Ploughshares

Hidden Harms: Human (In)security in Outer Space

Consultation Report

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JULY 2024

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First published: July 2024

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ACKNOWLEDGEMENTS

This report is possible because of the following:

Funding support from the Mobilizing Insights in Defence and Security (MINDS) program of the Canadian Department of National Defence

Research leadership and management by Dr. Jessica West of Project Ploughshares

Workshop facilitation and research contributions by Guiliana Rotola (Space Policy Institute), Vaishnavi Panchanadam (University of British Columbia), Taylor Douglas (London School of Economics), and Allyssa Walsh (Dalhousie University)

Participants at the global series of virtual workshops held on July 13-14, 2023

Workshop rapporteurs Charlotte Hook (Space Policy Institute), Asha Harris (Wilfrid Laurier University), Abishane Suthakaran (Wilfrid Laurier University), and Project Ploughshares summer interns Morgan Fox (Queen's University) and Laine McCrory (McGill University)

Editing by Ploughshares Editor Wendy Stocker

Design and layout by Ploughshares Senior Communications Officer Tasneem Jamal.

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Overview

This report outlines key themes and ideas from a consultation on intersectional perspectives related to human security and insecurity in outer space. Motivated by prior feminist research on lessons learned from the fields of peace and arms control, the consultation was intended to uncover the many ways in which human well-being is connected to the security of outer space. An intersectional feminist approach aids this effort by examining how gender and other social identities overlap in ways that may compound the benefits, harms, and insecurities that people experience in relation to outer space and space systems.

With funding from the Canadian Department of National Defence MINDS (Mobilizing Insights in Defence and Security) program, the consultation aimed to:

- better understand the differentiated human implications of security and insecurity related to outer space;
- articulate diverse experiences of insecurity related to outer space to inform both domestic and global policy responses;
- consider alternative approaches to, and perspectives on, peace, security, and disarmament that might provide new ways of identifying, thinking about, and responding to the collective security environment in outer space;
- expand the scope of dialogue on gendered and intersectional approaches to peace and security in outer space and inspire additional research by others.

This report identifies current and future sources of insecurity in outer space through an intersectional feminist lens, drawing attention to the hidden violence/harms and to the different and disproportionate effects of these harms that exist because of different social identities such as gender, race, sexuality, and ability, as well as socioeconomic status and geography. Of particular concern is how the multiple overlapping determinants of advantage and disadvantage shape the human experiences, benefits, and vulnerabilities that are associated with outer space; in effect, factors that allow the secure uses of space for some result in insecurity for others.

Questions about how the harms and benefits of space security are distributed and experienced are rarely raised because those who face disproportionate or different harms are rarely in the room. Women, people of colour, and those from the Global South have not been sufficiently represented in the diplomacy of space security. However, diversifying the faces in the room will not suffice: the underlying objective of inclusivity is change.

Although a key concern of both the consultation and this report is the need to better incorporate intersectional perspectives into discussions of norms, rules, and principles of responsible behaviour, as well as possible legal agreements that are currently unfolding at the United Nations, it is clear from this consultation that we need to foster fundamentally new conversations on space security. These conversations must not only include voices and perspectives that have traditionally gone unheard, but must respond to the values, experiences, and priorities associated with them. As one participant noted, we must make space for the unfamiliar and the uncomfortable.

There is a strong desire to have new and different conversations related to outer space. A project that we had envisioned as a few people talking about gender and space quickly expanded into a series of vibrant global online gatherings. One participant noted that in her 30 years of practising space law, she had never before attended a workshop focused on the values and approaches of intersectional feminism.

But desire for change is not enough. A deep and sustained transformation in the concepts and approaches that inform peace and security in outer space requires diplomatic leadership to make such change a priority in every venue. It also requires resources to support research, access to and participation in decision-making, and a change in the conversation.

What follows is a detailed reporting of the consultations held in July 2023, which included interactive online sessions, as well as a series of survey questions. Because the consultation brought together individuals from a variety of academic and professional backgrounds as well as geographic locations and included small group discussions, the result was many different conversational strands. We have done our best to pull these strands together and to supplement concepts and examples with additional resources, as noted in the footnotes as well as the resource list appended to this report; many resources were recommended by participants during the consultation.

It is our intention that both the consultation and the report serve as springboards to launch additional, deeper discussions, research, and diplomatic efforts on the various themes and takeaways identified by this initial conversation. We hope that people who might not otherwise feel that they have a place in this community can find new ways to make their perspectives and contributions known and valued.

Takeaways

The linkages between human well-being and peace and security in outer space are often overlooked in discourse dominated by strategic interests and state perspectives. But such linkages are key for nurturing new, more inclusive and sustainable approaches to space security. The following key points from the consultation can help:

Connections are key

Humanity is intricately linked to the space environment and space-based capabilities and services. These connections must be captured in understandings of security, harms, and violence associated with outer space. This human/Earth–space connection is also central in identifying and promoting alternative approaches to space security. So are links with cross-sector governance frameworks, such as human rights, sustainable development, environmental protection, and Indigenous rights.

An intersectional approach is necessary

Human benefits and insecurities associated with outer space are complicated and layered. Understanding and responding to potential harms in this context demands an intersectional approach; although critical, a focus on women and gender alone is insufficient. An intersectional approach to feminism has the added value of illuminating how social identities overlap in ways that may compound the benefits, harms, and insecurities that people experience.

Concepts and ideas must change

Many of the prevailing concepts associated with space activities and security render key stakeholders invisible and perpetuate forms of exclusion and violence on Earth. Intersectionality can disrupt patterns of thinking and provide alternative approaches and tools that reflect the interconnectedness of people, Earth, and outer space, and do not silo security from other forms of benefits and harms linked to safety and sustainability.

A broader approach to space security is needed

Understandings of and approaches to security in outer space must be broadened to better reflect the experiences of all people. Insecurities stemming from warfighting and weapons are important, as are sources of everyday violence, harm, and disruption that fall below this threshold, the effects of which tend to be underestimated, especially on already marginalized groups.

Visibility and accountability are priorities

Tools and mechanisms are needed to nurture visibility of, and accountability for, harms associated with outer space, including those that are outside the scope of armed conflict or use of force in outer space. Priorities of existing diplomatic initiatives include a broader view of concepts associated with arms control and conflict prevention, along with the development of norms that promote greater transparency and communication.

Meaningful and diverse participation demands new practices

Greater access to, and more diverse participation in, space governance are necessary to attain and sustain a deeper level of inclusion in the creation of ideas, values, and structures that shape space governance; recruitment, resources, and mentorship are essential, as are new modes of engagement.

Research is essential

Focused research is required to make visible the layers of unequal benefits and harms associated with outer space; recover marginalized histories and knowledge; and nurture more equitable approaches to peace and security.

Diplomatic leadership is required to facilitate change

State champions are needed to help normalize the topics and values associated with intersectional and inclusive approaches to space security through persistent efforts across all relevant forums.

Sufficient resources are needed

Neither meaningful participation and engagement in space diplomacy, new research, nor advocacy for more equitable approaches to peace and security in outer space can be achieved without dedicated financial and diplomatic resources.

Introduction: Missing the Human Link

The security of space systems is of increasing concern to countries, companies, and people around the world. Because outer space systems underpin national security, defence, and military capabilities on Earth and in cyberspace, they are increasingly a target of hostile and harmful activities. These efforts to deny use of outer space systems and data to others (while maintaining such use for oneself) are the products of emerging military doctrines, operational structures, and capabilities related to warfighting in outer space.[1]

So far, destructive capabilities have not been used against foreign satellites or in armed conflict, but they have been tested. Most harmful activities in outer space remain below the threshold of the use of force or armed conflict—interfering with but not physically destroying or permanently damaging objects on orbit—invoking military conceptions of a grey zone.[2]

Diplomacy and governance have not kept up. The Outer Space Treaty, which outlines the foundational principles that guide human activity in outer space, provides few guardrails that would prevent non-peaceful or harmful uses of outer space. The UN General Assembly maintains a longstanding mandate on the prevention of an arms race in outer space (PAROS) but has failed to adopt any new restraints or obligations, despite more than 40 years of diplomatic debate.

Such debate has largely neglected consideration of the human implications of insecurity related to space activities and capabilities, and the differentiated ways in which such insecurities are experienced around the world, including by women, despite decades of formal recognition by UN bodies of the need to incorporate women and girls in all efforts associated with the prevention and response to armed conflict.[3]

The discourse and diplomacy of space security prioritize strategic military capabilities and activities and conceptualize the space environment as one that is largely without human life.

Yet outer space remains the domain of significant human activity that affects not only military but civilian life around the world. Previous research has established the need to apply an intersectional and humanitarian lens to security and arms control in outer space, which

1 For detailed coverage of both counterspace capabilities and doctrines, see Secure World Foundation, *Global Counterspace Capabilities: An Open Source Assessment*, 2024, https://swfound.org/media/207826/swf_global_counterspace_capabilities_2024.pdf.

2 Jessica West and Jordan Miller, *Clearing the Fog: the Grey Zones of Space Govenance*, CIGI Paper no. 287, November 2023, cigionline.org/publications/clearing-the-fog-the-grey-zones-of-space-governance.

