Shaping the Final Frontier: Canada and the New Space Race

Markus Hellborg, Emily Standfield, Zac J. S. Wager and Karen Cook

Issue

The current international legal framework for state behaviour in space was created in the 1960s. With new technologies for emerging activities such as space mining, a number of states and private companies have become involved in a "new space race." Is the existing legal framework inadequate for addressing the new opportunities and challenges of the twenty-first century's space race?

Background

Recent technological developments and private commercial pressures have made possible outer space endeavours that were previously impossible. Canada stands to benefit greatly from increased space exploration, which will offer opportunities for partnerships, create jobs for Canadians and cement our place as a leading spacefaring nation. However, the new space race differs vastly from the one in the midst of the Cold War, and the existing international legislation needs to be updated to address new developments. There are two major themes in contemporary space activities that should guide Canadian policy moving forward: democratization and commercialization. Both present vital benefits and challenges for Canada.

The existing international legal framework for space governance today is the 1967 Outer Space Treaty (OST). However, its shortcomings are being exposed under the changing circumstances of the twenty-first century. The most contentious issue of the OST is manifested in the ambiguity between the right of use (article I) and the prohibition of appropriation of outer space resources (article II). Article I states that the exploration of outer space should be "carried out for the benefit and in the interests of all countries, irrespective of their economic or scientific development, and shall be the province of all mankind." This ensures that space exploration is a freedom given to all states, but the notion that space exploration should be "carried out for the benefit and in the interests of all countries" is ambiguous. How, and to what extent, wealth and scientific discoveries gained from space exploration are to be shared between states is unclear (Jakhu, Pelton and Nyampong 2016).

Article II states that celestial bodies are "not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by other means." The phrase "province of mankind" in article I, in conjunction with the prohibition on appropriation, obscures what constitutes permissible activities in space. In the instance of space mining, for example, can a state own the extracted resource from a celestial body, but not the celestial body itself? Does the provision on the use of space for the benefit of all countries allude to space as a common heritage of humankind? The OST is unclear on these questions, which has allowed for states to interpret them to their benefit. There is a dire need for clearer rules in order to decrease uncertainty for investors in the space sector, minimize conflict and facilitate the sharing of benefits from space activities with all humankind. It is crucial for Canada to take anticipatory action, or else Canada runs the risk of being reactive to the regulatory development of private companies and states with divergent interests in space.

Democratization

One of the distinguishing features of the new space race is democratization. Rather than being a sector of interest only to superpowers, as during the space race in the 1960s, several states are getting involved. Democratization refers to the increasing number of states being active and having a vested interest in space-related activities (Masson-Zwaan 2019; Pekkanen 2019). More space programs and agencies aiming to send astronauts into space are developing in countries such as Nigeria (initiated in 2001), the United Arab Emirates (2014), Turkey (2018), and Australia (2018). Other countries, such as Israel, are leveraging their technological expertise to develop new infrastructure and technologies in space, such as micro-satellites and innovative launch programs (Chavez and Liebermann 2019). Furthermore, to the dismay of the international community, countries such as Luxembourg and the United States are staking out regulatory niches and unilaterally implementing legislation granting ownership of space resources (Daemmrich 2020).

The benefits of space democratization are many. First, as alluded to in Canada's 2014 Space Policy Framework, the increasing number of active states provides opportunities for partnerships. These partnerships are helpful for the pooling of data and obtaining otherwise unavailable services. This can aid in the development of the space sector as a whole, which, in turn, provides socio-economic benefits for the involved states, as already seen in Canada (Euroconsult 2015). Second, it allows for higher degrees of specialization in the creation and innovation of space technology, as well as in their underlying production networks. Such specialization facilitates a rapid development of the space industry. This makes it possible for more states to benefit from the development of the space sector and increase wellbeing across the globe.

Commercialization

The new race to space is being championed by private corporations and countries eager to capture emerging economic opportunities. The benefits of such endeavours offer great incentives for Canada to pursue further exploration in space. Canada's space sector currently contributes more than $5 billion to its GDP and directly employs approximately 10,000 Canadians with high-paying, high-quality jobs (ibid.). Meanwhile, the global space economy is conservatively projected to triple in size by 2040 to US$1.1 trillion (Canadian Space Agency 2014). Further benefits of the commercialization of space include: rapid technological advancement, such as cutting-edge communications satellites or advanced robotic systems; the collection of much-needed resources, such as water and precious metals found in asteroids; a shared burden between governments and private industry to provide financing for future space adventurism; and the potential to inspire international cooperation and partnerships (Canadian Space Agency 2019).

Advancements in space are developing quickly, with optimistic projections of a sustained human presence on the moon by and the arrival of asteroid mining projects coming before 2030 (Government Accountability Office 2019; Wall 2020). Canada, with its well-established space program, is in a uniquely advantageous position to capitalize on this burgeoning space industry. However, it will need a progressive and inclusive strategy shared by all government sectors in order to stay ahead of would-be competitors, such as the United States, corporate agendas, and private industries, like SpaceX. An example of this trend can be seen when examining Canada's robotic commitments to the Lunar Gateway Project. As Michael Byers and Aaron Boley (2020) argue, the lack of a proper governance structure before the completion of this new station leaves Canada vulnerable to the demands of the US government.

