.-owned weapons in the territories of NATO members that are officially non-nuclear-weapon states. Also food for frustration is the failure of the international community to create effective policies in response to potential flashpoints in which nuclear conflict could emerge.

Ongoing challenges to the current global nuclear disarmament regime include unstable strategic relations between Russia and the United States (and, more generally, between Russia and NATO), the pursuit of a Mideast zone free of weapons of mass destruction, the overt nuclear deterrence policy endorsed by all NATO members, and North Korea's nuclear-weapons program.

Canada's outdated stand

Last May, during a virtual conversation organized by the Canadian Council of Churches, I asked Prime Minister Justin Trudeau about the Canadian government's position on nuclear disarmament. His response, which focused on the security benefits of nuclear deterrence provided by the nuclear-armed members of NATO was unpersuasive, if predictable.

Like most NATO members, Canada had boycotted multilateral negotiations on the TPNW—as the United States had asked. Although Canada presents itself as a responsible non-nuclear-weapon state, it embraces an overt

nuclear deterrence doctrine as a valid security policy, effectively legitimizing the weapons held by nuclear-armed allies.

Apprehension and consternation about such a stand by Canada is widespread among Canadian civil society experts, academics, former ranking diplomats, and a host of prominent citizens.

> "Although Canada presents itself as a responsible non-nuclear-weapon state, it embraces an overt nuclear deterrence doctrine as a valid security policy, effectively legitimizing the weapons held by nuclear-armed allies.

More than a thousand recipients of the Order of Canada continue to call for Canada to lead in efforts that will lead to nuclear disarmament.

Deterrence a stumbling block to disarmament

As Mr. Trudeau indicated, Ottawa still believes that nuclear deterrence works as a security strategy. The underlying idea is that we are safe from attack because we live under a nuclear umbrella and our enemies—or potential enemies—will not attack us and risk a nuclear reprisal.

But does nuclear deterrence actually work? And is this even the right question to ask? Even if nuclear deterrence works sometimes, in some circumstances, to some extent, the fundamental question ought to be this: Are the real or perceived benefits of deterrence outweighed by the risks of the continued existence and potential use of nuclear weapons?

The answer: Yes, they are. The risks clearly outweigh any possible benefits. Nuclear weapons are widely acknowledged to pose a real, demonstrable threat to the continuation of human civilization as we know it, perhaps only comparable to environmental catastrophe. The recognition of this outsized risk does not require an agreement on the question of whether deterrence actually works. And it is precisely this approach that proponents of nuclear abolition need to make repeatedly and compellingly.

For decades, nuclear deterrence has been a doctrinal security tenet among nuclear-armed states and their nuclear-dependent allies; its purported benefits constitute the ultimate rationale for the continued possession of nuclear weapons. If there is agreement on this basic principle, it follows that, to achieve nuclear abolition, there must be a major alteration in the conditions and assumptions that have undergirded the global security architecture since the end of the Second World War, including the strategic stability between the United States and Russia, the two major nuclear-weapon states.

But this belief in deterrence as a basis for security has now become the subject of much dogmatic debate. And even though the prospect of security dividends can be valid, it is used by some actors only to justify their dogma. Thus, while there is value in cool-headed dialogue on the supposed value of nuclear deterrence, the point, for many policymakers today, is simply to support their own unswerving position.

Strong deterrence advocates are as far from the position of nuclear abolition advocates as they have ever been. Neither group is likely to change their position based on the arguments of the other side. If and when nuclear abolition happens, it will not be because the nuclear-weapon hawks have all seen the error of their ways and accepted the arguments of their opponents.

Upcoming opportunities for Canada

NATO's policy on nuclear weapons is clearly out of sync with the views and expectations of most states. The current perils that the use of nuclear weapons would unleash clearly outweigh real or perceived benefits of deterrence There is now a growing global recognition of the need to build

The International Campaign to Abolish Nuclear Weapons (ICAN) took to the streets of Geneva to showcase the support for the UN Treaty on the Prohibition of Nuclear Weapons ahead of a meeting between U.S. President Joe Biden and Russian President Vladimir Putin. *ICAN/Aude Catimel*

a new security framework that does not rely on nuclear weapons.

Canada would be wise to work with its allies and engage with would-be adversaries in formulating security arrangements that do not pose an existential threat to human civilization. As a NATO member state, Canada surely has the prerogative to raise such issues within the alliance.

If Canada wants to be seen as a leader in rebuilding a better post-COVID world, it must step up its efforts to make significant progress in achieving nuclear disarmament. Critically, it must strive to identify the types of security arrangements that would assure all stakeholders of the security dividends that nuclear abolition could offer. Canada must help the world move from opposing dogmatic beliefs on nuclear deterrence to a multilateral system based on mutual security, the rule of law, and robust dispute resolution mechanisms.

While some elements of this necessary transition relate to security, not all do. As noted earlier, the nuclear-weapons infrastructure is a multi-billion-dollar enterprise, heavily supported by certain political interests and elements of society. Among the factors that will have to be thoughtfully considered are the perception of some that nuclear disarmament is a national security concession, and the weight and political influence of the nuclear-weapons industry.

Basic assumptions about the efficacy of nuclear deterrence need to be challenged because these assumptions are at the heart of arguments to retain nuclear weapons. Although the conversation has been going on since the dropping of atomic bombs on Hiroshima and Nagasaki in 1945, considerable work remains to be done to identify where changes should be made in policy and practice. At present, general policy recommendations call on states with nuclear weapons and their allies to formulate security arrangements that do not rely on nuclear deterrence. We need to get beyond this elementary stage.

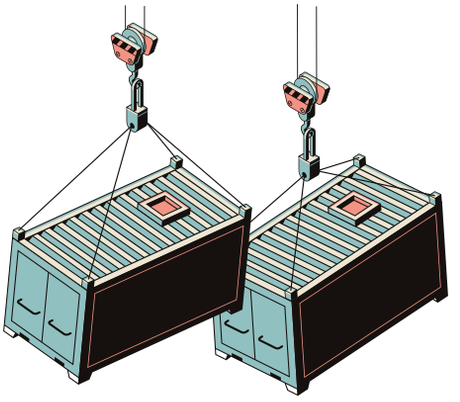
In 2022, Canada will have two concrete opportunities to act more decisively on its stated commitment to nuclear abolition. The Review Conference of the Nuclear Non-Proliferation Treaty (NPT) will have sessions in January. Canada is a State Party to this treaty and will be expected to make a significant contribution. In March, there is a scheduled first Meeting of States Parties to the Treaty on the Prohibition of Nuclear Weapons. Canada is not a state party to this agreement, but can and should attend as an observer. Such an act would indicate Canada's commitment to the abolition of nuclear weapons.

In each of these forums, Canada can clearly show its intent to change course and more credibly support nuclear disarmament efforts. □

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

Conventional Weapons

An analysis of Canadian arms export data for 2020



Written by Kelsey Gallagher

The government of Canada publishes federal arms export data in its annual *Report on Exports of Military Goods from Canada*. The report for 2020 reveals that Canadian military exports were at historically high levels, and that some of the customers were among the world's worst abusers of human rights. While the 2020 edition includes minor improvements in transparency, significant information is still missing or obscured.