3 This is slowly changing. Canada introduced a paper on gender-based considerations for a legally binding instrument on the prevention of an arms race in outer space (PAROS) to the Group of Governmental Experts meeting in 2023–2024 to discuss further practical measures on implementation of the PAROS mandate. See Group of Governmental Experts on Further Practical Measures for the Prevention of an Arms Race in Outer Space, *Gender-based considerations for a legally binding instrument on the prevention of an arms race in outer space*, 2023, https://docs-library.unoda.org/Group_of_governmental_experts_on_further_practical_measures_for_the_prevention_of_an_arms_race_in_outer_space_-_(2023)/WP.4.pdf.

has been lacking in diplomatic engagement.[4] As well, the United Nations policy brief on the future of outer space governance, under the umbrella of the "Our Common Agenda" diplomatic initiative, recommends "inclusive approaches."[5]

Expanding the boundaries of Women, Peace, and Security

The Women, Peace and Security (WPS) agenda, which was launched with the adoption of UN resolution 1325, calls for the full, equal, and meaningful participation of women in conflict prevention and resolution, peacebuilding, and post-conflict reconstruction efforts.[6] While this agenda advances more inclusive discussions of security related to outer space, it is not a solution to the problem of underrepresentation of diverse stakeholders, perspectives, and priorities in space security governance. In particular, the WPS agenda as it relates to armed conflict has been limited to the inclusion of women and girls. The gendered impacts of non-traditional security concerns and contexts below the threshold of armed conflict are neglected, as is the need to think beyond gender as a singular measure of inequality.

Although our work was originally prompted by the question "How is the future of conflict gendered?" and the UN Women, Peace, and Security framework, this focus proved too limiting. Systems of power rooted in identity—including gender, race, class, disability, and sexual orientation—are compounding and intertwined with hierarchies of economics and geography. A truly feminist analysis rooted in intersectionality is needed to explore simultaneously the multiple, overlapping factors of advantage and disadvantage that shape human activities, experiences, and vulnerabilities in outer space.

Intersectional feminism

As noted in Canada's most recent National Action Plan on Women, Peace, and Security, *Foundations for Peace*, an intersectional feminist approach "recognizes and responds to the reality that while all women face inequality, they do not all face inequality in the same way. Such inequality manifests in discrimination and exclusion."[7] In other words, experiences of harm and inequality are layered and not equal. The goal of this consultation was to begin

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4 Jessica West and Gilles Doucet, *A Security Regime for Outer Space: Lessons from Arms Control*, Project Ploughshares, October 2022, https://assets-global.website-files.com/63e066081ef50cb16a3f4157/63e066081ef50c44473f41dc_ArmsControlLessons_OuterSpace_10.22.pdf.

5 United Nations, *For All Humanity— the Future of Outer Space Governance: Our Common Agenda Policy Brief 7*, May 2023, https://www.un.org/sites/un2.un.org/files/our-common-agenda-policy-brief-outer-space-en.pdf.

6 For more on the WPS resolution and agenda, see United Nations Department of Political and Peacebuilding Affairs, *Gender, Women, Peace and Security*, 2024, https://dppa.un.org/en/women-peace-and-security.

7 Government of Canada, *Foundations for Peace: Canada's National Action Plan on Women, Peace and Security*, 2024, p. 13, https://www.international.gc.ca/transparency-transparence/assets/pdfs/women-peace-security-femmes-paix-securite/2023-2029-foundation-peace-fondation-paix-en.pdf. The term "intersectionality" was introduced by Kimberlé Crenshaw in 1989; see "Demarginalizing the intersection of race and sex: A Black feminist critique of antidiscrimination doctrine, feminist theory, and antiracist politics," *University of Chicago Legal Forum,* no. 1 (1989): 139-167, https://chicagounbound.uchicago.edu/cgi/viewcontent.cgi?article=1052&context=uclf.

to identify some of these layers and to consider alternative approaches that can better reflect the diverse human implications of peace and security in outer space.

Missing the connection

At the outset of the consultation, participants were asked a series of questions related to the intersection of feminism and space security. Responses showed clearly that while feminism in general is viewed as highly relevant to space security, this connection is not well reflected in current discussions and diplomatic processes related to space security.

Participants identified the following challenges to explain this absence:

- prevailing (mis)perceptions about feminism and intersectionality;
- a lack of existing data and literature;
- the lack of funding for research and advocacy;
- existing approaches to space security, which were described as heavily Western, state-centric, militarized, masculinized, and colonial;
- the complexity of the topic, which often requires efforts to identify secondary or tertiary connections that are not immediately obvious or easy to uncover;
- the need to bring different communities of research and practice together;
- the view that human and identity-related concerns are less important than strategic security issues (and the lack of awareness of the connections between the two);
- the lack of diversity in both space diplomacy and the space industry;
- the siloing of discussions about space security from other fields of technology and governance.

Despite these and other challenges—many of which were further explored during the consultation—it is clear that there is both a need for, and enthusiasm to begin, the integrating of a broader array of perspectives and priorities to understandings of space security. The remainder of this report suggests some of the ways in which we might begin to do so.

> **The breadth of response indicates that outer space is essential for both daily activities and in determining what it means to be human.**

Part I: Human Connections

The starting point for this consultation is recognition that outer space is deeply human. The first part of the workshop thus focused on uncovering the human harms and other implications (both direct and indirect) of threats and insecurities in outer space—including those below the threshold of armed conflict—and the ways in which these might disproportionately impact communities based on gender, race, socioeconomic status, or geographical location.

The big picture: Invisible vulnerabilities

Key takeaways from this initial portion of the consultation include the following:

- Space systems represent an unevenly distributed continuum of human benefits and harms that are shaped by gender, race, socioeconomic status, geographical location, and other differentiating qualities.
- The essential relationship between space systems and human life around the world creates a triple vulnerability for marginalized people.
- Additional sources of potential human harm associated with space systems are linked to intersections with the environment and emerging technology.
- Human harms linked to space systems and insecurities in outer space are shrouded by multiple layers of invisibility.
- Significant research is required to both identify and make visible the broad spectrum of human connections to space.

First glance: Essential connections

To initiate discussion, consultation participants were polled about the ways in which humans are connected to outer space. While the poll cast a broad net, it provided a crucial entry point into the topic of human connectivity to outer space, and invited reflection on how the impacts of threats and insecurities related to outer space might be felt disproportionately.

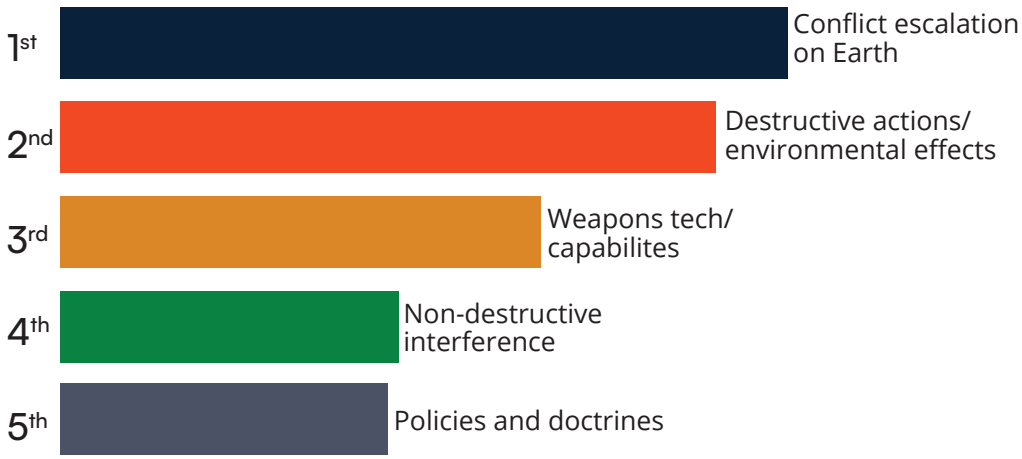
Figure 1: How are humans connected to outer space?

Word cloud generated by participants on July 13, 2023

Poll responses indicated wide-ranging conceptualizations of how humans are connected to outer space. Some were cosmological and imaginative, including dreams and science fiction; others focused on instruments, including critical infrastructure and military satellites. The breadth of response indicates that outer space is essential for both daily activities and in determining what it means to be human.

Participants were then encouraged to consider sources of human harm linked to outer space.

Figure 2: Rank sources of insecurity in space to human harm



Poll generated by participants on July 13, 2023

Both sessions of the consultations ranked the five categories of threats, both at and below the threshold of armed conflict, similarly. **Conflict escalation on Earth** was consistently ranked as having the greatest potential for exacerbating human harm, followed by **destructive actions/environmental effects** and **weapons technology/capabilities. Non-destructive interference** and **policies and doctrines** consistently ranked last (with variations only in the degree of the intervals between the two ranks).

However, discussion of the poll results suggested that many participants viewed the five threats as interrelated, emphasizing the role that policies and doctrines play in legitimizing various modes of harm and warfighting in space. Many were surprised that non-destructive interference did not rank higher, particularly given its prevalence. Participants suggested that its low prioritization reflects both an acceptance for such activities as well as an underestimation of our reliance on space-based systems for daily activities on Earth and the disproportionate effects that their disruption cause.

The details: Layers of harm

Both the workshop and survey components of the consultation asked participants to reflect on the insecurities associated with outer space and the disproportionate impacts experienced by individuals and communities based on gender, race, socioeconomic status, geographical location, or other differentiating qualities. Participants were also asked to identify sources of harm that might be missing from existing discussions.

Responses emphasized the risks posed by actions below the threshold of armed conflict, particularly to essential services such as the Internet, as well as pervasive, everyday violence associated with space-based capabilities. Finally, the discussion also raised concerns with the uneven ways in which both the benefits and harms of space are distributed, as well as the hidden harms that come about through the development of space and related sectors, which can cause grave insecurity for those already most vulnerable.

The overall picture that emerged from the discussions and online survey is of a continuum of benefits and harms from space systems.

