

Governance in Outer Space: The Case for a New Global Order

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Introduction

In its early stages, outer space exploration was characterised by a multilateral approach, based on international cooperation and the idea of outer space as a 'global commons' to be considered for the benefit of humankind collectively. In 1958, the United Nations General Assembly established the Committee on the Peaceful Uses of Outer Space (**UN COPUOS**) to govern the exploration and use of space for the benefit of all humanity and to pursue international cooperation in the peaceful uses of outer space. Since that time, the UN COPUOS has been supported in its work by the United Nations Office for Outer Space Affairs (**UNOOSA**). That work has led to the creation of five international space treaties:



the 1967 Outer Space Treaty,¹



the 1968 Rescue Agreement,²



the 1972 Liability Convention,³



the 1976 Registration Convention⁴



and the 1979 Moon Agreement.⁵

In more recent times, this multilateral approach has been superseded by an individualist State approach, as the economic potential and commercialisation of outer space has been realised. Outer space activities now support many aspects of our everyday lives, from high-

speed internet and telecommunications to navigation, remote health services, global financial transactions and environmental and climate mapping. There have also been advancements in space mining and engineering, seen as a viable source of future economic growth and resource capability on Earth to sustain an expanding population. In this period, the number of private commercial space actors has increased substantially, fuelled by a start-up investment culture and innovations in technology, and many commercial entities now have their own launch capabilities which enable them to take space objects and infrastructure directly into outer space.

The existing space governance framework established under the architecture of the five UN space treaties has, in this environment of rapid change and dynamic growth, become outdated. There is currently an absence of a clear global space regulatory framework dealing with property and ownership rights, liability in the event of a collision, dispute resolution, licensing and the registration of security interests. In this regulatory void, individual nations have created their own distinct space legislation and policies and now pursue new space programs with record investments.

This creates the risk of inconsistent and conflicting regulations between different nations in relation to basic rights and obligations related to outer space activities. As a result, there is an increased likelihood of disputes, and an unpredictable normative system to inform commercial investment and activities in outer space. There has also been an impasse among public and private entities in terms of accepting responsibility and taking committed action to ensure a safe and effective operating environment for commercial space activities – undermining not only the ongoing viability of outer space activities but also creating a serious risk of harm to life and property on Earth.

¹ Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies (1967).

² Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (1968).

³ Convention on International Liability for Damage Caused by Space Objects (1972).

⁴ Convention on Registration of Objects Launched into Outer Space (1975).

⁵ Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (1979).

Property rights

This article explores the challenges and the way forward for governance in outer space by concentrating on two issues of particular industry concern at present:



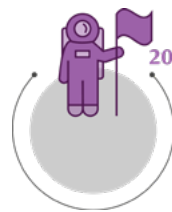
property rights and

space debris.

Space mining will be one of the major focus areas of commercial space activity in coming decades. There is potential to mine lunar ice for oxygen and hydrogen to make rocket fuel and to sustain human-occupied lunar bases. Additionally, near-Earth asteroids have water sources and contain precious mineral resources, including carbon, nickel-iron alloys and platinum group metals. This will prove to be valuable as efforts intensify to look beyond the scarcity of the Earth's non-renewable resources in the face of the confronting reality of climate change.

Without a uniform, predictable and consistent property rights framework, there is a disincentive for commercial actors to invest in and pursue further innovations in space exploration and mining because there is uncertainty in how rights over projects launched and resources acquired in outer space will be recognised across different jurisdictions. This may also lead to greater geopolitical tensions as different nations 'go it alone' and look to implement their own domestic regulatory frameworks dealing with property rights in outer space. Indeed, we are already starting to see this potential play out on the global stage.

In December 2017, the United States National Aeronautics and Space Administration (**NASA**) established its Artemis Program, a human spaceflight initiative which aims to revitalise the United States space undertaking with a 'new era' in exploration.



The immediate aim is to land, by 2025, the first crewed mission on the Moon since Apollo 17 in December 1972 (with the crew to include the first woman and the first person of colour on the Moon).

NASA will then use innovative technologies to explore more of the surface of the Moon than ever before, and will collaborate with commercial and international partners to establish the first long-term presence on the Moon with a view to the extraction and use of resources from the Moon and near-Earth asteroids.⁶

⁶ NASA, 'Artemis', available at <https://www.nasa.gov/specials/artemis/> (last accessed 24 July 2022).

The longer-term aim is to use the experience, technology and knowledge gained from the Artemis Program to send the first astronauts to Mars and beyond.⁷

In support of the Artemis Program, and the public and private partnerships and enhanced outer space activity contemplated by it, NASA released the Artemis Accords in October 2020.