Data overview

In 2020, Canada exported $1.96-billion in military goods to non-U.S. destinations. Although this figure was only about half that for 2019—which is the highest ever—it is the third-highest ever recorded and at least double that of almost all years between 1978 and 2017.

The decline from 2019 was mostly due to lower exports to Saudi Arabia, which fell 54.9 per cent. However, Saudi Arabia remained Canada's top non-U.S. customer for military goods, consuming 67 per cent of Canada's exports to non-U.S. destinations. Fully 93.9 per cent of Saudi-bound exports were light armoured vehicles (LAVs) and their associated components, manufactured by General Dynamics Land Systems-Canada in London, Ontario.

As a key belligerent in the ongoing war in Yemen, Saudi Arabia has been accused of many breaches of international humanitarian law, some of which could constitute war crimes. The United Nations Group of Eminent Experts on Yemen has directly cited Canada's provision of weapons to Saudi Arabia as "helping to perpetuate" this war.

Canada's second-largest non-U.S. customer was the United Kingdom, with exports rising by 5.6 per cent over 2019 levels to $122-million—the highest value since 2009. The top export categories for the UK were aircraft and associated components ($29-million), "technology" ($28.4-million), and imaging and countermeasure equipment ($14.9-million).

The next biggest non-U.S. customer was Turkey. From the high point of $151-million in 2019, Turkish exports fell dramatically to $48-million in 2020. Early in 2020, Canada suspended arms exports to Turkey and later shut down all exports to that country of WESCAM targeting and surveillance sensors. (See the Ploughshares report *Killer Optics: Exports of WESCAM sensors to Turkey – a litmus test of Canada's compliance with the Arms Trade Treaty*.)

Reported Canadian arms exports 1978-2020

Exports to Belgium, which reached record-high levels in 2018 and 2019, fell by 96 per cent to

$6.1-million. The unusually high prior export values relate to the transfer of Canadian-made LAVs to Belgium for use in training Saudi security forces in northern France. The drop in 2020 likely indicates that this contract had run its course.

Export permit denials

The total number of permit applications received by Global Affairs Canada (GAC) in 2020 was down by nearly 25 per cent, which the government attributes to the pandemic. As well, GAC denied more export permits for controlled goods than for any year since at least the mid-2000s. Nearly 75 per cent of the 58 reported denials were for dual-use goods, which have both commercial and military functions; of those, 65 per cent were to China and almost all the rest were to other parts of the Asia-Paficifc region.

Most of the remaining export permit denials were for full military goods to locations that included Hong Kong, Bangladesh, Cameroon, Nigeria, and Libya.

Several permits were denied because the goods requested posed a substantial risk of contributing to the serious violation of human rights; Canada, as a State Party to the Arms Trade Treaty (ATT) is obligated to deny such exports.

However, two denials were for proposed exports to Libya, which is under a UN arms embargo. Because under Article 6 of the ATT Canada is prohibited from exporting arms to countries under such an embargo, these applications should not have entered the risk assessment process. It appears that Canada has not yet fully incorporated all ATT obligations into its domestic arms

TOP 12 NON-U.S. DESTINATIONS FOR CANADIAN MILITARY EXPORTS IN 2020

Saudi Arabia	$1,310,566,266.36
United Kingdom	$122,879,079.22
Turkey	$48,049,465.54
Japan	$42,275,355.49
France	$41,374,150.74
Singapore	$35,065,448.39
Germany	$33,643,475.68
Sweden	$29,184,929.91
New Zealand	$27,293,140.84
Australia	$27,196,583.48
United Arab Emirates	$24,818,351.43
South Korea	$23,565,832.32

"NO CREDIBLE EVIDENCE"

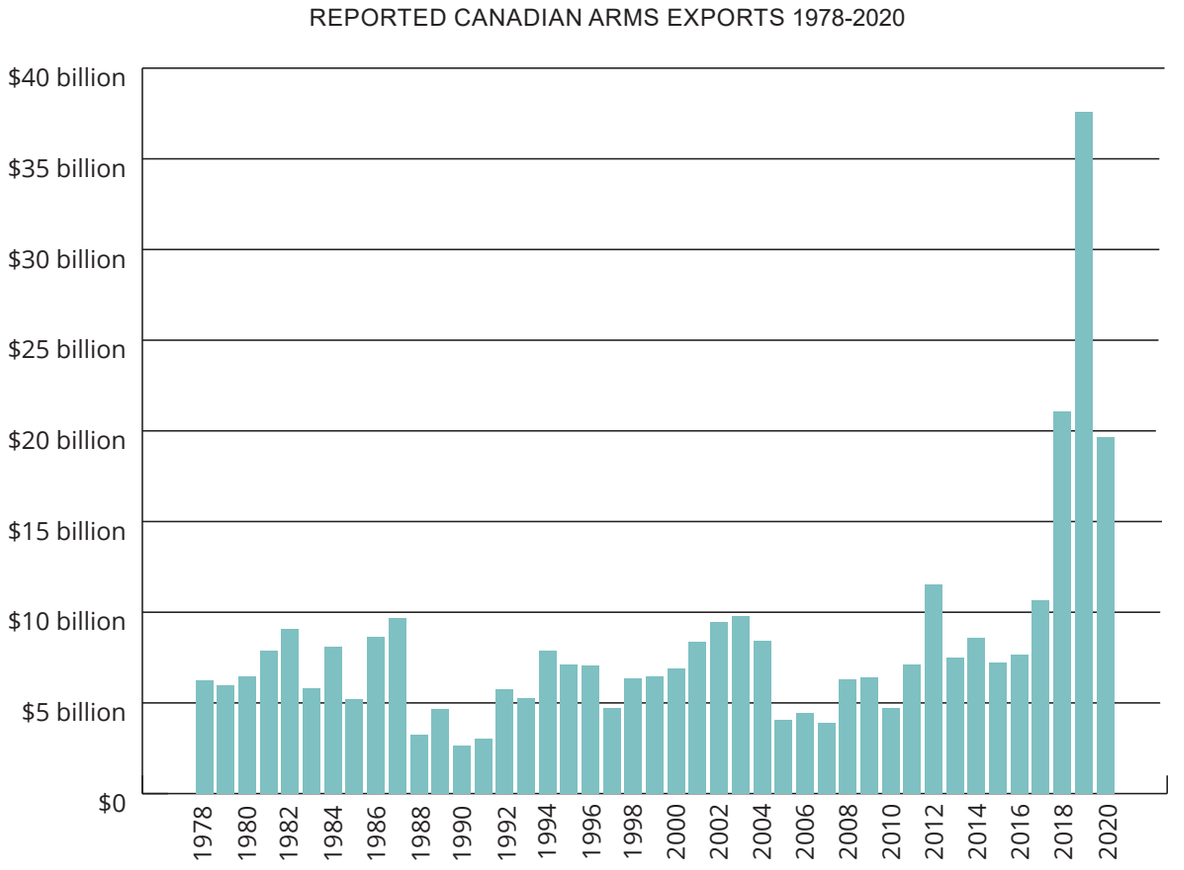
CANADA'S FLAWED DEFENCE OF ARMS EXPORTS TO SAUDI ARABIA

On August 11, Project Ploughshares and Amnesty International Canada released a jointly produced report on Canadian arms sales to the Kingdom of Saudi Arabia—*"No Credible Evidence": Canada's flawed defence of arms exports to Saudi Arabia*. Two weeks later, Ploughshares and Amnesty participated in a video panel discussion under the same banner: "No Credible Evidence." Participating were Verity Coyle of Amnesty International, Justin Mohammed of Amnesty International Canada, Ploughshares Executive Director Cesar Jaramillo, and, as moderator, Ploughshares Researcher Kelsey Gallagher.

