

# INNOVATION LETTER

## THE PRESENT AND FUTURE OF SPACE LAW

### *Abstract*

Rapid developments taking place in the space sector present both opportunities and risks. The underlying principles of international space law remain valid today. However, there is much need for new regulations and solutions to address the myriad emerging issues resulting from the new realities and prospects of space exploration and utilisation. While soft law is a valuable tool, it cannot be the only answer. The law must uphold the protection of the common interests of humanity, and doing so will not impede but rather promote good industrial and commercial endeavours by private entities.

Never before has space been such a part of our daily lives as today. Many day-to-day activities rely on space applications, from positioning and navigation signals to accessing telecommunication services transmitted via satellite. Weather forecasts, environmental pollution and climate change monitoring on our planet are primarily based on satellite data. There is also a significant space dimension to war as can be seen in the context of the conflict currently ravaging the heart of Europe, once again. At the same time, preparations are underway for deeper exploration of our Moon and close planets, primarily Mars, and to establish permanent human outposts farther away than ever before. There are occasional setbacks, as always: challenging endeavours can only be achieved one step at a time. Private undertakings play an essential role in all these achievements, and as technology advances and space exploration becomes increasingly affordable, even the smaller private enterprises have the means to launch smaller and smaller satellites.

Ongoing developments do have the potential to significantly improve our life on Earth. At the same time, they also carry high risks that directly affect our planet. In this context, I will briefly focus on three fundamental concepts: safety, security, and sustainability. Although we have a better understanding of space today, it remains a harsh environment and poses not-indifferent safety risks, all the more so where human life is concerned; for example, the escalating debris crisis resulting from human activity has exacerbated the safety conditions in orbit.

I will come back to this issue later. Security may be of even greater concern: satellites are high-value assets vulnerable to various types of attacks, including those by private entities. Cyber capabilities are also essential but vulnerable components of every space-based application. The risks increase when States are involved: targeting satellites, albeit 'only' through cyber means, may become a new form of warfare, capable, in the worst-case scenario, of paralysing global communication and exchange. An unfettered arms race in outer space could produce even more apocalyptic scenarios. Sustainability is not only an issue for tomorrow: it is already today's problem. Orbital debris poses a significant challenge to the long-term sustainable exploitation of space for the benefit of our planet. The growing number of (also sub-orbital) space launches contributes to environmental pollution on Earth, an issue we cannot fail to address. Future planned activities on the Moon, asteroids, or planets will raise concerns regarding the sustainable use of celestial bodies.

Opportunities and risks shape the path that law will have to follow in the coming years. The legal framework concerning outer space and the basic legal parameters that define what is lawful and what is unlawful in the conduct of space activities are enshrined in the Treaty on Principles Governing the

Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, better known as the Outer Space Treaty (or OST), adopted by the UN General Assembly on 19 December 1966 and opened for signature on 27 January 1967. Some of the provisions of the Outer Space Treaty have been further elaborated upon by three subsequent instruments: the Astronauts Agreement of 22 April 1968, the Liability Convention of 29 March 1972, and the Registration Convention of 14 January 1975 (referred to by their abbreviated names). However, unlike these four treaties, the Moon Agreement of 18 December 1979 (also abbreviated), albeit in force among a limited group of States, has never gained widespread adoption due to the reluctance of most space powers to ratify it.

The treaties in question were adopted during the early days of the space era when space activities were profoundly different from what they have become today. Consequently, there have been occasional calls to modify the international legal framework governing space activities in order to bring it more in line with today's needs. However, I do not share these concerns. In my opinion, the essential features of the legal regime governing outer space are still valid today, as they protect values crucial for the international community as a whole. This is particularly true of the prohibition on extending State sovereignty over any portion of outer space or celestial bodies, coupled with the ban on appropriation by other means (Article II, OST) and for the freedom to use outer space and celestial bodies for all States, to the benefit of all countries and of humankind (Article I, OST), as well as for the attribution of private space activities to their national States, which shall authorise and supervise private actors and bear the responsibility for their conduct (Article VI, OST). Adherence to this principle has not hindered the substantial growth of private space activities in recent decades. Still, it maintains a form of 'public' control over an environment that continues to constitute a risk for those who use it and those living below. Simultaneously, it represents a potential source of benefits that can and should be available to all humankind.

The focus should not be so much on amending the treaties but on supplementing them with new rules that can effectively regulate the new opportunities and risks that scientific and technological developments are rapidly bringing to light. When the first treaties were formulated, international law was, to a certain extent, anticipating reality. Today, however, there is the risk of lagging behind the rapid evolution of technology, possibilities, and ventures.

