PLOUGHSHARES
REPORT

FROM SAFETY TO SECURITY

EXTENDING NORMS IN OUTER SPACE
GLOBAL WORKSHOP SERIES REPORT

by Jessica West and Gilles Doucet

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From Safety to Security: Extending Norms in Outer Space
Global Workshop Series Report

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ABOUT

In November 2020, global space experts were invited to participate in a series of regional online workshops to identify priorities and possible next steps in the development of norms related to space-based military capabilities and activities. These workshops were part of a wider research project to map the normative landscape in outer space that is being undertaken by Dr. Jessica West, a Senior Researcher at Project Ploughshares, and Mr. Gilles Doucet, President of Spectrum Space Security, Inc.

HIGHLIGHTS

Safety and sustainability as security issues: Our project is based on the premise that security-related norms of behaviour in outer space are directly linked to—and can build upon—established and emerging safety and sustainability practices. Although some participants disagreed with this approach, the discussions identified close linkages, including many shared practices that can help to reduce misperceptions and conflict escalation. Moreover, safety and sustainability are linked to existing shared values and perceived benefits and rooted in more inclusive language.

The workshop discussions reinforced our appreciation of norms as social and value-laden, served to distinguish norms from other types of rules, and emphasized the importance of moral obligation in motivating behaviour. These factors have implications for advancing a normative approach to enhanced security in outer space.

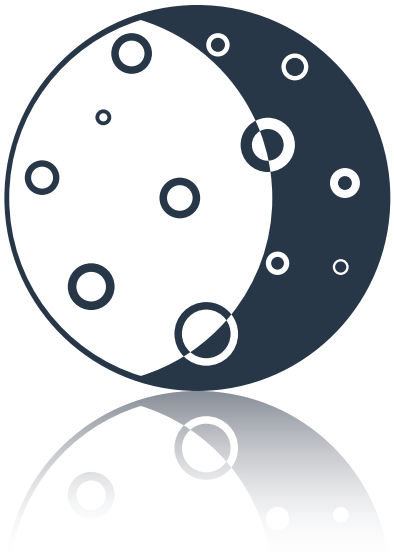
- *Shared values:* A key takeaway from the workshops is that shared values and benefits are essential to effective norms of behaviour. Any efforts to develop new norms of behaviour in space must first reflect a shared understanding of collective values and purpose. Our research has identified numerous core principles that inform space governance, detailed in the report below.
- *Inclusivity and fairness:* Identifying and building on shared values create a foundation for promoting norms that are both inclusive and fair, but these values must be incorporated into the entire norm process, including the goals and benefits of normative development.

The desire to advance normative approaches to security in space is not new, but has not met with much recent success. The intent of the workshops was to identify viable paths to advance this agenda. In addition to considering process, participants prioritized potential threats as well as opportunities for mitigating security risks in space.

- *Threatening activities:* Anti-satellite weapons (ASATs) and testing, and concerns linked to the weaponization of outer space and the conduct of non-cooperative rendezvous and proximity operations (RPO) and other close-proximity operations (CPO), were consistently flagged as priorities, in tandem with the production of

space debris.

- *A threatening operating environment:* The operating environment itself—with its prevalence of secrecy and overall lack of transparency, trust, and dialogue—was seen to be a key contributor to the potential for conflict and conflict escalation.
- *Opportunities for good practice:* Participants emphasized transparency and communication practices as both necessary and feasible going forward. Core practices included:
    - Notifications
    - Registration and disclosure
    - Data sharing
    - Consultations and maintaining direct lines of communication.



Missing mechanisms: Our workshops revealed that many of the mechanisms—core tools and processes—to propagate, practise, and promote norms of behaviour are missing. There is little or no engaging with others; no dialogue, information exchange, consultation, or communication. The absence of such mechanisms creates challenges at both the diplomatic and operational levels.

Leadership is important: Strong norms need effective leaders who can explain how certain necessary actions are clearly linked to accepted values and standards. Additionally, leadership must include consistent practice of the norms that are being espoused.

KEY FINDINGS

Practical priorities identified by workshop participants include:

- Debris prevention and mitigation, which were generally accepted as being of interest to all and urgently required.
- Developing the technical means to better enable good practice in outer space, notably modes of communication and data sharing at an operational level.
- Building likemindedness through a focus on inclusive security goals that are rooted in shared values and benefits. Building on safety and sustainability values is one way to do this. Developing a shared conceptual approach and definitions is another.
- Identifying and developing incentives for good practice that include all participants.
- Demonstrating leadership by engaging in and communicating practices that enhance the safety of other operators, mitigate potential misperceptions, and contribute to long-term sustainability of the operating environment.

ABOUT THE PROJECT

RESEARCHING NORMS IN SPACE

Norms, defined here as rules or behaviours rooted in shared values and social expectations of appropriate conduct, are a growing focus of outer-space governance. Recently, more practices that are intended to enhance both safety and sustainability in outer space, such as the long-term sustainability guidelines developed by the UN Committee on the Peaceful Uses of Outer Space (COPUOS), have been articulated and adopted. There is strong interest in approaching other security challenges is a similar way. Canada's national defence policy, "Strong, Secure, Engaged," for example, aims to "provide leadership in shaping international norms for responsible behaviour in space."[1] Many states have similar objectives. The development of norms is also of interest at the UN General Assembly's Committee for Disarmament and International Security.[2]

Our project, funded by a grant from the Mobilizing Insights in Defence and Security (MINDS) program of the Canadian Department of National Defence, supports this objective by generating information and insights into how existing and emerging norms related to space activities—many of which are focused on safety and sustainability—can inform norms related to space-based military capabilities and activities, enhancing security in the space environment.

To map the existing governance landscape in outer space, we examined and coded 90 documents that dealt with global space governance, focusing on the values and purposes promoted, the types of activities addressed, any behaviours mandated or otherwise included, and the tools or mechanisms to enable such practices. Key insights from this work are presented in Figures 2, 3, and 6. A full report on this research was presented by Jessica West to the International Astronautical Congress in October 2020.[3]

The project also surveyed global space experts on prevailing normative expectations in outer space. Findings from the survey were published in From Safety to Security: Reducing the Threat Environment through the Responsible Use of Outer Space.