The focus of both report and panel discussion was Canada's decision in 2020 to resume new arms exports to Saudi Arabia, following the suspension of new export permits in 2018 in response to the assassination of Jamal Khashoggi.

Both the report and the panel discussion are designed to make Canadians and other global citizens aware of how weapons are being used NOW, in real time, to inflict harm on civilian populations—often in defiance of both Canadian and international law.

Readers of *The Monitor* are encouraged to watch the panel discussion; "No Credible Evidence" can be found on the Ploughshares YouTube channel. Then plan to give some focused attention to the report *"No Credible Evidence": Canada's flawed defence of arms exports to Saudi Arabia*, which can be found on the Ploughshares website. We would welcome your comments on both.



control regime.

Although more permits were denied in 2020, more than 99 per cent of permit applications for full military goods were approved, in line with prior years. Many of these permits were to countries facing credible allegations of violating international humanitarian or human rights law, as well as other abuses. Thus it appears that Canadian officials are still approving many more applications for arms exports than are justifiable.

Gaps in the data

While the annual report on military exports has become more transparent in recent years, the current edition still contains overly generalized and unhelpful data.

Applicants for export permits must give details about the actual weapons being transfered and the end-use or end-user in the recipient country. None of this detail can be found in the report. Instead, exports are slotted into 22 broad categories derived from Group 2 (the "munitions list") of the Export Control List (ECL).

As well, GAC continues to double count goods. When the goods covered by an export permit contain items from multiple categories under the ECL, the total export value is repeated across all those categories. The exact value of transfers is thus impossible to determine.

Export data on dual-use goods is still significantly under-reported. As other States Parties to the ATT, such as Sweden, report on dual-use exports, it is not clear why Canada continues to omit such data from its annual report.

Exports to the United States

Canada only partially reports on military exports to the United States—Canada's largest customer. The data in the latest report includes export values for only four of the 22 categories of the munitions list. Thus huge amounts of data remain off the public record, despite Canada's obligation un-

der the ATT to be both transparent and universal in reporting foreign arms exports.

Brokering data

Under the ATT, Canada must control and report on the brokering of arms exports. Brokering occurs when the Canadian government permits a Canadian citizen or corporation to facilitate the transfer of military goods between two other states.

The 2020 report, for the first time, includes brokering data. However, because the data is so general, with little detail on exactly which weapons are being brokered or the nature of end-use, it is of only minor use. As is the case with direct exports, GAC appears to double count brokering data.

Most conventional brokering permits issued by Canada in 2020 were for transfers to locations deemed partially free or not free by the Freedom House "Freedom in the World" index. Among the goods transferred were imaging and counter-measure equipment and associated components from Australia to Egypt; and bombs, missiles, and associated components from France to Saudi Arabia.

This second example is particularly troubling. There is considerable evidence that Saudi Arabia has breached international humanitarian law while conducting airstrikes in Yemen. If Canadian-brokered explosives were used in Saudi airstrikes, Canada would almost certainly be in violation of the ATT.

Canada the arms dealer

Canada continues to export large quantities of military goods, with much of the total going to opponents of human rights. Some of these weapons end up in today's most deadly conflict zones.

While the annual *Report on Exports of Military Goods from Canada* is helpful in gaining a general understanding of the Canadian arms trade, researchers must still rely on secondary sources and open-source information to truly understand how Canadian-made weapons are being used abroad. □

Kelsey Gallagher is a Researcher at Project Ploughshares. He can be reached at kgallagher@ploughshares.ca.

Arms control in outer space

Lessons from the Chemical Weapons Convention

Written by Emily Standfield

There is currently strong international interest in a formal arms control agreement for outer space. However, many obstacles that have prevented such an agreement in the past must still be surmounted.

While some believe that space requires novel arms control solutions, ongoing research for the Ploughshares project "Beyond norms: military restraints for enhanced security in outer space" reveals that we don't have to start from scratch. Some key challenges, which relate to definitions, verification, dual-use technologies, and the role of industry, have already been successfully confronted in the 1993 Chemical Weapons Convention (CWC), which aims to eventually eliminate all chemical weapons by prohibiting their development, production, stockpiling, trade, and use by States Parties. Adopted by most of the world's nations, the CWC is widely considered the "most successful multilateral disarmament instrument."

It can also serve as a model for a new outer space agreement on arms control.

Flexible definitions

The CWC focuses on use and intent, barring the use of toxic chemicals for all non-peaceful purposes. A toxic chemical is loosely defined as "any chemical which through its chemical action on life processes can cause death, temporary incapacitation or permanent harm to humans or animals."

An Annex of chemicals that meet this definition is provided and is updated as needed. For example, the chemical Novichok and its precursors were added to the Annex in November 2018, after the chemical was used in an assassination attempt.

Theoretically, almost any object in outer space can be used to attack or damage another space object. As well, radio transmitters and other energy emitters can damage or disable space objects from afar. Thus, some critics assert that it is impossible to define a space weapon and so regulate its use.

However, as the CWC shows, focusing on certain effects and intentions can help to ensure that objects are used only for peaceful purposes.

Robust verification

Verification is the backbone of arms control because it allows each actor to trust that other actors are fulfilling their obligations and not cheating. The CWC has the most comprehensive

verification system of any arms control treaty. At its heart is the Organisation for the Prohibition of Chemical Weapons (OPCW), an external organization that was established to build trust and confidence among States Parties and ensure CWC's implementation. The OPCW works in tandem with each State Party's National Authority on chemical weapons, which submits detailed declarations on that state's chemical weapons, chemical weapons storage facilities, and any other related production capabilities.

Additionally, the Verification Annex in the CWC sets out the procedures for verifying chemical-related activities, as well as monitoring through routine on-site and surprise 'challenge' inspections that can be called for by any State Party on another State Party. These multi-layered measures collectively ensure effective verification of compliance.

Aspects of this verification regime could be applied to space. While efforts to verify possible restrictions on weapons in space do not have to be as intrusive as those of the CWC, measures that increase cooperation, trust, and communication are critical.