Space systems as essential: A triple vulnerability

Participants emphasized that space capabilities and their applications have become so pervasive that they are inextricably connected to the well-being of civilians around the world. However, these space applications can be seen as a double-edged sword, particularly to marginalized people who are more vulnerable to the effects of disruptions. Discussion focused on the following:

Implications when space systems are essential infrastructure

The use of space systems has become so critical to daily life that any conflict or event that disrupts these systems—either through actions in space or on Earth—will directly impact civilians. But neither access to critical infrastructure nor vulnerability to disruptions that deny access is the same for everyone.

The question of who determines and gains access to critical infrastructure was repeatedly

raised. Participants indicated that access to space-enabled infrastructure is particularly disproportionate along gendered and developmental lines, reinforcing existing inequalities, such as the digital divide.

Participants also noted the dilemmas inherent in broadening access to infrastructure. On the one hand, greater access to space-enabled infrastructure can empower marginalized populations. For instance, access to the Internet or Earth observation resources can help women to make more informed household decisions, access important healthcare information, and use navigation and communication capacities to avoid dangerous areas. People with disabilities can use space technologies to make life more manageable in an ableist world. Additionally, the online world enabled by space systems has been crucial in allowing LGBTQ+ individuals and communities to create safe spaces to express their sexuality and subvert the threat of reprisal.[8] Yet, paradoxically, these populations are often the most vulnerable to harms related to such systems, such as data breaches and surveillance (see below), and are more susceptible to harm when access to such services is lost because of the destruction, damage, or disruption of space systems from armed conflict or non-kinetic interference associated with grey-zone competition.

It is Important to note that harm from loss of access is not directly correlated to dependence. According to participants, states and communities with comparatively less access to space-based capabilities are not necessarily less vulnerable to disruptions related to space. Instead, discussion highlighted a ***vulnerability paradox***: those with disproportionately less access to space may be more vulnerable to disruptions of those services due to less resilience and access to redundant capabilities. Specific concerns were raised about the implications of having only a few providers of such critical commercial infrastructure as space-based communications, including broadband Internet, as any disruption to this infrastructure could leave some populations—particularly those in developing countries that have significantly lower levels of infrastructure access—disproportionately affected and unable to carry out essential daily activities.

The effects of employing space systems in armed conflict

When space systems are considered in a warfighting context, the focus is usually on targeting such systems. But discussion during this consultation highlighted the need to better understand and account for the use of space systems in the conduct of armed violence on Earth.

Greater access to the information provided by space systems can help to protect civilians during armed conflict. Such capabilities can make visible and document violence, destruction, and other humanitarian and human rights abuses that arise during armed conflict, and facilitate the means to deliver aid and other protective responses. Yet unequal access to such

8 See Leanna Lucero, "Safe spaces in online places: Social media and LGBTQ youth," *Multicultural Education Review* 9, no. 2 (2017): 117-128, http://dx.doi.org/10.1080/2005615X.2017.1313482 and Ashley Austin et al., "It's my safe space: The life-saving role of the internet in the lives of transgender and gender diverse youth," *International Journal of Transgender Health* 21, no. 1 (2020): 33-44, https://doi.org/10.1080/15532739.2019.1700202.

capabilities, as noted above, raises questions about who benefits and who is left out.[9]

An overwhelming majority of participants were concerned about the ways in which use of space systems during armed conflict can amplify the already disproportionate impacts of violence, including gender-based violence, and inequalities, serving as a "threat multiplier." For example, the ability of space-based surveillance or global positioning services to track movements and behaviours may be used to target or control vulnerable populations, as noted in Canada's most recent National Action Plan on Women, Peace, and Security.[10] Additionally, digital technologies empowered by space satellites may be used by various state and nonstate actors to undermine humanitarian relief efforts and spread harmful misinformation. These risks may increase as the value of space-derived data continues to grow in an emerging era of warfighting powered by artificial intelligence (AI) (see below).[11]

The effects of space infrastructure development

Finally, participants questioned who benefits from space and space-enabled infrastructure and what counts as critical infrastructure. Answers to both questions are influenced by gender and other sources of systemic inequality, which determine not only which capabilities and services are developed (and for whom), but also which are deemed worthy of protection (and for whom), and at whose expense.

The benefits of space must also be questioned. The development of space-related infrastructure can inflict harm on some by, for example, displacing marginalized groups, especially Indigenous communities. The development of ground infrastructure for space systems was cited as causing disproportionate harm to Indigenous communities by severing their connection to ancestral lands and limiting their agency and decision-making power over these lands.[12] Participants explored how these effects are often gendered, with women disproportionately harmed by such displacements. Survey responses also pointed

9 For more on this see Saad Hammadi, "Tracking human rights violations with no certain access to satellite data," *The Ploughshares Monitor,* Spring 2024, https://www.ploughshares.ca/publications/tracking-human-rights-violations-with-no-certain-access-to-satellite-data.

10 Government of Canada, *Foundations for Peace: Canada's National Action Plan on Women, Peace and Security,* 2024, p. 20, https://www.international.gc.ca/transparency-transparence/assets/pdfs/women-peace-security-femmes-paix-securite/2023-2029-foundation-peace-fondation-paix-en.pdf.

11 See, for example, Syndey J. Freedberg Jr., "SecArmy's Multi-Domain Kill Chain: Space-Cloud-AI," *Breaking Defense,* November 22, 2019, https://breakingdefense.com/2019/11/secarmys-multi-domain-kill-chain-space-to-cloud-to-ai; David Ignatius, "How the algorithm tipped the balance in Ukraine, *The Washington Post,* December 19, 2022, https://www.washingtonpost.com/opinions/2022/12/19/palantir-algorithm-data-ukraine-war.

12 An example includes Kānaka Maoli resistance to the Thirty Meter Telescope on their ancestral lands and the crackdown and criminalization of land defenders who seek to protect the sacred mountain of Mauna a Wākea. For an example of the ecological and ontological harm caused by space infrastructure and resistance to it, see Michelle Broder Van Dyke, "'A new Hawaiian Renaissance': How a telescope protest became a movement," *The Guardian,* August 17, 2023, https://www.theguardian.com/us-news/2019/aug/16/hawaii-telescope-protest-mauna-kea. See also Sonya Atalay, William Lempert, David Delgado Shorter, and Kim Tallbear, "Indigenous Studies Working Group Statement," *American Indian Culture and Research Journal* 45, no. 1 (2021): 9-18, https://doi.org/10.17953/aicrj.45.1.atalay_etal.

to the environmental impacts of infrastructure development that disproportionately affect Indigenous lands and peoples.[13]

Reflections on disproportionate impacts also revealed unease about the gendered effects of space infrastructure. One participant noted that studies of physical harm from infrastructure, such as radiation exposure, are still measured on the bodies of men, meaning that potentially different and disproportionate harm to the bodies of women remain unknown. Others noted that the space industry itself overwhelmingly benefits men.[14]

Environmental effects

The environmental impacts of space debris and other contaminants were raised as another source of human vulnerability in and from outer space. Space debris poses a significant risk to the safety and security of all systems in outer space. But participants noted that, while space debris damages or destroys space systems indiscriminately, the risks associated with space debris are not shared equally. For example, space operators do not all have the same access to accurate and timely data about the orbital environment (space situational awareness), nor do they have the same ability to mitigate such threats through manoeuvres or redundant capabilities. This disparity reinforces the risk of disproportionate harms to critical infrastructure (see above).

Concern was expressed about the effects on human health and the environment if significant numbers of space objects re-enter Earth's atmosphere. Participants noted that this risk remains understudied; this lack could indicate biases in how we prioritize values and think about harms related to space. But participants did note that we do know that other environmental impacts from space infrastructure, such as contamination from the mining of minerals needed to develop ground infrastructure, have outsized effects on developing countries, marginalized communities, and women.

Others noted that such impacts do not only affect humans and urged efforts that go beyond anthropocentric views of environmental harm to consider the well-being of ecosystems both on Earth and in outer space.

Impacts of emerging technology

Participants also mentioned the potential for new humanitarian threats, insecurities, and harms posed by the intersection of space systems and other emerging technologies. For example, the development and use of AI capabilities are deeply entwined with space-re-

13 For instance, the launch of an ESA satellite into orbit in 2017 occurred despite opposition by Inuit leaders in Greenland and Canada over the possible contaminating effects of its toxic fuels on their traditional lands and waters. Similar dynamics were repeated in a 2018 ESA satellite launch, when Inuit leaders were not informed of the possibility that a rocket stage would fall into the open waters in which Inuit communities have traditionally hunted. See Tiff-Annie Kenny and Tad Lemieux, "Latest rocket launch renews concerns over food security," *The Conversation,* October 18, 2017, https://newsroom.carleton.ca/story/rocket-launch-inuit-food-security.

14 For more, see Elise Stephenson, "Making space for women: Gender, diversity and outer space," *UN Women,* March 14, 2023, https://asiapacific.unwomen.org/en/stories/feature-story/2023/03/making-space-for-women-gender-diversity-and-outer-space.

lated capabilities and data; the ability for such systems to be used in disproportionate and discriminating ways is well documented.[15] This, in turn, raises questions about accountability for human harm caused by automated and autonomous systems that utilize space data.

Other advances such as quantum computing and encryption could also produce new forms of vulnerability and unequal protections. Participants emphasized the challenge of predicting and identifying the precise nature of such harms, given the lack of transparency around how space interacts with other forms of technology; the direct line between victim and weapon is muddied.

Participants expressed concerns over the lack of research and policy discourse on the peace and humanitarian implications of emerging technologies in outer space. Some survey responses also indicated concerns that the commercialization of emerging technology and space infrastructure could cause harm if inadequately regulated.

Invisibility as an amplifier of harm

Pinpointing space-related harms and their disproportionate impacts on different groups of people is difficult, partly because the use of space systems is so pervasive but also because the connections between space systems, people, and harmful activities are largely invisible—as can be the harms themselves. Participants noted that such invisibility stems from a variety of sources, including the following.