On 15 October 2020, the Artemis Accords were signed by eight founding nations –



As of September 2022, the Artemis Accords had been signed by a total of 21 countries and one territory.⁸

The Artemis Accords are intended to serve as 'a practical set of principles, guidelines and best practices to enhance the governance of the civil exploration and use of outer space'.⁹ However, while grounded in the Artemis Program, it is also contemplated that the Artemis Accords will provide 'mutually beneficial practices for the future exploration and use of outer space' more broadly.¹⁰ This framework, in the words of the Artemis Accords, aims to:



increase the safety of operations,



reduce uncertainty,



and promote the sustainable and beneficial use of space for all humankind.¹¹

It is envisaged that the specifics of cooperative activities regarding the exploration and use of outer space will be implemented via bilateral instruments between individual countries, government agencies and other entities.¹²

Yet, while the Artemis Accords state that they are intended to 'implement the provisions of the Outer Space Treaty and other relevant international instruments',¹³ in many ways they may be regarded as being fundamentally inconsistent with those instruments.

First, in relation to property rights, the Outer Space Treaty envisages space resources as part of a 'global commons.' As stated in Article I:

The exploration and use of outer space, including the Moon and other celestial bodies, shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of scientific development, and shall be the province of all mankind (emphasis added).

Article II further provides that outer space resources are 'not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means'

However, the Artemis Accords are designed to facilitate the extraction and use of outer space resources, including through commercial means. That reflects the position taken by the United States more generally that outer space resources are capable of private ownership and use. Notably, the United States *Commercial Space Launch Competitiveness Act 2015* provides that

a United States citizen engaged in commercial recovery of an asteroid resource or a space resource ... shall be entitled to any asteroid resource or space resource obtained, including to possess, own, transport, use and sell the asteroid resource or space resource obtained.¹⁴

⁷ Ibid.

⁸ Australia, Bahrain, Brazil, Canada, Colombia, France, Israel, Italy, Japan, Luxembourg, Mexico, New Zealand, Poland, South Korea, Romania, Singapore, Saudi Arabia, the Ukraine, the United Arab Emirates, the United Kingdom, the United States and the Isle of Man.

⁹ Artemis Accords, section 1.

¹⁰ Idem, preamble.

¹¹ Idem, section 1.

¹² Idem, section 2.

¹³ Idem, preamble.

¹⁴ Public Law 114-90, 25 November 2015, Title IV, section 402.

The United States approach is the private ownership and use of outer space resources is not an act of 'national appropriation', so that the Outer Space Treaty is not infringed by this legislation. Further, in the Trump Administration's April 2020 Executive Order, 'Encouraging International Support for the Recovery and Use of Space Resources', it is stated that not only do Americans 'have the right to engage in commercial exploration, recovery and use of resources in outer space' but that 'outer space is a legally and physically unique domain of human activity, and the United States does not view space as a global commons.'

However, the opposing argument is that the adoption of legislation which expressly permits private ownership of outer space resources, under the authority of the national State, necessarily amounts to the assertion of sovereignty over outer space resources.

The United States position on outer space property rights clearly informs the drafting of section 10 of the Artemis Accords, which states that 'the extraction of space resources does not inherently constitute national appropriation under Article II of the Outer Space Treaty'.¹⁵

That position has been criticised by major space-faring nations that have declined to sign the Artemis Accords, including Russia and China. This impasse could lead to geopolitical tension and possible property and ownership disputes over outer space resources in future, undermining the certainty, confidence and predictability needed to incentivise ongoing investment in outer space activities.

A precursor to that potential is reflected in the Memorandum of Understanding signed by the China National Space Administration and the Russian Space Agency in March 2021 in relation to the joint construction of an autonomous lunar research base, envisaging lunar exploration, experimentation and resource utilisation. This International Lunar Research Station will seek to engage other global partners and the project will be governed by its own distinct set of normative rules for cooperation.

Notably, the Artemis Accords also fail to mention the Moon Agreement, another international space treaty which seeks to implement a 'global commons' approach to outer space resources.

Article 11 provides that '[t]he Moon and its natural resources are the common heritage of mankind', and repeats the Outer Space Treaty approach that the Moon is 'not subject to national appropriation by any claim of sovereignty, by means of use or occupation, or by any other means'. Further, Article 11 provides:

Neither the surface nor the subsurface of the Moon, nor any part thereof or natural resources in place, shall become property of any State, international intergovernmental or non-governmental organisation, national organisation or non-governmental entity or of any natural person.