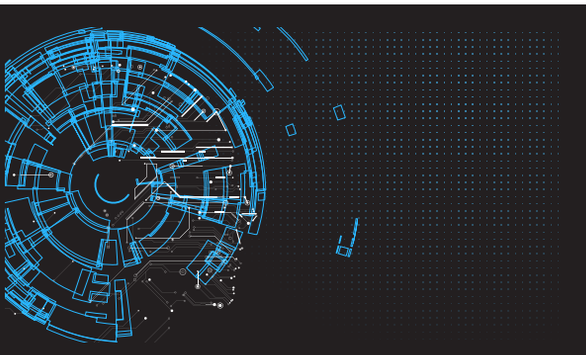
An external organization could help to establish confidence among space actors by facilitating communications and reducing opportunities for misunderstandings and conflict escalation. It could also provide equal access to verification capabilities such as space situational awareness data.

Other measures, such as international cooperation programs and knowledge promotion and exchange, encourage collaboration and allay suspicion.

The dual-use dance

The CWC deals with many chemicals that have both civilian and military uses. For example, pesticides and ballpoint pen ink can also be used to create chemical weapons.

For this reason, the CWC focuses on use as well as capability. Besides prohibiting many known chemical agents, the CWC bans the use of any chemical as a weapon. And because some chemicals are more dangerous than others, the CWC groups chemicals into three Schedules according to the level of risk each poses to the conven-



THE FUTURE OF WARFARE

On June 9, Project Ploughshares Senior Researcher Dr. Branka Marijan discussed the role of artificial intelligence and automation in modern and future warfare with war historian Dr. James Rogers in the webinar "The Big Question: What is the Future of Warfare?" (A link to It can be found on the Waterloo.ai website.)

As both scholars made clear, the future is already here. Semi-autonomous and automated systems are being employed now by advanced militaries and even by some non-state actors. Marijan mentioned the recent Turkish use of loitering munitions (also known as suicide drones), while Rogers described how some militaries deploy systems that "hoover up vast amounts of metadata" that are used to create kill lists for programmable drones.

Militaries are often eager to adopt these technologies, which can allow for "remote warfare" that minimizes the risk to their own forces. Unfortunately, as Marijan pointed out, the result can be a constant state of low-level warfare, which disrupts civilian populations in the target areas.

So, the problem is complex. The tech itself is far from perfect and not adequately regulated or protected (think: hackers). At the same time, new systems permit states of semi-war or occasional war that are unsettling and disruptive.

Both speakers believe that new AI-enabled and automated tech and the ways in which such tech is used need to be regulated. This need is recognized by many.

AI is not going away. It is now like electricity, according to Rogers. It will be used by society and by the military. But there are precedents for controlling or limiting the military uses of some tech. The Chemical Weapons Convention is one successful example.

> Many of the dual-use capabilities in space are being developed by private sector actors for new and beneficial activities such as satellite servicing and debris removal. All actors must be on-board to create and implement a useful agreement.

tion and the likelihood that each will be used for peaceful purposes or in weapons. Those that are in Schedules 1 and 2 are rarely used for peaceful means and so are highly restricted. Those in Schedule 3 more often have dual civilian and military applications and are subject to controls rather than outright bans.

By prohibiting or restricting chemicals based on their effects and their capabilities, a wide-reaching regime that can deal with dual-use is created. It is not difficult to see how similar restrictions could be put in place for dual-use capabilities in outer space. For example, there could be a ban on the intentional damaging or destruction of a space object, as well as technologies with little or no civilian capability. Space objects that are most often used for civilian purposes, but also have military uses, could be subject to controls and verification measures.

Including the private sector

The drafters of the CWC recognized industry as an important component of a successful convention. Industry, primarily concerned with the cost of compliance, inspections, loss of confidential business information, and shutdowns, was regularly consulted on the verification regime and the inspection process. Because of industry concerns, certain provisions, such as "Managed Access" and the "Confidentiality Annex," limit OPCW inspections and protect classified information.

Trade and production are regulated according to the Schedule of each chemical. International trade is banned for all Schedule 1 chemicals, except for small quantities for peaceful purposes such as research or the production of pharmaceuticals. Schedule 2 and 3 chemicals, which are produced commercially, are subject to export controls and end-of-use certificates.

The CWC shows the importance of involving industry in arms control agreements. Many of the dual-use capabilities in space are being developed by private sector actors for new and beneficial activities such as satellite servicing and debris removal. All actors must be on-board to create and implement a useful agreement.

Try and try again

While not an exact blueprint for a successful arms control agreement in space, the CWC can inspire a process that overcomes the obstacles that have prevented earlier attempts to reach such an agreement. One last lesson to learn from the CWC is that it pays not to give up. The CWC was preceded by the 1925 Geneva Convention and 70 years of norm-building and negotiations.

If we can learn anything from the history of the Chemical Weapons Convention, it's that with time, effort, and resolve, roadblocks to arms control can be overcome. □

This article is based on research supported by the Canadian Department of National Defence through their MINDS (Mobilizing Insights in Defence and Security) program for the project Beyond norms: military restraints for enhanced security in outer space *led by Dr. Jessica West.*

Emily Standfield was an intern with Project Ploughshares in Spring 2021.

Arms control diplomacy

A new era in U.S.-Russia strategic stability?

Written by Claire Wähler

During the Trump administration, relations between the United States and Russia deteriorated significantly, leading to the death of major arms control treaties, escalating cyberattacks, and retaliatory measures.

On June 16 in Geneva, Switzerland, as part of his first foreign trip as U.S. President, Joe Biden met privately with Russian President Vladimir Putin to revive strategic stability talks. The meeting, which concluded with a joint presidential statement that calls for "ensuring predictability in the strategic sphere, reducing the risk of armed conflicts and the threat of nuclear war," could mark the beginning of a new era of arms control diplomacy.

The goal

Key to any new efforts is the critical Reagan-Gorbachev principle established in Geneva in 1985 that "a nuclear war cannot be won and must never be fought." This is a far cry from the international commitment to eliminate nuclear weapons newly enshrined in the Treaty on the Prohibition of Nuclear Weapons (TPNW), which entered into force in January 2021. As neither the United States nor Russia, which jointly control about 90 per cent of nuclear weapons stockpiles, has joined the TPNW, their renewed recognition of this principle is essential to maintaining the norm of non-use of such weapons at a time when the risk of nuclear confrontation is high, and provides a basis for continued weapons reduction efforts.

Still, rebuilding this strategic relationship is daunting. Speaking at the Carnegie International Nuclear Policy Conference on June 22, Russian Deputy Foreign Minister Sergey Ryabkov indicated that Moscow has proposed "as a first step a joint review of each other's security concerns." The review would be "holistic" and include the "entire spectrum of both nuclear and non-nuclear offensive and defensive arms that have a strategic capability."

Complicating an already huge task are the asymmetric interests of the two nuclear weapons powers. While the United States has aired concerns about Russia's nonstrategic nuclear weapons, Russia is focused on U.S. ballistic

missile defence and high-precision conventional munitions that could threaten Russia's nuclear forces and second-strike capability.

Recovering lost ground

In June, Ryabkov indicated that any resolution of "the issue of land-based intermediate and shorter range missiles, whether nuclear or conventional," must be based on reciprocal verification and confidence-building measures, as well as a moratorium on deployment of intermediate-range nuclear ground-based missiles. Some of this work will involve recovering lost ground.