Lack of knowledge and data

Participants noted an overall lack of understanding of human connections to space and of the disproportionate impacts, which they saw as a layer of invisibility. They also pointed to the general lack of understanding of the many different forms of harm; such ignorance leads to an overestimation of the benefits of space and a possible reproduction of harms.

For example, a lack of data on the gendered effects of threats related to outer space leads to a dearth of evidence on how these threats and insecurities affect women, thus contributing to invisibility. And when gendered effects are studied, men are often not included in the discussion, because of the tendency in research and policy to equate issues of gender with women's issues. Such a blinkered view affects studies of other vulnerable groups. For example, survey responses noted the need to incorporate an understanding of how threats and insecurities are disproportionately experienced by persons with disabilities; this group was largely ignored in the small group discussions, likely a reflection of the erasure of these experiences from the broader research agenda.

Clearly, it is important to introduce an intersectional lens to our study of the effects of outer space.

15 For example, Israel's reliance on AI-assisted military decisions in the ongoing conflict in Gaza has resulted in massive destruction to civilian life and infrastructure. See Branka Marijan, "How Israel is using AI as a weapon of war," *The Walrus,* February 22, 2024, https://thewalrus.ca/israel-ai-weapon.

Invisible data connections

The harmful effects of space systems on humans can be difficult to observe and quantify because of the myriad ways in which space-derived capabilities and data run through other systems and infrastructure on Earth and are thus often connected to communities and individuals in different ways.

Harms that are difficult to detect/observe

States prefer to use invisible non-kinetic or 'grey zone' activities to harm opponents' space systems. They might target space-based components, ground stations, data, or end-users, causing disruptions and other interference. Not only are these acts difficult or impossible to observe, but operators are reluctant to publicize vulnerabilities in their systems. The result is greater obscurity of the level of conflict or insecurity in outer space and resulting human impacts.

Discursive framing

Language and framing add a final layer of invisibility. Participants emphasized the role played by language in constructing and upholding hierarchies and thus invisibilities. While the gendered language of space activities is increasingly documented—and in some cases corrected (see below)—discussion turned to the language of security/insecurity itself. Participants noted the challenges posed by different understandings and definitions of these concepts; the concept of security is often associated with "hard" issues like weaponization, while threats to vulnerable groups, including women, are considered "soft" issues and hence understood to be outside the ambit of security discourses.

Discussions also highlighted how the use of militarized language in security often occludes more cooperative approaches to security (see below), and how the Western-dominated lens through which research, policy, and legal frameworks on space security are conceptualized marginalize perspectives from other parts of the world, particularly the Global South.[16]

To make visible and address these gaps, participants recommended borrowing from feminist approaches in related and overlapping areas of study; they also noted the challenge of replacing entrenched vocabulary and concepts (see below).

16 For more, see Rajeswari Pillai Rajagopalan, "Space and cyber global governance: A view from the Global South," Centre for International Governance Innovation, January 29, 2023, https://www.cigionline.org/articles/space-and-cyber-global-governance-a-view-from-the-global-south.

> **Asked to identify words that they associated with space security, participants produced a word cloud in which masculine, militarized, and state-based concepts dominated.**

Part II: Alternative Concepts and Approaches

Building on the identification of harms that are often overlooked in existing conceptualizations of space security, the second part of the consultation considered alternative concepts and approaches that could help to enhance understandings of insecurities related to outer space and to inform policy responses.

The big picture: Shifting how we think

Key takeaways from this part of the consultation emphasize:

- the harms, violence, and blind spots that stem from prevailing militarized, masculinized, colonialized, and state-based conceptions of outer space and security;
- the ability of intersectionality to disrupt patterns of thinking and provide alternative approaches;
- the many practical examples where feminism has helped to create new paths forward on defence and security issues, including humanitarian approaches to arms control and gender-informed approaches to Internet governance and emerging technologies;
- the need for approaches to space security that reflect the connectedness of people, the environment, and outer space, and do not silo security from safety and sustainability;
- a need to be wary of adding feminist concepts to prevailing approaches without attending to the need for deeper transformations in how we practise security.

First glance: Uplifting the values of connectedness

Asked to identify words that they associated with space security, participants produced a word cloud in which masculine, militarized, and state-based concepts dominated[17]; both sessions' clouds included '***geopolitics***,' '***critical infrastructure***,' '***defence***,' '***armed conflict***,' '***militarism***,' and '***non-weaponization***'. The subsequent discussion and responses in the online survey underscored these associations, which one participant summed up as "techno-nationalism focused on military, national, for-profit competition."

17 Jessica West, "Lost in space: feminist considerations of space security," *Z Friedens und Konflforsch* 12, (2023): 307-323, https://doi.org/10/1007/s42597-023-00107-w.

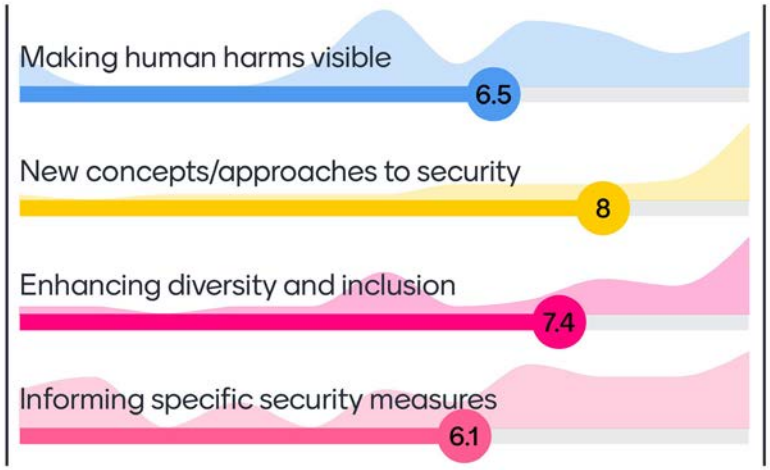
Figure 3: What words do you associate with space security?

Word cloud generated by participants on July 13, 2023

And yet concepts associated with cooperation—'***global commons***', '***access to space for all***', '***sustainability'***, and '***responsible behaviour'***—were also named in the poll, indicating that other perspectives aren't necessarily absent and can be uplifted.

The second poll focused on how to amplify these more cooperative approaches. Participants were asked to rate four types of interventions. Across both sessions, participants rated ***developing new concepts/approaches to security*** the highest, followed closely by ***enhancing diversity and inclusion, making human harms visible***, and then ***informing specific security measures***.

Figure 4: Where are feminist approaches most needed/effective?



Poll generated by participants on July 13, 2023

> **Overall, the values, questions, concepts, and frameworks raised by feminism were positioned as being capable of disrupting patterns of thinking and providing alternative approaches.**

Overall, the responses suggest the need for alternative practices and security measures to flow from new ways of conceptualizing security in outer space and reveal the limits of trying to insert them into existing frameworks.

When questioned about such alternatives, participants emphasized concepts, values, and approaches that are rooted in an awareness of the ***connectedness*** and ***relationships*** that link people to one another, to the past, and to the environment, including:

- intersectional feminism;
- human security, humanitarianism, and human rights;
- stewardship;
- decolonization;
- environmental considerations.

Figure 5: What are some alternative approaches to security?

Word clouds generated by participants on July 13, 2023

The subsequent discussion elaborated on the relevance of these concepts to outer space.

The details: Feminism as disruptive

Asked to reflect on how intersectional approaches and concepts might help to enhance our understanding of insecurities related to outer space, consultation participants highlighted both the challenges and limitations of current frameworks as well as alternatives. Drawing on successes in other policy areas, they emphasized approaches that reflect the interconnectedness of humans, the environment, and outer space.

Limitations of current approaches

Discussion and survey responses yielded detailed reflections on the limitations of existing approaches to space security and governance. The following concerns were raised:

- Existing approaches are **ahistorical** and thus **invisibilize diverse stakeholders and voices**, including the role of women and representatives from the Global South in shaping contemporary space law and governance.
- These approaches **ignore the role of power and inequality** in structuring space activities and infrastructure, both past and present.
- Existing approaches **are gender-biased**. The language of major treaties, resolutions, and other international instruments related to outer space is highly gendered and biased toward males. Terms such as '**mankind**', '**astronauts and envoys of mankind**', '**man's entry into outer space**', '**manned and unmanned stations of the moon**', '**manned spacecraft**', and '**man-made**' are frequently used.
- Such approaches **are state-biased** and ignore the impacts of space activities on humans and the environment, as well as equity-related concerns in the space sector.
- Existing approaches **are technology-biased**, ignoring the social implications and gendered effects of technology and data, while obscuring the linkages between

technical capabilities and systems and human harms.

- These approaches **normalize violence and exploitation** by using **colonial-biased** terms like **'exploration'** and **'conquest',** referring to space as a **frontier** and ***terra nullius***, and depicting outer space as a hostile and desolate environment that is unpeopled/inhuman and controlled so that it can provide an extractable resource.
- Existing approaches **exclude Indigenous perspectives** that are often imbedded in spirituality, astrology, and cosmology, the last of which views celestial bodies in space as animated beings and not mere objects.[18]
- Such approaches **are geography-biased**, overlooking some regions and many countries with nascent capabilities, particularly in Africa.

From a peace-and-security perspective, these existing approaches can be seen to narrow conceptualizations of threats and harm as well as available responses, silencing feminist concerns about exploitation, exclusion, oppression, and injustice.

Alternative approaches through intersectional feminism

Discussion and survey responses noted numerous alternative perspectives and approaches that can help to correct limitations and reduce harms that stem from dominant discourses, while providing alternative modes of peace, security, and governance.