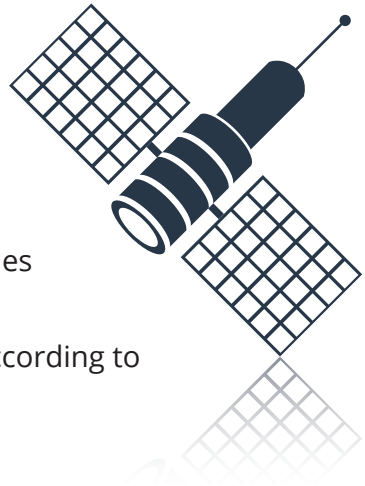
The final stage of this work involved a series of regional online workshops with space experts to help identify priorities and envision possible next steps. This report details the outcomes of those meetings.

1 Government of Canada, *Strong, Secure, Engaged: Canada's Defence Policy*, June 7, 2017, New Initiative 84, https://www.canada.ca/en/department-national-defence/corporate/policies-standards/canada-defence-policy.html.

2 See for example, UNGA First Committee, "Reducing space threats through norms, rules and principles of responsible behaviours," A/C.1/75/L.45/Rev.1, October 23, 2020, https://reachingcriticalwill.org/images/documents/Disarmament-fora/1com/1com20/resolutions/L45Rev1.pdf.

3 Jessica West, "From safety to security: Reducing the threat environment through the responsible use of outer space," IAC-20-E6.4.2, 71st International Astronautical Congress (IAC) – The CyberSpace Edition, 12-14 October 2020.

WORKSHOPS WITH GLOBAL SPACE EXPERTS



Our team's initial round of research involved identifying, recording, and mapping expected behaviour or standards of behaviour established by law or policy, as well as a survey consultation with more than 100 space experts from around the world.

The purpose of the workshops was to solicit feedback from global space experts on the findings of this research and to identify priorities and possible next steps in establishing military norms.

To facilitate broad consultation, three workshops were organized according to regional time zones:

- November 3, 2020: Asia-Pacific time zones
- November 5, 2020: European time zones
- November 12, 2020: North American time zones.

The workshops assembled approximately 80 experts from 15 countries. They represented a broad range of expertise and experience with military, civil, and commercial space programs; presented legal, policy, diplomatic, academic, and civil society perspectives; and revealed technical and operational expertise.

Prior to the workshop, participants were provided with both a summary of the project's previous efforts to map the existing normative landscape in outer space and the survey report.

During the workshops, participants were asked to reflect on:

- The qualities of norms in general and what makes them effective
- Space security challenges that would most benefit from the elaboration of normative practices
- Opportunities and strategies for expanding space-related norms in a security or military context.

To encourage interaction and candid responses, participants were polled anonymously on a series of questions using Mentimeter, an online participation and engagement tool. These polls formed the basis for small-group discussions in breakout rooms, each of which had a discussion leader and rapporteur.

A list of some of these polls, as well as visual representations of responses to the poll questions, is available in the Annex to this report.

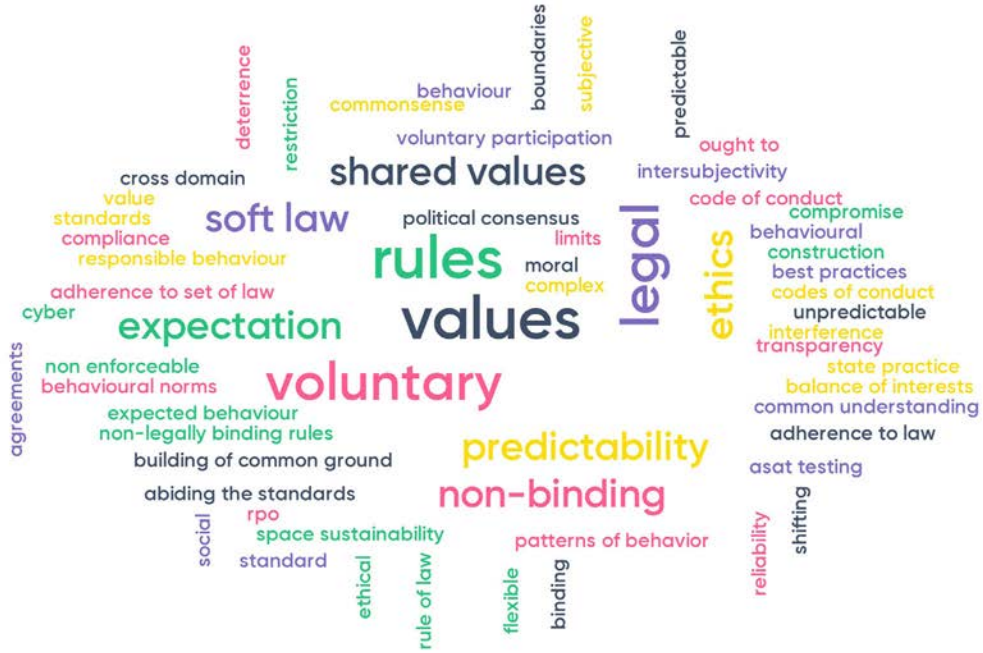
The workshops were held under the Chatham House Rule, so the information shared and collected is not attributed to individual participants. The participants were responding in their personal capacity and not representing the views of their employers or affiliated organizations. The proceedings of the workshops were not recorded.

WORKSHOP PART I: WHAT ARE NORMS?

The workshops began and ended with questions about the qualities of norms and what makes them effective.

A question on the definition of norms was posed to participants as part of an introductory interactive session using Mentimeter. While the line of questioning may seem redundant for a project on space norms, our experience is that people often have different understandings of the concept of norms, and these differences can impede constructive dialogue. Additionally, enriching everyone's understanding of norms helps them to establish a common base to use in identifying practical measures to advance such norms.