Following concerns that Russia had repeatedly violated the terms of the Intermediate-Range Nuclear Forces (INF) Treaty, which eliminated both nuclear and conventional ground-launched ballistic and cruise missiles up to a range of 5,500 km, the United States under President Trump withdrew from that treaty. The New START treaty—the last nuclear arms reduction treaty between Russia and the United States—came close to lapsing, when the Trump administration argued for a shorter extension than what was wanted by the Russians.

> "Controlling or restraining the use of cyber weapons will be extremely challenging. Unlike nuclear arms, cyber capabilities are easy to hide, difficult to detect and verify, and largely free of public-facing accountability measures.

The Trump administration also withdrew from the international Open Skies treaty, which allowed unarmed aerial surveillance flights over the territory of other member states. (Russia also later withdrew when President Biden announced that his administration would not move to rejoin the treaty.)

While President Trump made some attempts at strategic stability talks with Russia, they ultimately did nothing to address arms control or nuclear issues, or contemporary U.S. concerns, including Russian interference in the 2016 U.S. election, Russia's annexation of Crimea in 2014, and the ongoing Syrian war.

The Trump administration's 2018 Nuclear Posture Review is perhaps its most significant strategic legacy. For the first time, the United States allowed for U.S. use of nuclear weapons in retaliation for non-nuclear attacks, including cyber, on domestic infrastructure. An updated National Defence Strategy is now under way but is unlikely to fully walk back conditional first-use of nuclear weapons.

What to watch for

In Geneva in June, President Biden said that, going forward, the United States and Russia would "work on a mechanism that can lead to control of new and dangerous and sophisticated weapons that are coming on the scene now that reduce the times of response, that raise the prospects of accidental war." He didn't describe either the mechanism or the weapons.

But in an address to the Carnegie conference, Dr. Colin Kahl, U.S. Under Secretary of Defense for Policy, related conversations with Russia about "how to fold" nuclear elements of strategic stability into "conversations on other technologies, both existing and emerging, that could have implications for strategic stability." He declined to comment on an upcoming Nuclear Posture Review, other than to say that it will be integrated into the analysis of the National Defence Strategy. The NDS is mandated to be released to Congress no later than 2022, but could be released later this year.

Cyber capabilities could be important as both threat multipliers for nuclear arms and key tools in developing safety protocols for nuclear weapons. Cyber could be used to monitor and evaluate stockpiles; it could also be used to disable the arsenal of an adversary. Much de-

REASONS FOR HOPE: HIROSHIMA DAY 2021

On August 7, Project Ploughshares co-sponsored a virtual panel discussion to commemorate the days in August 1945 on which atomic bombs were dropped on Hiroshima and Nagasaki. The panelists were the Hon. Douglas Roche, O.C., Ploughshares Executive Director Cesar Jaramillo, and former Ploughshares intern Kirsten Mosey.

Concern was expressed for a world that still possesses 14,000 nuclear weapons. And for the many nuclear-weapon states that are now engaged in modernizing them—"a chilling occurrence" in Doug's view, which contributes to a global danger level that is the highest it's been since the end of the Cold War. As Cesar noted, it's just "dumb luck" that nuclear weapons have not been used since 1945.

The reluctance of Canada and other NATO members to join the Treaty on the Prohibition of Nuclear Weapons was also discussed and descried.

Yet the dominant mood of the discussion can only be characterized as hopeful. The TPNW has already had a positive impact, inspiring a new, sophisticated global citizenry to work together for change. Doug saw the creation of a new treaty as just one sign that the world is moving from a culture of war to a culture of peace. Cesar saw a new resolve at the United Nations, with states banding together to achieve a more just and peaceful world. Kirsten highlighted a new generation that is "feisty for change."

A positive message to mark a sombre day.

pends on how nuclear and cyber technologies develop and interact.

It is entirely reasonable to worry that cyber interference with nuclear command-and-control systems could spark dangerous if unintentional escalation in a crisis. For example, the systems that control U.S. nuclear arms are not dedicated to that task alone, but are responsible for both nuclear and non-nuclear operations. Accessing or attempting to access these controls could escalate tensions very quickly and provoke nuclear attacks. Even the illusion of a successful cyber breach could escalate tensions severely.

Controlling or restraining the use of cyber weapons will be extremely challenging. Unlike nuclear arms, cyber capabilities are easy to hide, difficult to detect and verify, and largely free of public-facing accountability measures. The possible use of cyber weapons is also contentious and likely to remain so. The United States has accused Russia of numerous high-profile cyber-attacks, including the use of ransomware, which Russia has repeatedly denied.

Is it possible to re-establish mutual trust in a relationship that has suffered numerous setbacks linked to supposed treaty violations and subsequent withdrawals? As Biden noted in Geneva, "We'll find out within the next six months to a year whether or not we actually have a strategic dialogue that matters." □

Claire Wählen was an intern with Project Ploughshares in Spring 2021.

PLOUGHSHARES AT WORK

Exploring how emerging technologies affect war and peace

An interview with Senior Researcher Dr. Branka Marijan

Project Ploughshares: Branka, you analyze the military and security implications of emerging technologies—a program area you developed. Explain how this came about.

Branka Marijan: When I started with Ploughshares in 2015, I did a scan of our work and saw that new technologies were transforming and amplifying existing security concerns across our programs—outer space security, arms control, the abolition of nuclear weapons, the nature and causes of armed conflict.

Since its founding in 1976, Ploughshares had been focused on disarmament and effective arms control. This focus remained. But it was clear that we also needed to formulate a response to the challenges of modern tech.

As an organization, we decided to weigh in on potentially harmful developments, such as autonomous weapons, and to examine the security and humanitarian benefits of new technologies like open-source intelligence, which can monitor and track weapons and military technologies. I believe that this decision displayed the foresight that peace organizations need to be responsive and provide more diplomacy-oriented and inclusive worldviews to counter those dominated by conflict and power politics. While I specifically examine new technologies of warfare and security applications of these technologies, my colleagues are also paying attention to the technological transformations in their respective areas.

Our perspective adds value and direction to national and global conversations on modern technology, especially tech aided by artificial intelligence (AI). Yes, it can be challenging to raise security and defence concerns with a group of technologists who don't envision their technologies on a battlefield or being used to violate human rights. But such conversations are necessary, because many modern technologies are multi-use, developed for one purpose, but easily weaponized or adapted for other uses.

I think the decision we made in 2015 was the right one and really put us at the forefront of some of the discussions happening now in Canada and globally.

PP: Analyzing emerging technologies can be, well, pretty technical. Are you a techno-nerd? What particular skills or traits do you bring to this study?

BM: Until I started at Ploughshares, I really

wasn't a techno-nerd. As a kid, I was fascinated by innovations and their societal and global impacts. And I'm pretty intuitive with tech. I have taken great care to learn from technologists who can communicate with a non-specialist audience. Now I consider myself a proud member of the techno-nerd community!