Challenges

While the commercialization and democratization of outer space activities may prove beneficial for Canada in many key areas, the new state and private actors also generate new challenges that need to be accounted for in any new policy initiative.

First, there are challenges related to the developments of the space sector as a whole. At this stage, Canada needs to consider issues of safety when it comes to the equipment, infrastructure and techniques used in the harsh environment of space. Endeavouring to ensure the safety of space activities thus relies on oversight and information sharing without infringing on intellectual property rights (as in the spirit of the OST). Furthermore, about 95 percent of privately developed space technologies have a dual usage for both commercial and military purposes (Pekkanen 2019). Therefore, additional oversight and guidelines are needed to ensure the peaceful use of outer space.

Second, a more operational issue is the increase in the number of actors and space technologies may lead to congestion in outer space and in the Earth–moon orbits. It has already been observed that the number of satellites in orbit are creating difficulties for the use of space. For instance, NASA is increasingly worried about orbital debris as SpaceX and other companies vow to launch thousands of satellites into space (Grush 2018). NASA argues that to mitigate catastrophic damages there is a great need to build the capabilities to decommission up to 99 percent of these satellites as soon as they have completed their space time (Liou et al. 2018). In order to keep the congestion on adequate and safe levels, there is a need for a more sophisticated traffic control system and a formalized dispute resolution mechanism for cases where damages do occur.

Third, the most contentious issue relates to the diverse state and corporate interests relating to articles I and II of the OST, that is, the right of use and prohibition of exploitation. Fragmentation on this issue can already be seen, and as the prospect of space mining develops, the pressure for clarity on this matter increases. As previously mentioned, the United States and Luxembourg are unilaterally introducing domestic legislation allowing for ownership of the resources extracted in space (Gradoni 2018; Luxembourg Space Agency 2019; US Congress 2015; The White House 2020). If sole ownership is granted to the spacefaring actors, there are risks that social and economic divides between those with and without capabilities for space exploration will be exacerbated.

Many actors are calling for similar types of equitable sharing of extracted resources as ensured under the Moon Agreement or the United Nations Convention on the Law of the Sea, which include provisions that make celestial bodies and the deep seabed legal global commons. The advocates of a more laissez-faire approach to space mining, however, argue that any notion of a global commons in space is unwarranted. They assert that it will stifle the pace of technological development we see today as it removes incentives to pursue such activities (Landry 2013). This approach is indeed extreme since, although the dominant interpretation of the OST is that appropriation is forbidden, rapid developments are occurring regardless (Jakhu and Pelton 2017). New international legislation therefore needs to be cognizant of enabling actors to continue the development of the space sector while also ensuring that the principles of equitable sharing in the OST are upheld.

Fragmentation and diverging state interests are making global collective approaches increasingly difficult, which creates a need for diplomacy and partnerships to be rapidly employed (Israel 2019). Canada can play a major role in overcoming these challenges if it advocates for stronger international legislation and progressive domestic policy. This would facilitate economic advancement in outer space in conjunction with Canadian values of equality and peaceful cooperation. Canada can lead the charge in clarifying and building upon the OST to ensure that the framework suits the challenges of the twenty-first century space race.

Policy Recommendations

1. **Canada needs to increase its involvement in the UN Committee on the Peaceful Uses of Outer Space (COPUOS).** Canada has yet to provide its perspective on key issues at these meetings. Canada should use COPUOS to promote equitable access of space activities from the various state and private actors, in order to uphold the foundations of the OST. The Canadian foreign affairs agenda should *increase its prioritization of space to promote economic and social development*. Strengthening Canada's participation will likely: offer opportunities for economic growth; reinforce Canada's legal commitments to the principles outlined in the OST; and continue to build partnerships toward an inclusive international environment, which will prevent fragmentation of space law globally. This should be in accordance with fundamental principles of OST, including the promotion of equal opportunity of space exploration and the prevention of militarization.

2. **Canada should establish unbiased international committees that will promote inclusivity by upholding the fundamental pillars outlined in the OST.** Formulating a dispute and resolution committee would contribute to mitigating issues involving intellectual property rights, damage disputes, legal interpretations and prevention of malicious militarization. Without a separate dispute and resolution mechanism, COPUOS lacks the authority and standard procedures to mediate conflict between actors in space.

3. **Canada should sustain multilateral cooperation with like-minded states to collaborate on legislation and standards for space activities.** Developing an international institution to address, implement and enforce legislation of space activities will lead to a decrease of uncertainties, minimize conflict and ensure the benefit for all humankind. Lessons can be learned from the provisions on equitable sharing as it relates to deep seabed mining stipulated in the UN Convention on the Law of the Sea.

About the Authors

Markus Hellborg is a student in the BSIA/University of Warwick Double Master of Arts in Global Governance and International Political Economy.

Emily Standfield is a student in the University of Waterloo's Master of Arts in Global Governance program, based at the BSIA.

Zac J. S. Wager is a student in Wilfrid Laurier University's Master of International Public Policy program, based at the BSIA.

Karen Cook is a student in Wilfrid Laurier University's Master of International Public Policy program, based at the BSIA.

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