FIGURE 1: WHAT WORDS OR PHRASES DO YOU ASSOCIATE WITH NORMS?



Word cloud generated by participants on November 3, 2020.

Workshop participants consistently identified a core set of concepts that operationalize norms, including **standards**, **behaviours**, and **best practices**. They also revealed that norms are social and value-laden: social and moral underpinnings activate a sense of obligation to conform to norms, distinguishing norms from other types of rules. This is reflected in the emphasis on concepts such as **shared values**, **collectivity**, **common understandings**, **consensus**, and **expectations**.

The importance of shared values was persistently highlighted by workshop participants. Figure 2 depicts the prevailing values found in space governance documentation, as identified in our earlier research to map the existing normative landscape in outer space. This image was presented during the workshop proceedings.

FIGURE 2: VALUES AND PURPOSES REFLECTED IN SPACE LAW AND GOVERNANCE DOCUMENTS[4]

Norms are often seen as voluntary, in contrast to formal, legal obligations. This difference appeals to some diplomats and repels others. However, workshop participants described norms as both legally binding or otherwise linked to law, and voluntary. Rather than emphasizing the difference, it is helpful to think about the common ground shared by laws and norms. Both shape behaviour; both conform to prevailing social values and expectations. Moreover, many of the principles that inform normative behaviour are rooted in law. And while norms are not legally prescribed, they are marked by a sense of obligation.

From this exercise we learned that any new norms of behaviour in space must first reflect a shared understanding of collective values and purpose.

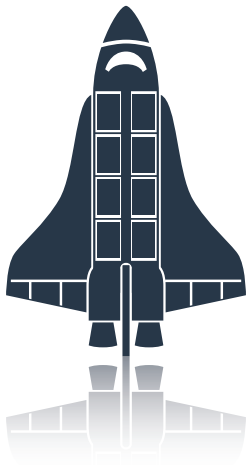
4 Ibid.

WORKSHOP PART II: PRIORITIZING RISKS

Our earlier research to identify and code prevailing normative expectations in outer space revealed significant gaps between embedded values related to peace, security, and conflict prevention, and rules related to specific types of space activities (see Figure 3). Workshop participants reinforced this finding by noting the absence of a shared understanding and vocabulary to explain the security challenges that norms should and can address.

FIGURE 3: ACTIVITIES IDENTIFIED IN SPACE LAW AND GOVERNANCE DOCUMENTS[5]

Participants were asked to identify the gaps and challenges that they deemed most pressing. This was done first through an open-ended question about current security threats and challenges in space, followed by an opportunity to rate the risk of specific types of activities.



5 Ibid.

FIGURE 4: WHICH ACTIVITIES BY NATIONAL SECURITY ACTORS IN SPACE CONCERN YOU THE MOST?

Word cloud generated by participants on November 5, 2020.

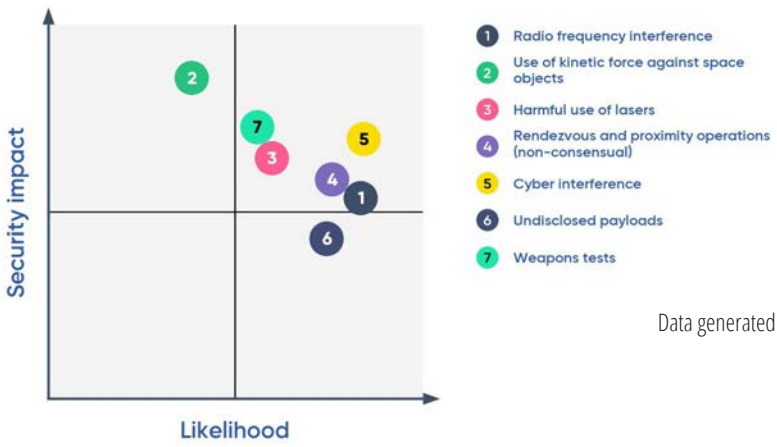
Commonly identified concerns were:

- Anti-satellite weapons and testing, and concerns linked to the weaponization of outer space
- The conduct of non-cooperative rendezvous and proximity operations and other close-proximity operations
- Space-based surveillance and inspection activities
- Space debris
- Jamming and other forms of harmful interference with satellite systems.

These concerns are consistent with the feedback collected from the survey process earlier in 2020. Importantly, the most persistent themes are clearly linked to arms control and other security interests; however, they are also intimately connected to issues of safety and sustainability in outer space.

Workshop participants were then asked to evaluate a set of seven types of risks that had been previously identified in the survey of experts from the earlier part of this project.

FIGURE 5: EVALUATE CURRENT RISKS



Data generated on November 12, 2020.

The rankings across the three workshops were similar:

- The kinetic use of force stood as the **black swan event**; it consistently ranked as having the greatest potential impact on security, but was also seen as the least likely.
- **Highly likely, with big impacts** were cyber interference, radiofrequency interference, and non-consensual RPO.
- **Least risky** were undisclosed payloads.

Like the poll respondents, the participants in discussion groups were most concerned with ASATs and RPO, along with space debris.

ASAT testing and debris

There was some debate about whether there was an existing norm against ASAT testing and debris production, but most participants identified efforts to reduce the chance for debris-causing events, including destructive tests of weapons systems, as a clear priority. Echoing the results of our survey, discussion participants agreed that a norm on ASAT testing once existed, but expressed uncertainty about its current status. Some participants feared that it had weakened or become more permissive. The spread of ASAT capabilities, which increases their potential for use, was noted as another reason to prioritize this issue, as was the indiscriminate threat that the creation of space debris poses.

Close approaches

Close approaches to foreign non-cooperative satellites were seen to be a more pressing concern than ASAT tests, because there exists very little consensus on whether such approaches are risky or marginally safe, and because of the overlap of civilian and commercial activities and services. Moreover, since such activities are new, there is minimal established practice and the opportunity for misinterpretation and miscalculation is greater.