While noting that there is no single, all-encompassing conception of feminism and it is crucial not to reduce feminisms to one homogeneous category, participants were nonetheless clear that feminist perspectives have much to contribute to understandings of space security. Rooted in broad concerns for **equity** and diverse and diffuse forms of political power, such perspectives offer concepts, questions, and frameworks that are largely absent from existing, mainstream discussions on space security. Intersectional approaches in particular draw attention to **exclusions, oppressions, power imbalances,** and **disproportionate impacts of space capabilities and insecurities.** Participants valued the concern for humanitarian elements of security and vulnerable communities that feminist theory inspires.

Examples of how feminist perspectives and approaches cam inform other areas of **technology governance** were noted, including:

- Feminist Principles of the Internet,[19]
- gender awareness in cybercrime,[20]
- awareness of biases underpinning artificial intelligence.[21]

Participants emphasized the value of **intersectional approaches to feminism**, which ex-

18 See Alina Utrata, "Engineering Territory: Space and Colonies in Silicon Valley," *American Political Science Review* (2023): 1-13, https://doi.10/1017/S0003055423001156.

19 Feminist Principles of the Internet, https://feministinternet.org/en/principles.

20 "Integrating gender in cybercrime capacity-building," *Chatham House,* July 5, 2023, https://www.chathamhouse.org/2023/07/integrating-gender-cybercrime-capacity-building.

21 Reva Schwartz, Apostol Vassilev, Kristen Greene et al. *Towards a Standard for Identifying and Managing Bias in Artificial Intelligence*, NIST Special Publication 1270, U.S. Department of Commerce, 2022, https://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.1270.pdf.

amine how gender relations and power are interlaid with other markers of identity and inequality such as race, disability, sexuality, and class. Drawing on African influences on feminism and works such as those by Kimberlé Crenshaw, Audre Lorde, and bell hooks were seen as ways to make feminism more inclusive and introduce liberatory practices, thus challenging what counts as knowledge by recognizing value in traditions such as oral history.[22]

Overall, the values, questions, concepts, and frameworks raised by feminism were positioned as being capable of **disrupting patterns of thinking** and providing **alternative approaches**. Such alternatives are further detailed below.

Humanitarian disarmament

When asked about feminist approaches and concepts that have worked to advance security elsewhere, participants pointed to a wave of humanitarian disarmament initiatives that have been rooted in concerns about what weapons do to people and to the planet, including specific concerns about gender.[23] Here, the concepts of '**reverberating effects'** and '**disproportionate harm**' have been useful. The Mine Ban Treaty is illustrative: not only is it centred on avoiding indiscriminate human harm, but it also accounts for the specific needs of women and children,[24] as does the Arms Trade Treaty.[25]

The Treaty on the Prohibition of Nuclear Weapons was also raised as an example of intersectionality at work, with an intentional effort to emphasize "disproportionate, humanitarian impacts of nuclear weapons on vulnerable populations such as aboriginal groups near testing fields" and environmentalism to underpin the argument for banning such weapons.[26] A similar effort was noted in the realm of cyber peace and security in which advocates emphasize the continuum of harms and differentiated impacts on individuals across virtual and physical spaces; this perspective resonates with feminist conceptualizations of the **continuum of violence** that blurs public and private spaces, and conditions of peace and war.[27]

Alternative concepts of security

Participants also noted that there are different ways of doing security. For example, **coop-**

22 Crenshaw, see note 6.; Audre Lorde, *Sister Outsider: Essays and Speeches* (Crossing Press, 1984); bell hooks, *Ain't I a Woman: Black Women and Feminism* (South End Press, 1981).

23 Jessica West, Branka Marijan, and Emily Standfield, "Regulating new tools of warfare: Insights from humanitarian disarmament and arms control efforts," Project Ploughshares, March 24, 2022, https://www.ploughshares.ca/reports/regulating-new-tools-of-warfare-insights-from-humanitarian-disarmament-and-arms-control-efforts.

24 "Gender and the Mine Ban Treaty," *Landmine & Cluster Munition Monitor*, June 2022, https://www.the-monitor.org//media/3327346/Gender-and-MBT_June-2022.pdf.

25 *Factsheet: Gender and the Arms Trade Treaty*, UNIDIR and Control Arms, August 23r 2022, https://unidir.org/publication/factsheet-gender-and-the-arms-trade-treaty.

26 See also Ray Acheson, *The Treaty on the Prohibition of Nuclear Weapons and gender, feminism, and intersectionality*, Reaching Critical Will, February 2023, https://reachingcriticalwill.org/resources/publications-and-research/publications/16762-the-treaty-on-the-prohibition-of-nuclear-weapons-and-gender-feminism-and-intersectionality.

27 Jacqui True, "Continuums of violence and peace: A feminist perspective," *Ethics & International Affairs* 34, no. 1(2020): 85-95, https://doi.org/10.1017/s0892679420000064.

erative security measures have animated efforts in international security in the past, including those related to outer space. Such approaches can be military in nature, with cooperative arms control measures during the Cold War raised as an example in the discussion. But non-military approaches to security are also available. For example, security rooted in an **ethics of care** prioritizes shared responsibilities for the care of others, in contrast to an individualistic, rights-based approach to security.[28] As well, concerns for **everyday security** (related to the continuum of violence above) focus on the mundane forms of violence and insecurity that plague people, in differentiated ways, every day.[29] The concept of everyday security is relevant to outer space governance, in which an artificial distinction is enforced between military security and safety and sustainability issues, even though all three impact the ability of everyone to use space on a daily basis. **Equity** can also serve as a means of security for many who lack access to, or secure use of, outer space because of structural social and economic disadvantages.

Environmentalism and ecology

There was significant discussion on the need to prioritize environmental concerns and ecological approaches to governance in outer space, focusing on the ecological stability of the outer space environment and human responsibilities for care of this environment.[30] Survey responses noted that ecological feminism can be useful to understand and analyze how the oppression of women is linked to the oppression of nature in a society dominated by patriarchal norms, and how their liberation is similarly linked.[31] Pointing to examples in other fields that can be adapted to outer space, **environmental justice** was offered as an effort in which feminist and intersectional perspectives have been incorporated. It was noted that environmentalism has also become gendered; studies indicate that those who identify as men tend to shy away from environmental discussions, which are perceived to undermine masculinity.[32] It is possible that including diverse gendered voices and perspectives in conversations related to outer space could lead to environmental considerations being taken more seriously.

Decolonial approaches

Decolonial approaches include frameworks that are used to critique historical and persisting colonial structures, institutions, and power relations, as well as approaches generated by and for hitherto marginalized subjects and geographical regions, contending with the continuing ideological implications of colonialism that suggest alternative ways of life to those produced and upheld by the colonizer. Discussion group participants noted that de-

28 Fiona Robinson, *The Ethics of Care: A Feminist Approach to Human Security* (Temple University Press, 2011).

29 Ingrid Nyborg, Shweta Singh, and Gunhild Hoogensen Gjørv, "Re-thinking violence, everyday and (in)security: Feminist/intersectional interventions," *Journal of Human Security* 18, no. 2 (2022): 1-5, https://doi.org/10.12924.johs2022.18020001.

30 Marie-Catherine Petersmann, "Response-abilities of care in more-than-human worlds," *Journal of Human Rights and the Environment* 12 (2021): 102-124, https://doi.org/10.4337/jhre.2021.00.05.

31 Linda C. Forbes and Laura Sells, "Reorganizing the woman/nature connection," *Organization & Environment* 10, no. 1 (1997): 20-22, https://jstor.org/stable.26161651.

32 Aaron R. Brough, James E. B. Wilkie, Jingjing Ma, Mathew S. Isaac, and David Gal, "Is eco-friendly unmanly? The green-feminine stereotype and its effect on sustainable consumption," *Journal of Consumer Research* 43, no. 4 (2016): 567-582, https://doi.org/10.1093/jcr/ucw044.

colonial approaches are pertinent in the area of space security due to the colonial connotations of terms like **'exploration'** and **'conquest'** and the idea of **space as a frontier.**[33] Participants noted how **postcolonial theory** may be useful to shed light on how some forms of knowledge are valued over other forms and deemed scientific; and how the view of **oral, cosmological,** and **situated knowledges** as less valuable, leads to their being obscured. Hence, space, like the environment, comes to be seen as the source of exploitable resources.

Participants and respondents offered numerous alternatives to dominant, colonial ways of knowing, including:

- **ubuntu**, which derives from African philosophical traditions and emphasizes the relational, communal, social, spiritual, and environmental interconnectedness of all beings;[34]
- **Indigenous stewardship** perspectives rooted in traditional knowledges that emphasize respect, reciprocity, and relationality with the land, the environment, and other non-human beings.

As participants noted, each approach converges with environmentalist perspectives, emphasizing the interconnectedness of humans, the environment, and outer space. Examples of such approaches were found in decolonized health-related research by Indigenous scholars.[35]

Feminist legal approaches

Several examples of legal approaches to insecurity and violence were offered as efforts to make invisible violences visible by calling attention to the differentiated impacts of conflict at and below the threshold of armed conflict. They include feminist approaches to **international criminal law addressing genocide, crimes against humanity, and other war crimes**. Respondents noted that these approaches may be useful when considering the differentiated impacts of threats related to outer space, harms from grey-zone activities against space systems, and actions that affect space-related infrastructure. Drawing from efforts to address human insecurities related to other technologies such as AI, participants identified **human rights** frameworks as another valuable tool.[36]

33 For more on the functioning and harms of space colonization, see Alina Utrata, "Engineering territory: Space and colonies in Silicon Valley," *American Political Science Review* (2023): 1-13, https://doi.10/1017/S0003055423001156; Natalie B. Trevino, *The Cosmos is Not Finished*, Ph.D. thesis, Western University, 2020, https://ir.lib.uwo.ca/etd/7567.