As at July 2022, only 18 States were parties to the Moon Agreement.¹⁶ Yet the conflict between this multilateral normative space law instrument and the bilateral Artemis Accords is readily apparent.

Australia is the only nation which is a party to both the Artemis Accords and the Moon Agreement, raising questions as to how Australia can purport to reconcile the conflicting approaches to property rights under each of the instruments.

Apart from the specific concern over property rights, there is a further *systemic* governance concern arising from the approach of the Artemis Accords – that, in favouring bilateralism in relation to agreements concerning outer space rights and obligations (whether between States, or between government agencies or private enterprises), there is the potential for a multiplicity of overlapping and inconsistent outer space agreements that could be the subject of disputes over competing rights and obligations. There is also an incentive for parties to pursue commercial self-interest, instead of cooperation under the auspices of common international space law and protocols.

The Artemis Accords do contemplate in article 10(4) that signatories will 'use their experience under the Accords to contribute to multilateral efforts to further develop international practices and rules applicable to the extraction and utilisation of space resources'. Whether this occurs, and whether the property rights approach under the Artemis Accords itself forms part of any such practices and rules, remains to be seen.

¹⁵ Artemis Accords, section 10(2).

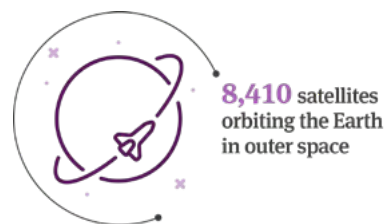
¹⁶ Armenia, Australia, Austria, Belgium, Chile, Kazakhstan, Kuwait, Lebanon, Mexico, Morocco, the Netherlands, Pakistan, Peru, the Philippines, Saudi Arabia, Turkey, Uruguay and Venezuela. A further four nations have signed (but not ratified) the Moon Agreement: France, Guatemala, India and Romania.

Space debris

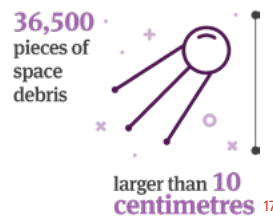
Ultimately, from a governance perspective, a common, multilateral-based oversight regime, supported by consistent standards for the recognition of common and individual ownership interests and the extraction and use of resources, is essential to ensure peaceful exploration in outer space and the long term viability of investment in activities from public and private entities. Cooperation, rather than competition, will help to deliver tangible benefits for every nation on Earth.

The trend towards an individualist State approach in the exploration of outer space and the movement away from collectivism and multilateralism has also left a void in governance and accountability which risks compromising the long-term safety and sustainability of outer space activities. This is particularly apparent in relation to the vexed issue of space debris.

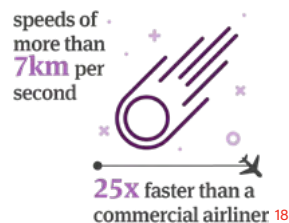
The European Space Agency (ESA) has estimated that there are currently more than:



along with



Debris can travel at



¹⁹ – is expected to expand significantly each year unless proactive remediation and removal steps are taken, creating a risk of 'catastrophic in-space collisions.'²⁰

¹⁷ European Space Agency, 'Space Debris by the Numbers', 10 May 2022.

¹⁸ Peggy Hollinger and Sam Learner, 'How Space Debris Threatens Modern Life', *Financial Times*, 8 June 2022.

¹⁹ Ibid.

²⁰ European Space Agency, see above n 17.

This may precipitate the 'Kessler effect,' in which the low-Earth orbit (LEO) – extending 2,000 kilometres beyond the Earth's atmosphere – is so crowded that one collision will lead to a chain reaction of cascading further collisions, potentially making the LEO inaccessible altogether in future years.²¹

Collaborative efforts among different nations to undertake a space debris remediation program are limited. That is not to say that there is an absence of protocols and standards. Indeed, in 2002, the Inter-Agency Space Debris Coordination Committee (IADC) – currently comprised of the national space agencies from 12 countries,²² along with the ESA – adopted non-binding guidelines designed to mitigate the increase in space debris. In 2007, the Scientific and Technical Subcommittee of the UN COPUOS adopted space debris mitigation guidelines (also non-binding) based on the IADC standards, which were endorsed by the UN General Assembly in December 2007. The resulting Space Debris Mitigation Guidelines of the Committee on the Peaceful Uses of Outer Space offer seven broad principles intended to 'be considered' in the mission planning, design, manufacture and operational phases of spacecraft and launch vehicle orbital stages: limiting debris released during normal operations, minimising the potential for break-ups during operational phases, limiting the probability of accidental collision in orbit, avoiding intentional destruction and other harmful activities, minimising the potential from post-mission break-ups due to on-board sources of stored energy, and limiting the long-term presence of spacecraft and launch vehicle orbital stages in the LEO region and geosynchronous Earth orbit region after the end of the mission.