However, concerns were also raised about some potential responses to the risks of CPOs, specifically safety zones surrounding particularly sensitive military satellites. Several participants viewed a focus on “how close is too close” as more harmful than helpful in a military environment, arguing that it could be misused or enable crisis escalation, particularly if it involved drawing clear boundaries around objects. Others noted that the answer to this question varied with different technological capabilities, making a standard difficult to establish.

Not often on the radar of security policy was how to mitigate the risks posed by radiofrequency and cyber interference, both to individual space systems and to the stability of the operating environment. This was a prominent theme of discussion during the Asia-Pacific workshop. Although clearly a concern, there was some assertion that it would be more prudent to bring a space perspective to ongoing cyber governance discussions.

Threats due to the nature of the operating environment

Individual poll responses expressed strong concerns about the operating environment itself, especially the prevalence of **secrecy** and overall **lack of transparency**, **trust**, and **dialogue**.

These factors were echoed in discussion groups. Also cited was the lack of mechanisms to manage potentially threatening activities in space and to maintain a stable operating environment. Participants noted an absence of space traffic governance and the growing characterization of space as a *warfighting domain*.

Two strong overarching themes emerge from discussions: communication and transparency.

Communication: The absence of a common rapid and reliable communication tool for all major space actors was seen as a key operating risk. Communication is essential to establish norms of behaviour and to implement them effectively; communication is critical to manage crises. Indeed, many of the priorities for best practices in space, such as notifications and consultations, are in essence modes of communication.

For example, there are few processes for consultation and the existing diplomatic structure is inadequate. Participants also noted the lack of mechanisms to serve as hotlines or for data exchange. The lack of good communication tools is also clearly linked to poor transparency.

Transparency: The urgent need for greater transparency was consistently expressed, although participants recognized that achieving transparency in a military context is difficult. They found the current ability to hide or be deceptive about activities in outer space dangerous, viewing a lack of transparency as key to the shift toward a conflictual and confrontational operating environment.

Transparency can be linked to both safety and security interests. It can help to develop and evaluate adherence to norms by providing a way to identify both normal/safe and abnormal/unsafe behaviours. It can help to deter threatening behaviour. And, by building confidence, transparency can expand a range of other security practices.

Improving transparency relies on communication and data-sharing mechanisms. But, while participants agreed that sharing data should be timely, transparent, and trustworthy, they were not sure how data sharing should occur. Among the missing pieces are:

- Standards of data sharing, related not only to content and process, but also to security and confidentiality of data
- Institutional mechanisms through which to share data.

Space Situational Awareness (SSA) was a prominent topic for discussion. Participants were generally keen to see SSA data exchange develop along civilian lines, but recognized the challenges. Space weather monitoring was identified as an activity for which the international community can begin to develop processes for both communication and transparency, while reinforcing existing agreements for best practice.

Overall, discussions on challenges and threats suggest that insecurity is the result not only of a lack of norms, but the lack of processes and mechanisms that support both the development and the implementation of good behaviour in outer space.

WORKSHOP PART III: PRIORITIZING PRACTICES

Beyond examining norms, it is helpful to identify and articulate types of behaviour that could mitigate insecurity and reduce threats.

Our earlier examination of existing normative expectations in outer space revealed that the contemporary space governance framework already identified many practices that space operators are required, expected, or recommended to perform, as well as some restrictions. Some elements related to security. (See Figure 6.)

While specific practices must be tailored for security activities and requirements, this framework provides a good base on which to build. Moreover, it correlates strongly with themes identified in the workshops, such as challenges in the operating environment posed by a lack of transparency and communication, as well as core values and principles such as due regard for the environment.

FIGURE 6: CATEGORIES OF BEST PRACTICES IDENTIFIED IN SPACE LAW AND GOVERNANCE DOCUMENTS[6]

Constraints	Communication	Due regard	Technical design
• Weapons of mass destruction • National appropriation • Intentional contamination • Intentional destruction • Harmful interference • Interference with jurisdiction and control • Restrain weapons testing and use of force	• Make capabilities known • Clarification • Consultation • Disclosure • Data dissemination • Information exchange • Maintain communications links • Anomaly sharing/attribution • Provide orbital information • Publish national policies • Status updates	• Cooperation • Coordination • Notification • Avoid interference • Minimize collision risk • Minimize debris • Minimize health/safety risks • Adequate distance between spacecraft • Supervision/monitoring • Tracking • Warnings • Minimize use • Registration • Risk assessment • Spectrum coordination	• Resiliency • Compatibility • Policies and procedures • Identification • Interoperability • Trackability • Command and control • Standardization • System security • Training

To identify priority behaviours for the development of norms, participants were first asked an open-ended question about relevant practices and behaviours in space, and then asked to rate the value of a series of practices, identified in the survey results and through the codification of existing governance documents.

6 Ibid.

FIGURE 7: ARE THERE PRACTICES OR BEHAVIOURS THAT YOU THINK ARE RELEVANT IN A SECURITY CONTEXT?

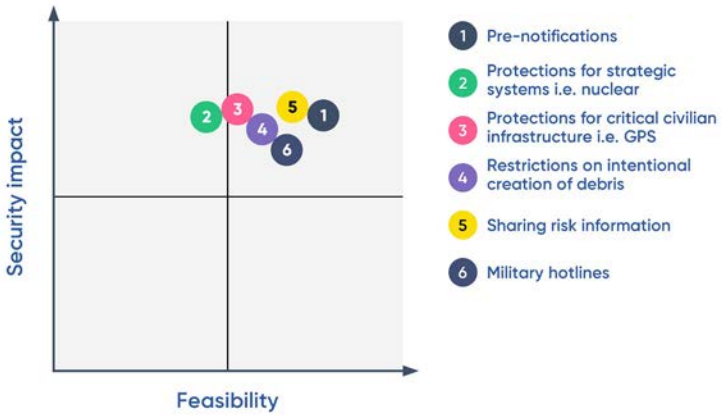
Word cloud generated by participants on November 3, 2020.

Other practices identified as being aligned with security activities include:

- Notifications
- Exclusion and safety zones (although deemed problematic by some)
- Data sharing
- Consultations.