34 Jacob Rugare Mugumbate and Admire Chereni, "Editorial: Now, the theory of Ubuntu has its space in social work," *African Journal of Social Work* 10, no. 1 (2020), https://www.ajol.info/index.php/ajsw/article/view/195112.

35 Rachel Eni et al., "Decolonizing health in Canada: A Manitoba first nation perspective," *International Journal for Equity in Health* 20, no. 206 (2021), https://doi.org/10.1186/s12939-021-01539-7.

36 Lorna McGregor, Daragh Murray, and Vivian Ng, "International human rights law as a framework for algorithmic accountability," *International and Comparative Law Quarterly* 68 (2019): 309-343, https://doi.org/10.1017/S0020589329000046.

Caveats and limitations

Participants noted the difficulty of disrupting dominant modes of thinking and actively debated the value and impact of past efforts to shift the meaning and practices associated with security.

Co-option

Participants discussed at length the Canadian government's "Women, peace and security" agenda. Some opined that it has changed how different actors think about security, specifically the gender-differentiated impacts of armed conflict, weapons, and peace processes. They noted that the agenda has highlighted the role that civil society organizations play in bringing marginalized voices and perspectives to the table. However, others argued that it has not changed how these actors act, attributing this lack of change to co-opting and implementing the WPS agenda—a normative system—within the military/defence sphere, which is focused on operational effectiveness. That is, attempts to apply WPS to areas that are not concerned with gender norms per se are inherently limited in scope. Participants also drew from feminist critiques of WPS, noting that application of the WPS agenda tends to reinforce masculinized and heteronormative power relations.[37] It was emphasized that these dynamics should be considered when looking to integrate gender perspectives in space security.

Participants warned that feminist theories are often misunderstood, derided, or co-opted for political ends. There was significant debate about the value of making feminist theories more acceptable to security experts and to the broader public as a significant step toward effectively leveraging the value of these perspectives (see Part III below).

Not making the cut

Feminist concerns with gender and other power structures associated with identity are often seen as secondary considerations and frequently passed over in favour of more traditional security topics.

Western dominance

It was noted that mainstream approaches to feminist theory, including approaches to equality, reflect a distinctly Western perspective and that feminist theories should better incorporate the perspectives of people from the so-called developing world.

Competing approaches to change

Not all forms of feminism offer the same approach to systemic change. While some favour working within existing approaches and frameworks—such as the WPS agenda—others hold that we cannot continue operating within the bounds of the systems that brought about inequality in the first place.

Overall, the consultation highlighted the need for a deeper transformation of approaches to outer space security. Such change needs more than an understanding of concepts; in the absence of new practices, they are likely to remain abstract and fail to produce lasting change.

37 Jamie J. Hagen, "Queering women, peace and security," *International Affairs* 92, no. 2 (2016): 313-332, https://doi.org/10.1111/1468-2346.12551.

> **A persistent theme from the consultation is the need to incorporate broader understandings of security, violence, and harm into diplomacy on PAROS.**

Part III: Responses

The final part of the consultation explored how to incorporate inclusive approaches and perspectives into global peace, security, and arms control efforts related to outer space. Up for discussion were possible norms of behaviour, arms restrictions, and synergies with other governance frameworks. However, participants emphasized a need to pursue more fundamental changes to the objectives and diplomatic processes associated with PAROS.

The big picture: Supporting equitable security in outer space

Key takeaways from the final portion of the consultation emphasize steps needed to create an equitable environment in outer space, one which is conducive to peace and nonviolence. They included the following insights:

- Security and arms control in outer space must be viewed as part of a holistic approach to space governance that includes peace, environmentalism, equity, and cooperation.
- Existing diplomatic approaches to PAROS, which are focused on restricting weapons and developing norms of behaviour, particularly those linked to transparency and communications, are at the heart of this effort.
- The scope of existing diplomatic approaches to PAROS must be expanded to respond to a broader understanding of peace, security, violence, and harm.
- Opening the door to participation is necessary but not sufficient: new ways of practising security at the diplomatic level, new ways of thinking, new approaches to existing tools, and new efforts to overcome embedded resistance to change are needed to help nurture more inclusive approaches to peace and security.
- Change can't happen without adequate resources.

First glance: Rethinking the 'what' of space security

One way to incorporate intersectional perspectives into space security is to influence the content of diplomacy. Participants were polled on the key norms or principles that would be prioritized by a feminist approach to space security. The results of the poll provide a snapshot of an approach to security governance that is characterized by peace, equity, inclusion, human rights, environmental protection, and cooperation. **Care** is at its core.

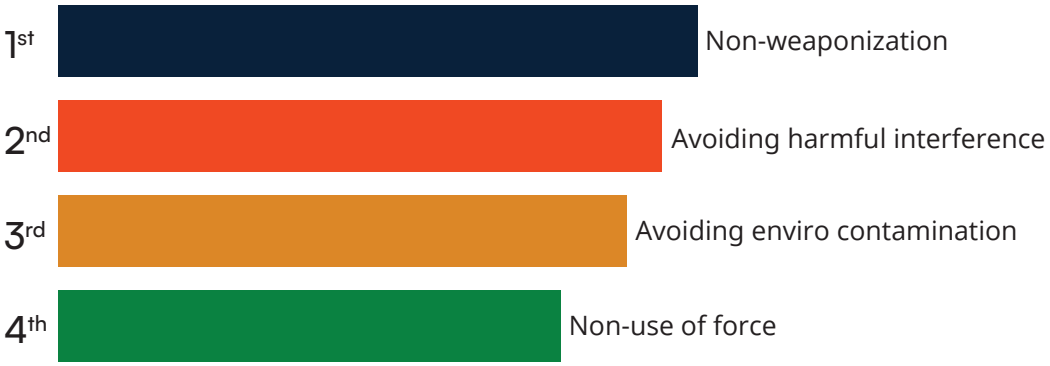
Figure 6: What norms or principles might a feminist approach prioritize?

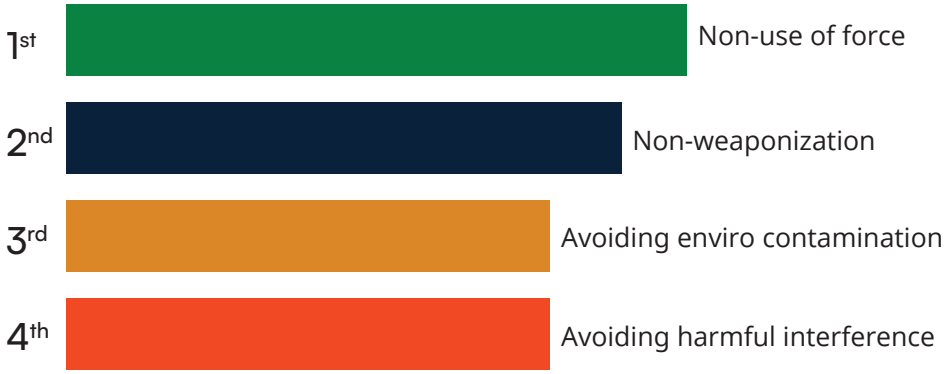
Word cloud generated by participants on July 13, 2023

However, features of traditional approaches to space security, and PAROS in particular, were frequently referenced in the polls from both sessions. They included **norms of behaviour**, **arms control**, **conflict prevention**, **non-violence/force**, **restrictions on destructive activities,** and **environmental protection**.

What is clear is that weapons matter in human-centred discussions of peace and security in outer space. While definitions and verification of weapons continue to be debated diplomatically, the potential for weapons use in outer space contributes to an insecure environment for everyone. Weapons were identified as one of the most pressing threats during the first portion of the workshop. And both sessions ranked non-weaponization highly when polled on the most valuable restraints for human protection.

Figure 7: Which restraints are most valuable for human protection?





Polls generated by participants on July 13, 2023

However, a significant takeaway from the consultation is that there is a need to expand the scope of existing diplomatic approaches and processes in response to a broader understanding of peace and security, both in terms of the issues that they encompass and the solutions proposed.

A persistent theme from the consultation is the need to incorporate broader understandings of security, violence, and harm into diplomacy on PAROS. Participants saw the threat of weapons entangled with other issues, including use of force and environmental contamination. As seen in Figure 7, weapons and arms control more broadly are also viewed as part of a holistic approach to space governance that includes peace, environmentalism, equity, and cooperation. This runs counter to current governance approaches that sever security discussions from those focused on the safety and sustainability of peaceful uses and pursue different responses to intentional threats and those that arise from the natural environment.

When polled on specific approaches to space security, respondents focused on creating an environment conducive to peace and non-violence. They saw transparency and communication as key norms or positive obligations. This response resonates with our earlier work that identified these two pillars as foundational to norms of responsible behaviour in outer space.[38] It also speaks to the concerns raised during the first part of the workshop about the harms that flow from layers of invisibility.

38 Jessica West and Gilles Doucet, *A Security Regime for Outer Space: Lessons for Arms Control*, Project Ploughshares, October 2022, https://assets-global.website-files.com/63e066081ef50cb16a3f4157/63e066081ef50c44473f41dc_ArmsControlLessons_OuterSpace_10.22.pdf; Jessica West, *From Safety to Security: Global Workshop Series Report*, Project Ploughshares, February 1, 2021, https://www.ploughshares.ca/reports/from-safety-to-security-global-workshop-series-report.

Figure 8: Which obligations are most helpful for human protection?