More seriously, my formal university education in the social sciences provided key transferable skills: analytical thinking, a facility in research, and adaptability. I learned to examine each problem in its social context. This training has given me a perspective that I believe is badly needed—and often absent—in discussions on technology. Techno-optimism dominates modern society. While not all optimism is misplaced, technology is often adopted uncritically. Only after some misuse or abuse are shortcomings even considered.

My role is to encourage policy circles to adopt a critical perspective much earlier. Because technological change is not inevitable or linear. It is the result of human choices, shaped by policies and standards and ethics and personal viewpoints. Technology can and must be controlled and shaped to meet human needs.

Ploughshares Senior Researcher Branka Marijan speaks at the True North Festival in Kitchener in June 2019.

PP: Go into a little more detail about your education and background.

BM: My path to this work has been a bit unconventional. My PhD thesis focused on peacebuilding in divided societies, specifically Bosnia-Herzegovina and Northern Ireland. I came to understand how important all members of society are in the peacebuilding process. Top-down initiatives often fail if they are not supported by bottom-up initiatives.

I have retained the belief that multi-level governance is critical to ensure policy follow-through. Treaties and political declarations at the international level are important and needed, but we also need national legislation and codes of conduct and standards for people building the technologies.

And, as a civilian survivor of war, I never forget—and describe as often as I can—the impacts that conflict has on ordinary people. My own story fuels my drive to save others from experiencing the effects of armed conflict.

PP: You bring a lot of energy, skill, and commitment to your work. What does that work look like these days?

BM: My biggest current research project relates to the responsible uses of AI in defence. The discussion on autonomous weapons had stalled at the United Nations Conference on Certain Conventional Weapons, but efforts to re-energize it began with two weeks of discussion in August and more scheduled over the next few months. I will be paying close attention to these discussions and doing more research and writing on these issues.

I am also trying to keep up with new technologies that are being introduced or sped up in response to the pandemic. I'm concerned about some of the ways in which this tech, like facial recognition, is being used. I am also beginning more writing on the need for data protections and tools that preserve privacy. All of these concerns relate directly to human security.

PP: A helpful overview. Can we discuss the responsible uses of AI first? With the help of a Mobilizing Insights in Defence and Security (MINDS) grant

from the Canadian Department of National Defence, you are researching efforts to regulate and control the military uses of AI. What research findings were most promising? Worrying?

“I believe that, as a society, we must be concerned about how data is collected, what data is collected, how it is used, and how governments regulate the process.

BM: The effort to develop clearer norms for the use of AI in defence is promising, but it is largely happening among traditional allies. My research focuses on the countries in the United States-led “AI Partnership for Defense”—Australia, Canada, Denmark, Estonia, Finland, France, Israel, Japan, Norway, the Republic of Korea, Sweden, and the United Kingdom—as well as likeminded states such as Germany and Spain.

Some of their efforts are in response to perceived Chinese and Russian use of AI for military purposes. The United States, in particular, seeks to thwart such efforts. Canada, with its AI talent, is a valued ally.

But more effort is needed to develop global norms and standards. Global norms are key to ensuring that misperceptions about intent and capability do not result in the development and use of technology that is immature and insufficiently tested.

The challenge is to achieve agreement on norms that respond to concerns for transparency and confidence building. Many states see AI as providing an advantage over their adversaries and are unlikely to fully disclose their capabilities. Without full transparency, some parties will not be confident in participating in agreements, fearful of unknowingly losing an advantage. In the end, we all lose because we must contend with unreliable and unpredictable technology.

Still, efforts taken by allies to develop standards and norms will have an impact on the types of policy responses that will emerge. Countries outside of these circles recognize this, are also paying attention and see the need to provide their own approaches. As such, there are opportunities that are emerging to start building some understandings of responsible AI behaviour at a more global level as well as introducing confidence building measures to ensure international stability.

PP: As we have already discussed, a lot of the tech you study isn’t used only by the military. It’s also used by police and other domestic security agencies. And, to be clear, we should note that you aren’t examining ALL new tech. You are looking at tech that is used in various security operations. This includes data collection and analysis, facial recognition, tracking, surveillance.

BM: Yes, that’s correct. As I said earlier, much of this tech is multi-use. For example, the company Clearview AI’s facial recognition technology was used by local police services across Canada and by the Royal Canadian Mounted Police. However, it turns out that Clearview AI broke Canada’s privacy laws when it scraped images from public websites and social media profiles and assembled the information in a database to sell to clients.

I believe that, as a society, we must be concerned about how data is collected, what data is collected, how it is used, and how governments regulate the process. In the United States, innocent people are being apprehended because their location-tracking device places them near the scene of a crime.

We must also consider the role of industry and how information is being collected and used. Some concerns relate more to privacy and consumer protections than security and defence. Consider, for example, insurance companies that monitor the driving of their clients with an app.

Still, in some countries, governments can track their own citizens, monitoring their social and political engagements across a number of platforms and applications and collecting seemingly innocuous information, such as the use of particular applications. Some authoritarian regimes try to use

tech to quell dissent from their diaspora communities. In conflict zones, peacebuilders encounter social media disinformation campaigns. Recent cyber attacks by what are believed to be state-affiliated groups show the importance of protecting the data of citizens to national security. Technology is transforming the global security environment and we need to pay attention to these shifts.

PP: I know that you often collaborate or connect with other groups. Can you talk about that?

BM: Acting with civil-society colleagues through networks such as the Campaign to Stop Killer Robots amplifies common concerns and raises global awareness. This sort of networking has also introduced me to some incredible thinkers and doers from around the world. Their perspectives are critical in shaping my understanding.

I often connect with academic experts, who are essential in making me see trends and deepening my understanding of technologies and their impacts. Many in the science and technology communities are most helpful in explaining their work so that a non-specialist can understand; they even offer useful social and political perspectives.

Civil society and international organizations, such as the International Committee of the Red Cross, are at the forefront in pushing for better regulations and policies. Working with them magnifies the impact of a small organization like Project Ploughshares. They help us punch above our weight. □

ANOTHER FACE OF PROJECT PLOUGHSHARES

"Little Things"
The X Page Workshop Performance 2021

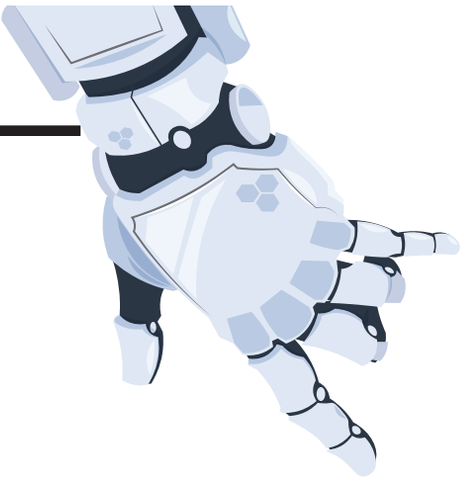
July 7, 2021

Ploughshares has an international reputation as a peace research organization that explores issues related to nuclear weapons, space security, the arms trade, and emerging technologies. But Ploughshares is also part of our local peace community. In this capacity, it was delighted to be a sponsor of an event that was livestreamed in early July.