Participants were also asked to rate the feasibility and security impact of some possible practices that we derived from both the research and the survey results.

FIGURE 8: HOW WOULD YOU RATE THE POTENTIAL OF THESE PRACTICES IN TERMS OF FEASIBILITY AND IMPACT ON SECURITY?



Data generated on November 5, 2020.

Responses in all three workshops reinforced the themes of transparency and communication. The most highly rated practices were:

- Pre-notification
- Restrictions on debris
- Military hotlines
- Data sharing.

Pre-notifications: The most common recommendation was to improve practices of pre-notifications for military activities. This idea is consistent with improving communication and transparency and builds on existing practice, including pre-launch notification, which also could be implemented more effectively, as suggested in the 2013 Group of Governmental Experts consensus report on transparency and confidence-building measures.[7] Prior notification is already a common safety practice and is also used as a security tool in other domains of military activity, notably when launching ballistic missiles. However, as participants indicated, the diplomatic and communication infrastructure needed to improve pre-notification is currently weak or non-existent. In this case, a bottom-up approach that improves communication among operators may be both beneficial and feasible.

Registration and disclosure: Registration is another good practice that should be improved, providing more detail in a more timely manner.[8]

Participants valued greater disclosure and noted that military actors have grown comfortable with providing more orbital information, but continue to withhold details about purpose and activities.

Lines of communication and consultations: Participants saw an urgent need for better communication to clarify intensions and reduce misperceptions, particularly during times of tension or crisis. Safety requirements have already led to improvements in national communications, but some participants argued for the national security value of dedicated military hotlines. There was also a call to establish practices for consultation, particularly for potentially dangerous activities. While Article IX of the Outer Space Treaty says that states should do this, it does not lay out a process, or define "potentially harmful interference." This type of dialogue could also facilitate the development of stronger norms, if the mechanisms were first developed.

Data sharing: There was agreement that sharing data related to risks in space, such as space situational awareness, builds trust and transparency, and contributes to the development of norms. But such sharing is not easy. Key concerns relate to how to share data, with whom, and how to develop trust in the data. These questions reveal not only the need for standards and common methodologies, but for further institutional development. Once again, workshop participants emphasized the mechanism to support norms above norm content.

7 UNGA, *Group of Governmental Experts on Transparency and Confidence-Building Measures in Outer Space Activities*, A/68/189, July 29, 2013, https://www.un.org/ga/search/view_doc.asp?symbol=A/68/189.

8 UNOOSA, *Online Index of Objects Launched into Outer Space*, 2021, https://www.unoosa.org/oosa/osoindex/search-ng.jspx?lf_id.

Moreover, some types of data sharing could be more achievable than others. Information about space weather is one promising area. Participants noted the value in creating open-source/open-architecture data systems. The International Committee on Global Navigation Satellite Systems (ICG) was held up as an example of a successful mid-level organization that encourages effective cooperation among states.

Satellite tracking: Some participants believed that technology could increase space security by improving the ability to track satellites in orbit—particularly those that conduct significant manoeuvres. Such developments were seen as feasible and desirable, particularly for commercial or civilian satellites that are subjected to national regulation, with coordination of potential conjunctions with other satellites on orbit a good first step. Implementation of such measures would help to single out non-compliance. But few thought that states would be willing to enhance the trackability of military satellites, particularly those involved in sensitive activities or counterspace technology development.

Protected systems: Participants registered interest in protecting critical space-based infrastructure, including systems linked to strategic security and stability, such as nuclear command and control satellites, and those that provide critical civilian services and benefits. However, feasibility remained a concern. And how is "critical" defined? What if states identified all their satellites as critical? Or if militaries refused to reveal satellites with sensitive functions? Questions were raised about the parameters of protection. Nonetheless, harm to these systems remained a key concern in relation to strategic stability, conflict escalation, and protection of civilians.

Participants identified other potential models for good practice, including the Rescue and Return Agreement. Some believed that pursuing the rescue of people with a greater focus on interoperability and communications systems could lead to the development of an infrastructure for cooperation in space. Antarctica was noted as an example of a global commons in a harsh environment, in which rescue has been a productive focus of international cooperation.

Using space systems to coordinate efforts after natural disasters and to provide emergency relief could provide another avenue for improving military cooperation. Practices outlined in the International Telecommunication Union's Tampere Convention on the Provision of Telecommunication Resources for Disaster Mitigation and Relief Operations and the International Charter: Space and Major Disasters could serve as models.

Again, both challenges/threats and proposed solutions focus on transparency and communication. Implementation remains the core problem. Most practices involve interacting with other states and operators, but it is unclear which bodies or processes should be used. Often, mechanisms are not in place.

WORKSHOP PART IV: WHAT MAKES NORMS EFFECTIVE?

The question of what makes norms effective underlies all workshop discussions, but was directly explored in both an anonymous Mentimeter poll and in group discussions in an attempt to consider the broader context needed to advance norms.

Participants emphasized that norms must be clear and simple. But these features alone will not make norms effective tools of governance.

Reflections on this question reinforced prevailing themes of the workshops: norms are social; fairness and inclusivity are important; and the absence of mechanisms presents significant challenges.

FIGURE 9: WHAT MAKES NORMS EFFECTIVE?

Word cloud generated by participants on November 5, 2020.

Inclusivity and fairness: Effective norms must be created through a trusted process. Participants agreed that a champion and **leadership** are essential, but also recognized that **consultation**, **engagement**, **participation**, **consensus**, and **inclusivity** are needed to insure buy-in, acceptance, and legitimacy. Such analysis reinforces the critical importance of building on shared values and collective interests.

What inclusivity and fairness mean in practice is a point of significant debate. Many insist that an inclusive approach needs a top-down process with universal participation, pointing to the procedural failures of the EU Code of Conduct effort. Others insist that a bottom-up approach that begins with a small group of stakeholders or experts is more feasible. The success of the UN COPUOS guidelines on the long-term sustainability of outer space is touted as a successful combined approach.