Poll generated by participants on July 13, 2023

The consultation also pointed to the relevance of **incorporating additional governance frameworks** into international approaches to peace and security in outer space. Those mentioned include:

- Women, Peace, and Security agenda,
- the United Nations Sustainable Development Goals,
- Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW),
- UN Declaration on the Rights of Indigenous Peoples (UNDRIP),
- international legal frameworks related to human rights and environmental protections.

Notably, these frameworks were almost entirely absent from discussions of relevant governance frameworks at the United Nations Open-Ended Working Group on Reducing Space Threats.[39]

However, the consultation also emphasized that many of the objectives of these frameworks are at the core of **the Outer Space Treaty**. In addition to principles related to equity, inclusion, environmental protection, and international cooperation, the OST, viewed through a broad interpretation of its concept of due regard, was seen as offering another potential approach to more inclusive space security. Taken with subsequent environmental initiatives such as the Stockholm and Rio Declarations, the OST was seen to have the potential to expand the interpretation of harm beyond activities in outer space to include harms experienced primarily on Earth that disproportionately affect the Global South, such as debris impacts and light pollution.

39 For a summary of the discussion, see Jessica West, *The Open-Ended Working Group on Space Threats: Recap of the first meeting, May 2022*, Project Ploughshares, September 6, 2022, https://www.ploughshares.ca/reports/the-open-ended-working-group-on-space-threats-recap-of-the-first-meeting-may-2022#:~:text=Others%20prefer%20a%20ban%20on,pervading%20sense%20of%20common%20purpose.

The details: Rethinking the 'how' of space security

The pursuit of a more holistic approach to a peaceful and secure outer space that is rooted in values such as equity, inclusion, peace, environmental sustainability, and human rights necessitates a different approach to the *how* of security and diplomacy. Participants repeatedly emphasized the need to overcome structural, procedural, and linguistic biases embedded in existing governance structures.

Changing the "how" to better incorporate intersectional priorities was the focus of both small- and large-group discussions, although participants were divided on the value of existing gender mainstreaming approaches.

Gender mainstreaming refers to the integration of a gender perspective into the preparation, design, implementation, monitoring, and evaluation of policies and programs to promote equality and identify existing gender disparities. Respondents noted the possible shortcomings of gender mainstreaming, as such an approach often simply adds more women into the mix instead of addressing the underlying systemic reasons for their marginalization. In other words, these approaches tend to address **the effects rather than the causes** of the exclusion of diverse gender perspectives in space security. Respondents further noted that adding diverse representation to the mix may be a necessary precondition to advancing systemic changes but it's not enough. Also needed are new ways of practising security at the diplomatic level—new ways of thinking, new approaches to existing tools, and new efforts to overcome embedded resistance to these and other types of changes.

Changing how we practise: Meaningful engagement

Diverse, inclusive, meaningful participation in space security at the diplomatic level is key. But participants in the consultation made clear that achieving such participation is difficult and requires many changes to current practices to avoid the "add women [and other minorities] and stir" approach, which will not change prevailing institutional norms. Priorities follow.

Being intentional about diversity

A core contribution of intersectional feminism is the recognition that individuals and groups of people experience inequality, discrimination, and other harms differently, based on overlapping social identities related to gender, race, sexual orientation, disability, geography, and socioeconomic conditions. Many voices have long been absent from space security discussions, including those of women; those from the Global South; black, Indigenous, and other people of colour (BIPOC); and 2SLGBTQ+ individuals. Also overlooked are the ableist nature of space activities and the voices of people with disabilities.

While it is important to increase opportunities for women to participate, it must be recognized that not all women think alike or share the same values and experiences. Discussants noted other aspects of identity and experience that must be acknowledged:

- Black voices in particular have been marginalized.
- There are more than two genders.
- Gender is experienced differently in the Global North and South.
- Diversity at every level must be sought—within national delegations, among ex-

perts/presenters, at side events, etc.

- Youth must be included.

Participants were clear that **opening the door is not enough**. The systematic exclusion of marginalized groups must be countered with efforts that actively find and bring in these voices by reaching beyond national delegations and industry. In many countries, women and other minorities are excluded from both, particularly when high levels of technology are involved. Greater **civil society** engagement is one way to reach more underrepresented groups.

What numbers really mean

Research included in a statement by Costa Rica to the United Nations General Assembly First Committee indicates that participation by women in Group of Governmental Experts (GGE) processes related to PAROS had increased from none in 2012 to only 33 per cent in 2023.[40] But being at the table is not enough. For example, while women were more than 37 per cent of participants at the OEWG process, they made only 23 per cent of oral contributions.[41]

Ensuring the engagement of diverse participants requires a deeper commitment to inclusion. Consultation participants recommended procedural rules, language (see below), and agendas that reflect diverse interests, priorities, and modes of engagement; and the inclusion of civil society and other nonstate actors.

Providing resources

Diverse participation in governance processes will be ineffective unless adequate resources are provided to ensure that all can engage meaningfully. Participants highlighted the following resources as key:

- financial support for travel, accommodation, translators, sign interpreters;
- technical support and education on technical topics and the workings of the UN and other diplomatic processes;
- funds for evidence-based research;
- mentorship, career development, and retention efforts;
- the provision of opportunities for leadership;
- the provision of partnerships and collaborative opportunities.

Getting the timing right from the beginning

Some participants were frustrated that attention to gender and other aspects of diversity is frequently an afterthought rather than the basis for structuring discussions, agenda, and procedures.

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40 Maritza Chan, Statement to the UN General Assembly First Committee, Ministerio de Relaciones Exteriores y Culto de Costa Rica, New York: 2023, https://reachingcriticalwill.org/images/documents/Disarmament-fora/1com/1com23/statements/19Oct_Costa_Rica.pdf.

41 Almudena Azcárate Ortega and Sarah Erickson, *OEWG in Reducing Space Threats: Recap Reports*, United Nations Institute for Disarmament Research, 2024: 12-15, https://unidir.org/publication/oewg-on-reducing-space-threats-recap-report.

Pursuing new tools and processes for engagement

Traditional structures of state-based discussions and debates severely limit diversified participation and the expression of a wide variety of views and perspectives. Participants noted that technology can help to facilitate engagement and cooperation across borders and organizations. Surveys, social media, and digital meeting tools have the potential to increase access to the spaces where these conversations take place and provide alternative means of input. For such an approach to be effective, however, barriers to accessing technology must be removed.

Diverse engagement tools are needed. Beyond official diplomatic discussions, participants saw value in informal meetings and discussions, consultations, roundtables, and research. Regional bodies are another vehicle; one participant pointed to the Arctic Council, which includes participation by nonstate actors.

Nurturing culture change

Nurturing equity and inclusion requires a change in the culture of diplomacy. Participants pointed to the need to challenge norms about the who, what, and why of space security to create space for views that may not be considered legitimate within existing framings.

Some participants pointed to persistent experiences of sexual harassment during UN space meetings, conferences, and coffee breaks as a tacitly accepted practice that requires immediate change. Ideas to redress such behaviour included UN-led workshops or a code of conduct to educate all attendees at events about appropriate behaviour.

Working across all levels of governance

Meaningful engagement in space security governance is not only a goal for the United Nations and other global institutions, but for all organizations. Participants noted that national policymaking can assume a positive role here. New Zealand and Australia served as examples of the value of consultative processes in developing more inclusive policies.

Allowing space for discomfort

Meaningful engagement in space security governance must allow room to challenge commonly held assumptions, views, and ideologies. Becoming comfortable with the resulting discomfort can help to broaden the scope of views accepted as legitimate, while making existing exclusions more visible and open to challenge.

Placing the onus on everyone

The point was made that the onus should not be only on minorities and underrepresented groups to correct for the lack of diversity and inclusion within space security diplomacy or to raise issues related to feminism, gender, race, sexuality, and so forth. Everyone must be part of the process.

Changing how we think: Language matters

When addressing inclusion and representation in space security, the language we use matters. One participant stated that reality is shaped by the language that we use, which is both normative and formative; our realities are constructed and shaped through language.[42] Building on Part II of the consultation, participants urged efforts to redress the masculinized, militarized, and colonialized language of space security as steps in shifting our thinking and policy responses so that voices are empowered and narratives that have long been excluded are included.

Gendered language

The main space-related treaties invisibilize women through "manned" language; women must imagine themselves within masculine constructs. UN-specific language often refers to the position of the UN Secretary-General as "him" and to the "Chairman" of various UN bodies. While such bias can be corrected with gender-neutral language—"humankind" and "crewed" spaceflight—participants noted that contemporary UN resolutions as recent as *Further practical measures for the prevention of an arms race in outer space* of 2019 and *Destructive direct-ascent anti-satellite missile testing* of 2022 have used "mankind."

Colonial language

The language of space activities is also heavily colonialized, using terms such as "colonizing" space and representing space as a "frontier" or "wild west." This language underpins practices that participants characterized as racist, exploitative, elitist, and environmentally destructive. Appropriate language must include terms such as "space exploration" and "living in space" but also the expressions of humanity found in Article I of the OST.

Militarized language

To prioritize the language of peace and peaceful uses, some participants recommended examining the militarized vocabulary that practitioners tend to employ when discussing space security.[43] While references to 'warfighting' stand out, other less noticeable examples include the concept of space as a 'domain'.

Respondents pointed to examples in which language has already been reworked. In UN Resolution 73/6 of the Space2030 Agenda, *Fiftieth anniversary of the first United Nations Conference on the Exploration and Peaceful Uses of Outer Space: Space as a Driver of Sustainable*

42 Paul Kay and Willett Kempton, "What is the Sapir-Whorf hypothesis?" *American Anthropologist* 86, no. 1 (1984): 65-79, https://www.jstor.org/stable/679389.