X-Page: A Storytelling Workshop is "a community arts initiative that connects women who are immigrants or refugees living in Waterloo Region, Ontario with artists who assist and mentor them in writing and performing their own stories." In a 90-minute show, women from the Middle East, South America, Africa, Asia, and Europe displayed the results.

Singly and together, their performed stories explored what these women were seeking from a peaceful life and how they worked to build it.

And there is yet another link between Ploughshares and X-Page. Our communications officer, Tasneem Jamal, volunteers with X-Page as the writing coach.



WHY AI-CONTROLLED WEAPONS ARE A BAD IDEA

Written by Wendy Stocker

I think I finally REALLY get it. I've been reading analysis of autonomous weapons and AI-powered tech by Ploughshares Senior Researcher Branka Marijan for years, but I've never completely understood why so many individuals and organizations and even countries are totally against weapons that can target and kill humans without humans as part of the decision-making process.

I saw humans as part of the problem. They were already maiming and killing fellow humans. Would handing the killing over to machines really make anything worse?

Now I believe, yes, it will.

I recently attended a Waterloo Artificial Intelligence Institute (Waterloo.ai) webinar, *The morality of artificial intelligence in warfare*, moderated by Branka, with panelists Laura Nolan and Jack Poulson. These two software experts, now advocates for non-tech solutions to human conflict, convinced me that turning warfare over to machines would be truly horrifying. Indeed, in some ways, it already is. As Jack Poulson says, "the future is here, just not evenly distributed."

Weapons are still under some measure of human control for at least part of their deployment. And we should not forget that humans still create these weapons and all their components. But equipping weapons with artificial intelligence is raising every imaginable red flag.

The development of AI is the first problem. The software creators are not trained to fully comprehend the ethical dilemmas that arise when deploying weapons in complex, ever-changing conflict situations. Moreover, they bring their own biases and preconceptions to the work, which can find their way into the software.

Another flaw: AI likes sameness, not constant change. It learns best in a stable environment, where it can draw conclusions from patterns. Armed conflict, particularly between asymmetrical opponents, is constantly changing and totally unpredictable. Deliberately unpredictable. Discover that the enemy (possibly a machine) is tracking your movements and you change your routines.

Target selection is another HUGE problem for AI. How does it decide who the enemy combatants are, especially in guerrilla or low-level conflict that engages a lot of weekend warriors, who return to their lives as bakers and farmers and itinerant workers between battles? In fact, AI does a poor job of targeting. It is still not past the stage of deciding that all males of a certain age are combatants. Not a very nuanced judgement.

One of the main claims in favour of autonomous weapons is that they can and will decrease the number of civilian deaths—or collateral damage. So, I was stunned to learn that the number of such deaths generally considered acceptable in any action is 30, according to a "collateral damage estimation tool." Fewer than 30, it's a proportional action; more than 30, you need to "tweak the parameters" until you get the desired number.

Can a killing machine incorporate ethics when choosing a target or deciding whether or not to fire? Again, the prospects are not bright. While it might be technically possible, for example, to feed a machine everything ever written about international humanitarian law, the fact is that a lot about IHL is "fuzzy." Interpretations differ. Definitions aren't constant or universal. How is a machine that bases decisions on consistent patterns supposed to react?

One lesson I learned from the webinar is that, even if you can teach a machine ethical principles, you can't tell it what those principles will look like in action, EVERY SINGLE TIME. As Laura Nolan explains, you can tell a machine not to attack someone who is surrendering, but you can't prepare it to recognize every display of surrender. Arms raised above your head means surrender. But what if you're injured or tied up and can't lift your arms? Does this mean you are still an active combatant? As Laura says, it is hard to accurately sense the environment. This is a problem for experienced humans; it's virtually impossible for machines.

Other problems were raised, but let's go back to the first one—human software developers, who are, after all, only human. It turns out that these developers need to be experts in international law, acute observers of natural and built environments, skilled analysts of human behaviour, and advanced students of every culture on the planet that has ever engaged in military conflict.

That's if they're actually told what the software they're developing will be used for. But they generally aren't.

Both panelists worked for big tech and both left because they didn't believe the work was ethical. They no longer believe that machines can be used to solve conflict. Humans cause conflict and humans must resolve conflict with the same tried-and-true human methods in use for millennia: communication, political leadership, compromise, diplomacy.

To which I say, AMEN. Branka, you were right all along. □

Wendy Stocker edits The Ploughshares Monitor.

Outer Space

Cloaked by a fog of peace

Written by Jessica West

In his book *On War*, published in 1873, military analyst Carl von Clausewitz said, "War is the realm of uncertainty; three quarters of the factors on which action in war is based are wrapped in a fog of greater or lesser uncertainty." Contemporary military theorists and planners still find this idea of the "fog of war" relevant.

But if war is cloaked in uncertainty and ambiguity, so, apparently, is peace. The notion of a fog of peace has been used to describe the chaos and failures of peacemaking and other military interventions in conflict. Based on Jean-Marie Guéhenno's experiences as head of UN peacekeeping efforts, his book *The Fog of Peace* charts the international community's inability to achieve its promise of protection.

I use the notion of a fog of peace differently. For me, it describes the use of the concept of peace to hide and disguise war and warlike activities. This fog creates a "grey zone" that hides and disguises the "hybrid" and "below threshold" activities so prevalent in today's security landscape. This fog of peace, produced by shifting and ever-expanding definitions of peaceful purposes, has found its way to outer space, where it provides cover for a growing array of military activities, essentially blurring the states of war and peace.

Peaceful purposes and military activity in outer space

Shared, peaceful use is at the heart of the vision set out in the 1967 Outer Space Treaty (OST). The OST recognizes "the common interest of all mankind in the progress of the exploration and use of outer space for peaceful purposes" and reserves the Moon and other celestial bodies exclusively for such use.

The concept of peaceful purposes has a long and complex history. Following the 1957 launch of Sputnik, the first artificial satellite, the United States argued that space should be used "exclusively" for "peaceful purposes" and that military capability should be subjected to oversight and even inspection. The Soviet Union countered with a proposal to place outer space under the control of the United Nations. Yet the space launch and satellite programs of both states were primarily military endeavours.

By 1959, the confidential "U.S. Policy on Outer Space" stipulated that the principle of peaceful purposes "does not necessarily exclude military applications." This view was first stated publicly at the UN First Committee in 1962, when the United States defined "peaceful uses" as "non-aggressive" and "beneficial." This interpretation embraced the passive use of military satellites.

SPACE CAFÉ CANADA: JUNE 18, 2021

"IS THE FUTURE OF SPACE EXPLORATION ROBOTIC?"

HOST: Dr. Jessica West

GUEST: Tim Kopra, VP of Robotics and Space Operations, MDA

An artist's concept of Canadarm3. *NASA/CSA*

Jessica was thrilled to interview a real NASA astronaut! A colonel in the U.S. Army when he retired in 2010, Tim Kopra is now with Canadian space company MDA. MDA has been awarded a contract to build Canadarm3, which will form part of Canada's contribution to the Lunar Gateway—an outpost circling the Moon that will support an eventual long-term human return to the lunar surface.