Representation is also critical. Concerns were raised about a focus on "likemindedness." Some participants pointed out that norm initiatives must welcome all states, including non-allied states that may have divergent security interests and views. Likewise, the language of "responsible behaviour" was thought by some to be subjective and less inclusive, in contrast to neutral or technical concepts such as "safety" and "sustainability."

The theme of inclusivity and fairness extends to the benefits and costs of norms. Many workshop participants indicated that effective norms had to provide clear benefits and advantages for all parties. The perceived unequal distribution of benefits and costs is often a point of contention in international discussion, with emerging spacefaring states feeling particularly disadvantaged.

Implementation: The workshops featured significant discussion on closing the gap between principles and practice. Debris mitigation was seen as one problem universally recognized in principle, but not always attended to in practice.

Individual polling across the three workshops revealed the perceived need for appropriate social conditions—including **trust**, **transparency**, and **verifiability**—in the implementation of norms. The reiteration of these factors, commonly noted in the arenas of international security and arms control, suggests that the success of norms depends, in part, on the broader governance context.

Workshop participants indicated that behaviours that are **observable** and **measurable** are thought to be more likely to be implemented, because non-compliance is easily seen. Of course, such observations require reliable sources of data.

Implementation depends not only on inclusivity and fairness, but on **accountability**, **consistency**, and **uniformity**. Participants pointed to perceived inconsistencies in international efforts to identify and shame weapons testing.

As well, effective norms provide **incentives** and appeal to the **self-interest** of invested parties. Of course, as participants noted, incentivizing behaviour at the international level is challenging.

Finally, **communicating** to demonstrate leadership and good practice was seen as necessary, but not sufficient. Communication must include the reasons for actions, linking them to values and norms.

Mechanisms required: Perhaps the strongest point to emerge from the workshops is the need for—and current lack of—mechanisms to support the development and implementation of norms. **Information exchange**, **dialogue**, **consultation**, and **communication** all depend on mechanisms to engage with others, but few such mechanisms exist.

Questions about how to propagate, practise, and promote norms of behaviour continually led back to the challenge posed by the absence of effective mechanisms. Participants asked:

- How does data sharing happen?
- How are notifications issued?
- How do communications and consultation take place?

- How do states participate and engage?
- What are the platforms for exercising leadership and championing norms?

The lack of mechanisms affects both the constitution of norms and their implementation. Discussions frequently pointed to data sharing as a core example; the value and benefits may be clear, but the process is not. The EU Code of Conduct process was another notable illustration of the difficulty of discussing norms and behaviours at an international level.

The absence of mechanisms is related to challenges of inclusivity and fairness, affecting who can participate, whose voices and interests are recognized, and who benefits from norms.

CONCLUSIONS AND KEY FINDINGS

The workshop series revealed global enthusiasm for advancing security-related norms, while identifying priorities and raising points of caution.

1. *Successful norms must be based on shared values.*

Norms are much more than voluntary rules; they are social and value-laden understandings of appropriate conduct that produce a sense of obligation to conform. The particular qualities of norms make them effective tools of collective governance.

To be successful, any new norms of behaviour in space must reflect a shared understanding of collective values, such as peace and conflict prevention or safety and sustainability. We can see that these values are related. And because the normative infrastructure for safety and sustainability has been more fully developed, it provides a helpful framework for advancing collective peace and security objectives.

2. *Security is linked to safety and sustainability.*

The premise of this project is that it is possible—and helpful—to build on existing governance values, practices, and mechanisms, including the recent momentum linked to safety and sustainability, to enhance security in outer space.

Not all workshop participants agreed with this premise. We acknowledge the urgent need to address risks and establish rules for military-specific activities and actors, and we do not mean to imply that a focus on safety and sustainability will resolve all challenges. But we do find that taking these values and practices into consideration can advance enhanced security.

Safety, sustainability, and security processes incorporate overlapping values that are linked to the core principles of the Outer Space Treaty. Moreover, while concepts of security are not always shared and can be perceived as competing rather than collective, safety and sustainability are firmly rooted in universal values and interests and provide accepted goals and a framework for governance. These concepts can usefully inform and inspire dedicated security governance mechanisms.

3. *Opportunities for progress exist.*

A key goal of the workshops was to identify and prioritize risks that can be controlled through stronger normative development. Included were anti-satellite weapons and testing, and the conduct of non-cooperative close-proximity operations.

Participants did agree that there had been a norm on ASAT testing, but some feared that it had become weaker. The spread of ASAT capabilities, which increases their potential for use, was seen as another reason to prioritize testing. Also seen as troubling was the potential creation of space debris by such testing, risking harm to everyone and everything in the

space environment.

Seen as a more pressing threat were close approaches to non-cooperative foreign satellites. At present, little consensus exists on the riskiness of this activity or on the parameters of safety. The confusion is partly because civilian and commercial activities and services overlap. Moreover, these activities are new, so that there is no history of established practice and the opportunity for misinterpretation and miscalculation is greater.

These concerns are consistent with the survey feedback. Importantly, the most persistent themes are clearly linked to arms control and other security interests. However, they are also intimately connected to safety and sustainability in outer space.

How do we build new norms that mitigate risk? We must focus first on debris prevention and mitigation, which are generally accepted as both a common interest and urgently required practice. Here we can build on shared values and concerns.

Participants also saw enhanced transparency and communication practices as both necessary and feasible. Early subjects of new norms included:

- Notifications
- Registration and disclosure
- Data sharing
- Consultations and communication links.

Such practices are already well established among space actors, although not necessarily well implemented, and activities are not unique to security and military sectors. Indeed, while many participants noted obstacles to military implementation of such practices, they frequently advocated for starting with safety measures and expanding from there.

4. *Norms can mitigate risks generated by the nature of the operating environment.*

The operating environment—with its secrecy; lack of transparency, trust, and dialogue; and lack of space traffic governance—is seen as a key contributor to potential conflict and conflict escalation. Also concerning was the growing characterization of space as a warfighting domain.