However, the practicalities of in fact removing space debris have proved to be difficult. As the ESA notes, space debris mitigation guidelines provide a framework for *what needs to be done*, but not for *how* it is to be achieved.²³

A key issue is that there is no definition of 'space debris' in any internationally binding space treaty or other instrument. There is reference in the Outer Space Treaty²⁴ and the Liability Convention²⁵ to 'space object' but there is no distinction between a functional space object and a non-functional space object – the latter properly falling

within the scope of what space debris may commonly be understood to be. This is problematic because, according to the Outer Space Treaty, space objects remain the property and responsibility of the 'launching State'.²⁶ Even an uncontrolled, fragmented piece of space debris – as a 'space object' – would therefore continue to be owned by the State which launched the satellite or other object into outer space in the first place. This means that salvage rights of the kind seen in maritime law – where other States are entitled to remove pieces of debris posing a threat to safety and security – are currently inconsistent with the international outer space regulatory framework. This undermines the basis for cooperative efforts to design and implement an active space debris removal and remediation program.

Recognising a clear distinction between functional and non-functional space objects would serve as a basis to build such a program, supported by recognised and accepted salvage principles. Those principles could be combined with an agreed waiver of sovereignty over identifiable space debris and authorisation for other States to undertake removal activities. For smaller fragments of debris that cannot be identified, there could be automatic salvage rights without the need for removal authorisation from the launching State.

This could in turn give confidence to private entities to invest in technologies that would facilitate the rapid removal of space debris – opening the door to the commercialisation of debris removal in outer space just as much as the commercialisation of satellite, imaging, mining and other activities.

Apart from this threshold definitional issue, the Liability Convention – which purports to define the scope of States' outer space liabilities to incentivise responsible behaviour – lacks the precision and clarity needed to ensure that end by encouraging States to take responsibility for the removal of space debris originating from objects launched from their territories. The Liability Convention contemplates that a launching State may be liable for damage caused in outer space (including, in theory, from flying space debris), but

²¹ Ibid.

²² Italy, France, China, Canada, Germany, India, Japan, Korea, the United States, Russia, the Ukraine and the United Kingdom.

²³ ESA, 'Mitigating Space Debris Generation,' available at https://www.esa.int/Space_Safety/Space_Debris/Mitigating_space_debris_generation (accessed 26 July 2022).

²⁴ Outer Space Treaty, article X.

²⁵ Liability Convention, articles I-V, VII, XXI.

²⁶ Outer Space Treaty, articles VII-VIII.

Takeaways

only in the event of 'fault'.²⁷ That standard is left at large, and there is no clear framework for identifying causation and ultimate liability for collisions. To encourage active remediation steps in relation to space debris, the 'deterrent impact' of failing to take responsibility for the removal of the debris needs to be strengthened.

There is also a need to develop standards for space traffic management and space situational awareness. This would help to improve safety and orbital debris management, and reduce the likelihood of collisions in outer space.

The existing governance framework has, in this sense, become outdated and is not adapted to deal with the contemporary issues and problems that have come from the commercialisation of outer space. A new binding space debris mitigation framework – designed and facilitated by the UN COPUOS – is necessary to ensure cooperation and the ongoing sustainability of outer space activities. The issue of the funding of a remediation program and the apportionment of costs among nations – when the majority of existing space debris can be attributed to the main space-faring nations of the United States, Russia and China – is also critical, and will form a key part in negotiating a new regulatory framework.



²⁷ Liability Convention, article III.

The existing outer space governance framework has become obsolete, and it has not kept up with the pace of commercialisation and technological change in outer space activities.

The time has come to define a new order in global space governance, underpinned by collaboration and cooperation, not individualism and competition. Among the priority focus areas in the development of a new international space normative framework are clearly defined property and ownership rights in relation to resources in outer space and a space debris mitigation and remediation program based on principles of salvage and common responsibility.

The failure to progress a space governance framework that is adapted to the commercial activities that will continue to define future space exploration will cause an ongoing impasse, with regulatory gaps and inconsistencies between different nations. Ultimately, this will deter commercial investment in outer space activities, and may also fuel geopolitical tensions, disputes and conflicts. Particularly in relation to the removal of space debris, a lack of collaborative mitigation efforts may undermine the sustainability of commercial space activities altogether, confining nations' dreams of expanding space exploration to Mars and beyond to the orbital graveyard.

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