Because the new "miniature ISS" will only be occupied by humans part of the time, many operations will be autonomous, relying on AI and robotics. All part of the exciting new technology-based space race that Kopra sees developing.

An advocate of a free market economy in space, Kopra still favours regulation in one key area: space debris. To obtain spectrum, he believes that satellite owners must demonstrate the ability to return those satellites safely to Earth when their missions have been completed.

To achieve international adherence to these regulations requires leadership. Kopra declares, "It would be really cool to watch Canada take the lead on how to maintain this environment in space."

The complete interview can be found on the Ploughshares website (www.ploughshares.ca).

In other domains, arms control agreements link the peaceful use of technology with restrictions on harmful or military use. No such agreement covers activities in space. As Major Jeremy Grunert of the U.S. Air Force Judge Advocate General's Corps recently pointed out, there is little to restrict military or even "non-peaceful" uses of space. And so, our understanding of peace has come to include a growing array of non-peaceful applications, making the imposition of such controls or restrictions more difficult. This "drift" is deliberate.

For example, the UN Committee on the Peaceful Uses of Outer Space (COPUOS) was established in 1959 to review and support international cooperation on legal issues related to the use and exploration of outer space. Its mandate is restricted to "peaceful purposes," which in practice includes non-aggressive military uses. However, efforts to specifically discuss military activities in outer space are routinely blocked by member states who, in this venue at least, adopt a strict interpretation of the mandate.

As well, military satellites are treated differently from commercial/civilian satellites. The Registration Convention is intended to create transparency in space by identifying and maintaining an international register of launched objects. But few satellites are registered as having a military function. The result is that the assumption of peaceful use protects military activities, often allowing them to evade any control.

The fog of peace has descended on the United Nations First Committee on Disarmament and International Security, which has mandated the Conference on Disarmament (CD) to address

the "prevention of an arms race in outer space" (PAROS) since 1981. This focus on prevention treats the need for arms control in outer space as urgent—but to control a possible future, not the present.

Illustrating a source of the fog, a working paper tabled by Canada at the CD in 1986 noted persistent conflicting interpretations by member states of "peaceful purposes," including one that involved no military use. How can there be a fruitful discussion with no agreement on basic terms? Forty years and many weapons tests later, the PAROS debate continues, unresolved. And military activities in space also continue, obscured by a cloak of opacity.

It's hard to hide a weapons test, but possible to obscure its purpose. China has commonly described its suspected ASAT tests as "scientific experiments." U.S. Operation Burnt Frost, which intercepted and destroyed a non-functioning U.S. satellite in 2008, was explained to the world as saving Earth from ecological danger. Last year, Russia released a projectile from another object in orbit, in what it described as part of a benign "satellite servicing" experiment.

It's exceedingly difficult to control weapons that no one owns up to having. Even today, when talk of warfighting in space has become *de rigueur* among militaries, the fighting part—the use of weapons—remains vague. The United States accuses Russia and China of weaponizing space, and they accuse the U.S. No one touts an aggressive weapons capability. Instead, states including France, Japan, and most recently Germany are pursuing military space units for "self-defence."

Is the absence of peace an open secret today? It appeared that peaceful camouflage was not even necessary in 2019, when India publicly acknowledged that it had conducted an ASAT test and few states raised any concerns.

For a long time, I viewed the proclivity to hide and deny "aggressive" uses of space as a sign of the strength of the principle of peaceful purposes. But now I fear that the murky definition of "peace" is cynically and consciously used to conceal violence.

As part of Operation Burnt Frost, the SM-3 missile was launched and went on to intercept USA-193 in February, 2008. *Public Domain*

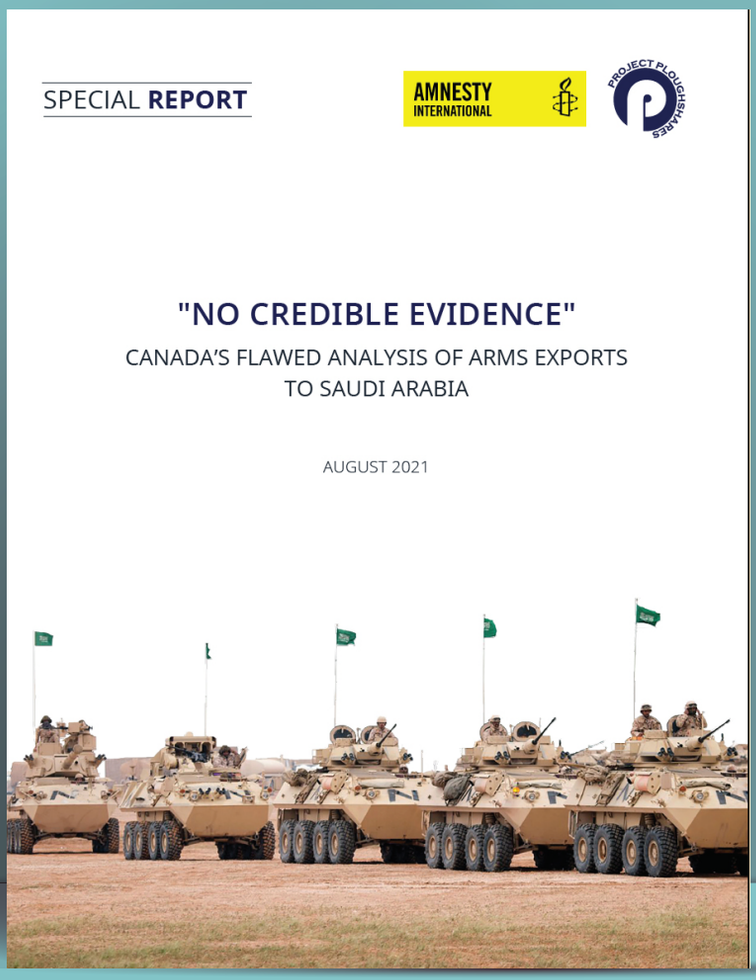
What's to be done?

The fog of peace masks the growing aggressiveness of military activities in space and the proliferation of weapons capabilities. But it is more than 50 years too late to try to ban military uses of space. Instead, we must reclaim the integrity of the concept of peace.

We need to identify non-peaceful uses of space and implement appropriate controls and restrictions. This process will become more important as activity on the Moon expands. Although the OST strictly forbids military activity of any kind, we have seen firsthand the effects that a foggy notion of peace can have.

The fog of peace can hide the buildup of non-peaceful activities until the moment that catastrophe strikes. And when that fog is dispelled, we may find that we have been groping our way across a battlefield all along. □

Jessica West is a Senior Researcher at Project Ploughshares. She can be reached at jwest@ploughshares.ca.



Look to Project Ploughshares for ground-breaking research on issues that matter to you.

Made possible by the support of generous donors.

Give today!

Visit www.ploughshares.ca or call 519-888-6541; toll-free 1-888-907-3223

You can find this latest report at www.ploughshares.ca.