Norms that focus on communication and transparency are needed to mitigate these risks, but currently the required mechanisms are not in place.

5. *New mechanisms are needed.*

Discussions suggest that outer-space security suffers not only from a lack of norms, but also from the absence of processes and mechanisms that support both the development and the implementation of good behaviour. They include core tools and processes to engage with others, through dialogue, information exchange, consultation, and communication. Developing practical processes and mechanisms at the operational rather than political level should be the goal of new security norms.

6. *Inclusivity is key to effective norms.*

Norms must expand beyond likeminded actors to include non-allied states that might have divergent security interests and views. The language of norms should be modelled on neutral or technical concepts such as “safety” and “sustainability” rather than “responsible behaviour,” which is seen by some to be subjective.

Inclusivity and fairness extend to the benefits of norms and potential costs. Many workshop participants emphasized that for norms to be effective, the benefits and advantages derived from collective behaviour must be shared. It is also critical that benefits be clearly recognized and acknowledged by all parties. Often the distribution of benefits and costs is a point of contention in international discussion, with emerging spacefaring states feeling disadvantaged.

Finally, it should be noted that meeting the requirements of inclusivity and fairness is harder without the appropriate mechanisms. Their absence lowers the number of actors who can participate, have their voices and interests recognized, and benefit from norms.

7. *Leadership is important.*

Strong norms need effective leaders who can explain how certain necessary actions are clearly linked to accepted values and standards. They bring norms from principle to practice. Leaders demonstrate behaviours that contribute to safety for all operators, reduce opportunities for misperception and the escalation of political tensions, and encourage the long-term sustainability of the space environment.

ANNEX

To encourage interaction and candid responses, participants were polled anonymously on a series of questions using Mentimeter, an online participation and engagement tool. These polls formed the basis for small-group discussions in breakout rooms.

The polls for which individual responses were aggregated are presented below, unedited, as they appeared at the workshop.

POLL QUESTION: "WHAT WORDS OR PHRASES DO YOU ASSOCIATE WITH NORMS?"

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POLL QUESTION: "WHICH ACTIVITIES BY NATIONAL SECURITY ACTORS IN SPACE CONCERN YOU THE MOST?"

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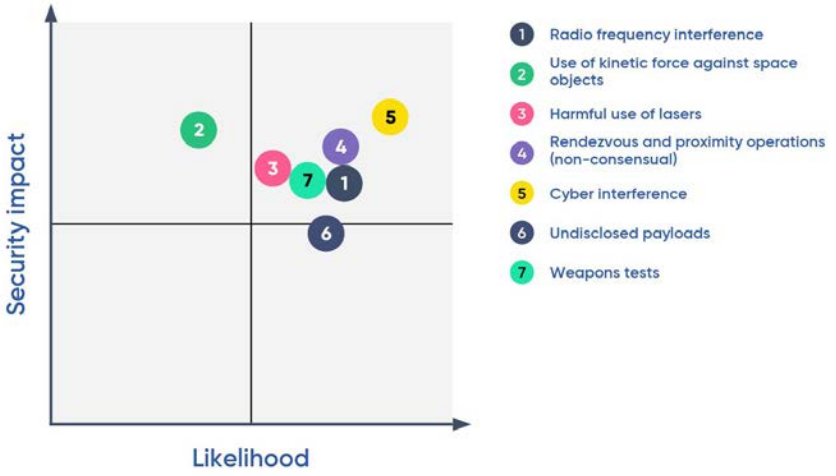
POLL QUESTION: "EVALUATE THE FOLLOWING RISKS



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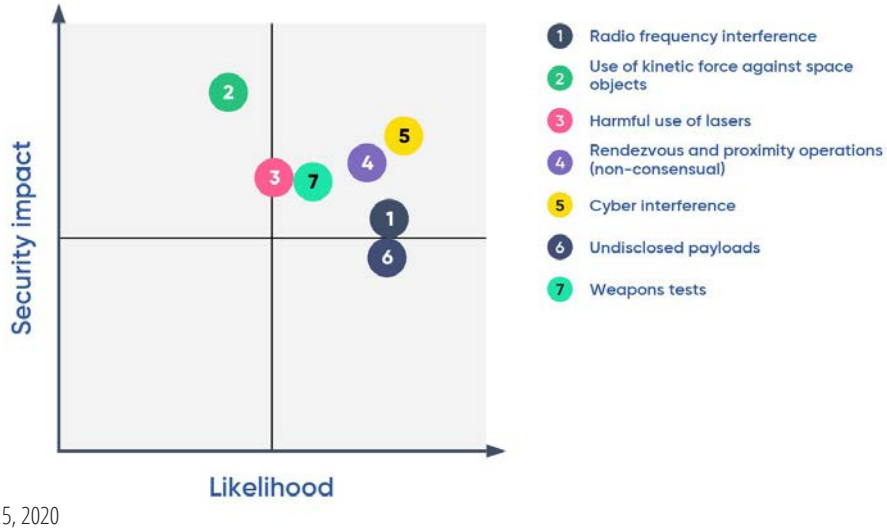

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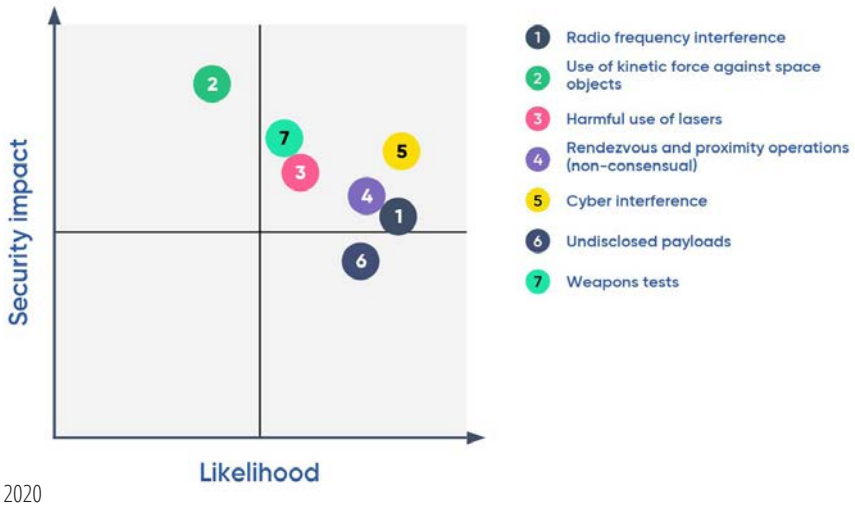

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POLL QUESTION: "ARE THERE PRACTICES OR BEHAVIOURS THAT YOU THINK ARE RELEVANT IN A SECURITY CONTEXT?"