Recent decades have seen various attempts to address the emergence of new opportunities or threats with the adoption of new sets of rules. As convergence on treaty-making has, however, become impossible, the path undertaken has been to frame non-binding sets of soft law principles or guidelines, for which some key documents have been prepared. I mention here, among others, the Principles relating to Remote Sensing of the Earth from Space, adopted by the General Assembly in 1986 (yet, there is a pressing need to address the impact on privacy created by the growing quantity of data being collected from space); the Principles relevant to the Use of Nuclear Power Sources in Outer Space, adopted by the General Assembly in 1992; the Space Debris Mitigation Guidelines, adopted by the UN Committee on the Peaceful Uses of Outer Space (COPUOS) in 2007, and the Guidelines on the Long-term Sustainability of Outer Space Activities, adopted by COPUOS in 2019. All these standards have contributed or will contribute, in different ways, to shaping the practice of States and other actors in the relevant fields. As far as private actors are concerned, standards of corporate social responsibility would be helpful. Nonetheless, further efforts are required, especially concerning overcrowded orbits due to the proliferation of space debris, potentially endangering the continued future use of Earth orbits. Soft law may not always provide an adequate answer.

Several other sectors require regulatory action, some more urgently than others. While not aiming to provide a comprehensive overview, I will highlight a few examples. The attempts to prevent an arms race in outer space, which is essential to keeping space – as far as possible – a peaceful environment, have still not seen any decisive step forward due to a lack of agreement among the

major powers. Developing rules and mechanisms for Space Traffic Management is essential to prevent the proliferation of orbital debris and supplement existing standards. Clear rules of the road are essential to avoid accidents and conflicts of interest.

In the coming decades, sub-orbital activities will become a crucial means for developing space tourism: the experimental phase is already underway for some vehicles. Due to the unique features of these flights and the lack of a defined boundary between airspace and outer space, clarification is needed on whether space law or air law will be applicable, or indeed a combination of both. Alternatively, new rules have to be developed. Establishing rules of the road would be particularly important in this case, considering the need to demarcate and safeguard sub-orbital flights from aviation and vice versa. It will be equally crucial to develop appropriate standards to protect the environment, both on ground level and in the atmosphere.

Another critical area requiring specific regulations is the exploitation of mineral resources and water on asteroids, the Moon, or other celestial bodies. There is a growing tendency among States and experts to deny that such exploitation would breach the prohibition of appropriation of celestial bodies outlined in Article II OST. Exploiting celestial bodies could potentially prove beneficial in sustaining space missions and substituting depleted Earth resources in the distant future. However, if such activities are to be permitted, it is essential to establish specific conditions that preserve the common interests of humanity while adequately protecting the environment of celestial bodies. Denying that space is a global common<sup>1</sup> can only contribute to chaos.

Critical reflections and research are currently being conducted on these various topics in the hope of reaching the broadest possible agreement that will provide the best available protection for the common concerns of all humankind. While it may seem that the measures being proposed are excessively stringent and that they may impede the development of profitable industrial and commercial activities in space, I am confident that regulatory frameworks can provide robust protection for fundamental shared interests, including protecting the environment and mitigating climate change, ensuring the safety and security of space activities (which require guaranteeing peaceful use), promoting sustainability, and enabling global access to possible advancements. I am confident that pursuing these objectives would not hinder but rather promote sound and profitable economic and commercial activities. Moreover, creating a stable and certain legal framework is crucial for private activities in space.

However, international law is insufficient to provide the necessary legal certainty. International legal rules require domestic implementation, and several States have already developed at least a basic national legislation on space activities, which allows them to comply with the most fundamental requirements of international space law, such as those relating to licensing and supervision over private entities operating in outer space. However, other States, such as Italy, still lack a proper domestic legal framework for national space activities. National laws are essential inasmuch as they implement international obligations. In their implementation, domestic legislation can help shape the interpretation of international provisions. If they converge on specific solutions, they can potentially contribute to establishing or consolidating international customary rules and developing new practices. In addition to States, at the Union level, EU institutions can also adopt regulations to supplement the national laws of their Member States. It should be borne in mind that the EU is acquiring complex systems, such as, among others, Galileo and Copernicus, whose space component is being developed by the European Space Agency (ESA) with which the EU has established a meaningful partnership. These systems play a leading role in the implementation of various EU policies. A Union-level role would be particularly beneficial in sectors such as sub-orbital flight,

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<sup>1</sup> See US President Donald Trump's EO 13914 of Apr 6, 2020, 85 *FR* 20381.

where uniform implementation of international standards, yet to be clarified or established, would be highly beneficial due to the necessary coordination with aviation navigation and safety standards.

As private activities in outer space expand, private international law will play an increasingly important role in identifying which courts have jurisdiction, determining applicable law, and establishing possibilities for enforcing foreign judgments in the event of disputes. This is another area where, pending the adoption of possible new ad hoc rules, research can do much to clarify the legal framework and propose innovative solutions, such as new fora for dispute settlement.

Space activities evolve rapidly thanks to continuous technological advances, presenting various social and ethical challenges to legislators and legal scholars. There is a pressing need for new rules which, while protecting fundamental societal values, will enable space exploration and the exploitation of resources for the benefit of all. These rules should provide clear pathways for the sound and sustainable development, and implementation, of new ideas in the public, industrial, and commercial sectors.