43 While the increasing reference to outer space as a 'warfighting' domain is a case in point that garners significant public attention, other more subtle examples include the concept of 'domain' itself, as well as the shift in language from 'space situational awareness' to 'space domain awareness'. See Julia Schenpf and Ursula Christmann, "'It's a war! It's a battle! It's a fight!': Do militaristic metaphors increase people's threat perceptions and support for COVID-10 policies?" *International Journal of Psychology* 57, no. 1 (2022): 107-206, https://doi.org/10.1002/ijop.12797; Sandra Erwin, "Air Force: SSA is no more; it's 'Space Domain Awareness,'" *Space News,* November 14, 2019, https://spacenews.com/air-force-ssa-is-no-more-its-space-domain-awareness; Paul Chilton, "Metaphor, Euphemism and the Militarization of Language," *Current Research on Peace and Violence* 10, no. 1 (1987): 7–19, https://www.jstor.org/stable/40725053; Carol Cohn, "Slick'Ems, Glick'Ems, Christmas Trees, and Cookie Cutters: Nuclear language and how we learned to pat the bomb," *Bulletin of the Atomic Scientists,* June 1987, https://genderandsecurity.org/sites/default/files/Cohn_Slick_ems_Glick_ems_Christmas_Trees_Cookie_Cutters.pdf.

Development, the phrase "interest of mankind" was replaced with "interest of all humankind."[44] The Committee on the Peaceful Uses of Outer Space (COPUOS) has replaced "chairman" with "chair" in all reports drafted since 2010.

New approaches to existing tools

There was significant debate about the value and repercussions of leveraging existing tools to address inclusion in security processes. These tools include:

The Women, Peace, and Security Agenda

The gender mainstreaming approach of WPS has traditionally focused on participation in peace processes and not on prevention, relief, and recovery processes associated with conflict, or sources of insecurity other than armed conflict. Some participants saw this approach as a limitation on the applicability of this agenda to outer space. Others raised concerns that the focus on "adding women" limits meaningful change, urging wider use of tools such as **GBA+** (Gender-based Analysis Plus) across the policy and governance process. And yet others indicated a view that WPS has been co-opted to serve state and military objectives.

However, some participants noted that the WPS Agenda has been used to pursue change at the national level, pointing to WPS units in military organizations that institutionalize a responsibility for inclusive, human-centred approaches across activities and planning. And, as indicated by Canada's national plan, the approach to WPS has been broadening. Importantly, it comes with a UN mandate that can be leveraged in diplomatic processes.

National tools

States are active in outer space and have a role to play in inserting WPS in space policy and activities. **National Action Plans** were suggested as one way to apply the WPS agenda to issues related to outer space security while encouraging national/local ownership of that agenda. It was considered noteworthy that Canada's latest National Action Plan acknowledges space security as well as the use of space technology in gender-based violence.[45] **National space policy** consultations and development processes can also provide an opening for greater representation (see above).

Processes for diversity, equity, and inclusion

Participants disagreed on the value of existing commitments to diversity, equity, and inclusion (DEI). Some viewed such commitments as a more inclusive and perhaps acceptable way to promote meaningful engagement by underrepresented groups and, perhaps, **private-sector engagement**. Others found such commitments mere performance and no more than counting exercises.

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44 United Nations Office for Outer Space Affairs, *The "Space 2030" Agenda: Space as a Driver of Sustainable Development*, 2024, https://www.unoosa.org/res/oosadoc/data/documents/2024/stspace/stspace88_0_html/st_space-088E.pdf.

45 Government of Canada, *Foundations for Peace: Canada's National Action Plan on Women, Peace and Security*, 2024, https://www.international.gc.ca/transparency-transparence/assets/pdfs/women-peace-security-femmes-paix-securite/2023-2029-foundation-peace-fondation-paix-en.pdf.

Cross-cutting governance mandates
As noted above, other governance frameworks and mandates that relate to cross-sector issues—such as human rights, sustainable development, environmental protection, and Indigenous peoples—could be more intentionally integrated into space security and governance processes.

The overall message is that existing processes and sources of legitimacy can be used to pursue greater diversity and inclusion in space security policymaking at both the national and international levels, if limitations are recognized and challenged.

Resisting resistance

There was significant discussion and debate on the challenge of overcoming resistance in the space security community to the greater inclusion of women and diverse perspectives and experiences. Such resistance was seen to take many forms, including:

- direct pushback at the state and corporate levels,
- disparagement of feminism and concepts related to gender,
- lack of investment of finances and other resources,
- narrow conceptualizations of expertise,
- cost concerns,
- reliance on minimal efforts,
- bargaining over priorities,
- prevailing gender and other identity norms associated with outer space and security.

Strategies to overcome such resistance and pursue political buy-in were proposed (see below).

Don't call it feminism
How to sell intersectional feminism? Some participants pitched strategies to make it more palatable to a broader audience, such as using the language of "equity, diversity, and inclusion," which can cover diverse geographies, classes, races, and disciplines. In many ways this broader approach underpins intersectional feminism. Others rejected this approach as "feminism by stealth," noting that it can lead to the perception that inclusion stops when the door is opened and overlooks systemic requirements for inclusion, such as equity and justice.

Educate
Some participants called for educational efforts to raise awareness of the value of inclusivity, participation, equity, diversity, and gender-responsive approaches to peace and security in outer space. Such education can take many approaches, including engagement, consultation, roundtables, and research.

Show the evidence
Some participants recommended drawing on facts, evidence, and data to demonstrate the benefits of inclusion on operational effectiveness and the repercussions of the lack of inclusiveness in space-related activities. If data were lacking in the field of space security,

relevant information could be found in other security fields.

Include men in conversations on gender
It was noted that gender includes men; thus, men should be engaged in discussions about gender and inclusion.

Think globally
We must consider how perceptions of gender vary in different cultures and communities.

Be realistic
Participants noted that it is necessary to be clear that efforts to enhance inclusion require both time and resources.

Pursue normative change
The need to challenge prevailing norms related to identity and outer space was made clear. Too many think that only white, heterosexual, Western men are involved in space activities.

Normalize new perspectives
Participants called for champions to normalize, persistently and at all forums, topics and values associated with intersectional feminism.

The need for research
Participants expressed an overwhelming need for additional research on the following:

- best practices related to meaningful engagement and inclusion;
- data on disproportionate harms and the value of diversity in the space sector;
- marginalized histories and knowledge;
- alternative approaches to peace and security.

"We can't back down"
These were the words of one participant, who noted that we don't have the luxury of thinking that we're done, even as the language and practices associated with inclusive approaches to peace and security evolve and expand. The work continues.

What have we learned? That progress is not enough. Efforts to achieve the objectives of feminism, particularly in the realm of peace and security, are part of a dynamic, ever-changing, unending process. Systemic change that challenges how we think about, and practise security can begin with, but must not end with, small changes.

Conclusion: Changing the Conversation

A core conclusion from the consultation on human (in)securities in outer space is the need for new conversations on space security. Although there has been some effort to expand participation in diplomatic processes, the underlying objective of inclusivity is **change**.

Existing frameworks related to WPS, while essential, are too limiting when used as singular tools. Gender experiences are not uniform and feminist perspectives vary around the world, because systems of power rooted in identity, including gender, race, class, disability, and sexuality, are compounding and intertwined with hierarchies of economics and geography. An intersectional approach is needed to explore the multiple, overlapping factors of advantage and disadvantage that shape human activities, experiences, and vulnerabilities in outer space.

And yet questions about how the harms and benefits of space security are distributed and experienced are rarely raised. This is because those who face disproportionate or different harms are rarely in the room; participation by women, people of colour, and those from the Global South in the diplomacy of space security has historically been abysmal.

Yet it's not enough to diversify the faces in the room. Even in integrated spaces, patterns of entrenched gender, racial, and geopolitical dominance are difficult to overcome. And long-standing exclusions are fortified by unequal resources, discussions in technospeak, and informal constraints on what counts as expertise.

Consultation participants stated clearly that modes of participation must be expanded to change the conversation. Recruitment, resources, and mentorship are essential; spaces must be made more accessible by, and welcoming to, diverse voices to sustain a deeper level of inclusion in the creation of ideas, values, and structures that shape space governance.

Distinct histories, experiences, and knowledge can help to advance stagnant diplomatic discussions and invigorate practical approaches to space governance. A more peaceful and inclusive future in outer space requires new concepts and ideas for space governance. In addition to insights gleaned from intersectional, decolonial, and humanitarian perspectives—which have inspired renewed momentum for disarmament elsewhere—participants noted the value of practices rooted in ecology, cooperation, and an ethics of care.

But none of this can be achieved without additional resources to support research, to support access and participation, and to support a change in the conversation.

Leading is listening

There is a strong desire to have new and different conversations related to outer space. A project that we had envisioned as a few people talking about gender and space quickly expanded into a series of vibrant global online gatherings. One participant noted that in her 30 years of practising space law, she had never before attended a workshop focused on feminism. But achieving deep and sustained change in the concepts and approaches that inform peace and security in outer space requires diplomatic leadership to make such change a priority across every venue.

Leadership is needed to help bring down the barriers that still prevent large swaths of the world's population from participating and influencing space activities, governance, and decision-making. Leadership is needed to bring questions about gender, race, class, ability, and sexuality from the margins to the centre of these processes, including those concerned with arms control and norms of responsible behaviour in outer space. And leadership is needed to normalize inclusion of different perspectives.

Most importantly, intersectionality requires not only acknowledging these differences but creating the space to learn from them. Leadership requires listening.

Appendix: Additional Resources

The following list of resources—many recommended by consultation participants—is intended to facilitate additional engagement with the core themes and concerns raised in discussions but should not be considered exhaustive.

Colonization and decolonization

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