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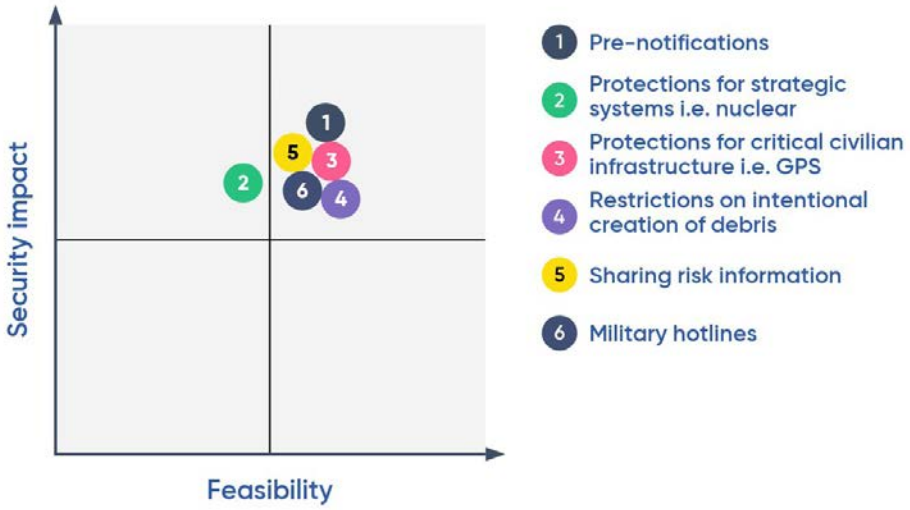
POLL QUESTION: "HOW WOULD YOU RATE THE POTENTIAL OF THE FOLLOWING PRACTICES?"



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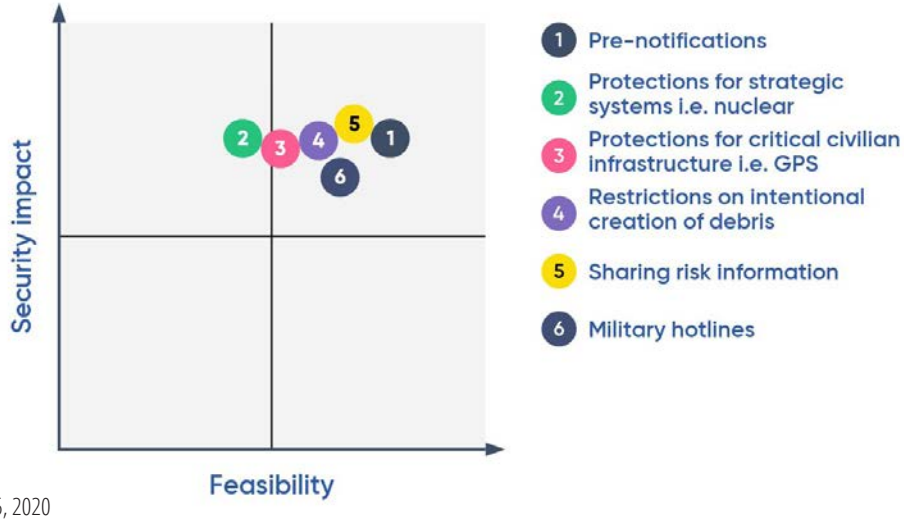

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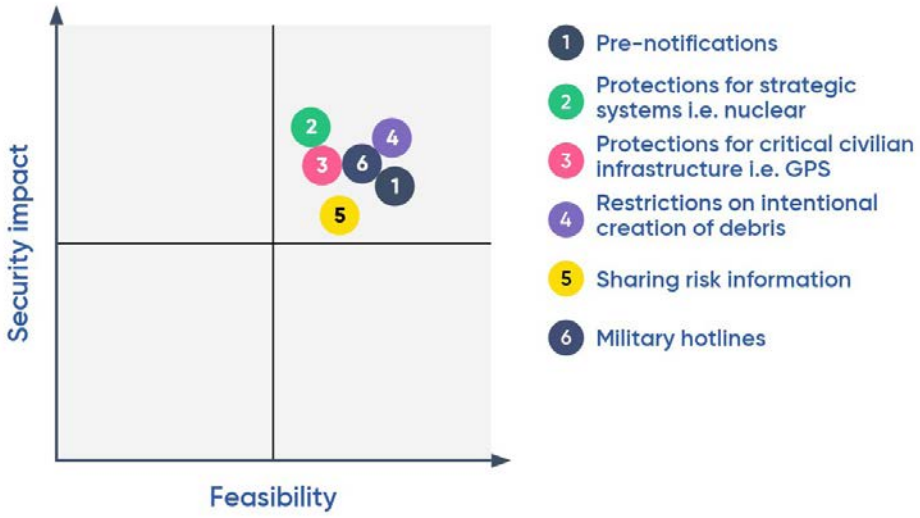

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POLL QUESTION: "WHAT MAKES NORMS EFFECTIVE?"

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Participants also offered individual, written responses to the following questions:

> "How to do we promote new security norms?"
>
> "What's the best idea we can take from this session?"

Responses to these questions are reflected in the written report and inform our final project recommendations.

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Project Ploughshares is a Canadian peace research institute with a focus on disarmament efforts and international security, specifically related to the arms trade, emerging military and security technologies, nuclear weapons, and outer space.