Legal status of outer space and celestial bodies

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Introduction

Outer space as a domain of human activity

Outer space is that part of the Universe which lies beyond air space and is accessible for human activities. Space law governs all human activities related to the use and exploration of outer space, which includes celestial bodies such as the Moon and asteroids.1 It is a field of international law,2 and not a self-contained legal regime,3 which governs and regulates space activities

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3 As Bruno Simma points out, whether a regime is a self-contained depends on if it is possible, at all, to “fall-back on the general legal consequences of international wrongful acts”: Bruno Simma, “Self-Contained Regimes” (1985) 16 NYIL 111 at 118. For more on self-contained regimes, see International Law Commission, Fragmentation of International Law: Difficulties Arising from the Diversification and Expansion of International Law, UN Doc A/CN.4/L.682 (2006). At particularly sect C, para 120, the ILC notes:

No rule, treaty, or custom, however special its subject-matter or limited the number of the States concerned by it, applies in a vacuum.
as a *lex specialis* in as much as no general rules of international law exist.

**Sources of international space law**

Space law governs all types of human activities pertaining to the exploration and use of space, including access to and transit through space, space applications, such as telecommunications and use of orbits, mining of celestial bodies, and any space-related activity that is yet to develop in the future. As outer space provides great socio-economic, political and strategic value, and with the shift away from State-led and government-funded space missions to commercial space ventures conducted by an increasing number of private space actors, the formation of space law is naturally thereby shaped by concerns and interests from the public, private and technological, economic, security and political domains. Space law comprises a number of international treaties and resolutions adopted by States under the auspices of the United Nations. Chronologically, the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space Including the Moon and Other Celestial Bodies (commonly known as the Outer Space Treaty) is the first international space law instrument. It contains the basic principles for space activities, provides the basis for the next four treaties, and with 104 ratifications and 25 signatories as of January 2016, the Outer Space Treaty is one of the international treaties with significant support. With widespread support, and the fact that several provisions of the treaty reiterate and codify rules established under an earlier General Assembly resolution, the Outer Space Treaty is considered to contain principles of customary international law which bind not only State parties to the treaty but also non-signatories. In addition, more than 25 countries have enacted their national space legislation which might be seen as an expression of *opinio juris*, if coupled with State practice, can be evidence of custom.

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4 In the words of the ILC, if a matter is being regulated by a general standard as well as a more specific rule, then the latter should take precedence over the former. *Fragmentation of International Law*, ibid., para 56.


6 *Outer Space Treaty*, supra note 2.

7 See the *Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched Into Outer Space*, 22 April 1968, 672 UNTS 119, 19 UST 7570, TIAS No. 6599, 7 ILM 151 (entered into force 3 December 1968) [*Rescue and Return Agreement*] (as of January 2015, 94 ratifications, 24 signatures and 2 declarations of acceptance of rights and obligations); the *Convention on International Liability for Damage Caused by Space Objects*, 29 March 1972, 961 UNTS 187, 24 UST 2389, 10 ILM 965 (1971) (entered into force 1 September 1972) [*Liability Convention*] (as of January 2015, 922 ratifications, 21 signatures and 3 declarations of acceptance of rights and obligations); the *Convention on Registration of Objects Launched into Outer Space*, 6 June 1975, 28 UST 695, 1023 UNTS 15 (entered into force 15 September 1976) [*Registration Convention*] (as of January 2015, 62 ratifications, 4 signatures and 3 declarations of acceptance of rights and obligations); and the *Agreement Governing the Activities of States on the Moon and Other Celestial Bodies*, 5 December 1979, 1363 UNTS 3 (entered into force 11 July 1984) [*Moon Agreement*] (as of January 2015, 16 ratifications and 4 signatures).


9 *Declaration of Legal Principles*, supra note 2.

The law of outer space can in some aspects be compared to other domains of international law which govern common spaces, such as the law of the sea and the law governing Antarctica. The high seas, deep seabed and the landmass of Antarctica, like outer space, are all excluded from claims of sovereignty. Like the other global commons, due to the particular natural predispositions in space (microgravity and vacuum, high-velocity motion in orbits etc.). Outer space, including celestial bodies, also have physical features which make them unique and therefore subject to a special sub-set of international law that must adapt to rapid technological developments and to activities which are constantly evolving and becoming more complex.

**Legal status of outer space**

**Are there boundaries and where are they?**

In order to define where exactly international space law is applicable, a determination needs to be made as to where outer space begins. As outer space is a natural phenomenon, one possible approach would be to orient any legal consideration to its naturally given conditions in relation to the Earth as a starting point for any human activity that is to be regulated. However, no physical boundary exists between air space and outer space. A number of attempts to define where air space ends and outer space begins have been undertaken since the launch of Sputnik I on October 4, 1957. No agreement on the delimitation of air space and outer space exists, despite the fact that this issue has been on the agenda of the United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS) for nearly 50 years.


13 UNCLOS, supra note 11, art 89.

14 Ibid., art 137(1).

15 Antarctic Treaty, supra note 12, art IV.

16 For a general technological background for space activities, see, for example: JJ Sellers, Understanding Space: An Introduction to Astronautics (New York: Hill-McGraw, 2007).

17 As Max Huber noted in the Island of Palmas case:

Territorial sovereignty is, in general, a situation recognized and delimited in space, either by so-called natural frontiers as recognized by international law or outward signs of delimitation that are undisputed, . . . or by acts of recognition of States within fixed boundaries. [...] Territorial sovereignty . . . serves to divide between nations the space upon which human activities are employed in order to assure them at all points the minimum protection of which international law is the guardian.


18 The first mention of the issue of delimitation took place at the ad hoc Committee on the the Peaceful Uses of Outer Space in 1959. Though the Committee noted there was no consensus on the matter and that “it might eventually prove essential to determine these limits”, States “generally believed that the determination of precise limits for air space and outer space did not present a legal problem calling for priority consideration at this moment”. See Report of the Ad Hoc Committee on the Peaceful Uses of Outer Space, UN Doc A/4141 (14 July 1959) at 25.
At a theoretical level, one can differentiate between a “functionalist” and a “spatialist” approach.\(^1\) According to the latter, a physical demarcation line between air space and outer space must be set. The Von Kármán line at 100 km above sea level was accepted by the International Aeronautical Federation as a boundary between air space and outer space.\(^2\) The functionalist approach takes into consideration the purpose of a vehicle in flight and its activity: it shall be crucial whether the vehicle is built to operate from Earth to outer space or to fly in airspace.\(^3\) This approach gained more substantial support in the 1970s due to the rapid development of technology.

It appears that a consensus within UNCOPOUOS on the delimitation problem cannot soon be expected\(^4\) but it can be affirmed that the functionalist approach has been endorsed by some of the major space-faring nations such as the United States (US).\(^5\) Currently, the lack of a delimitation of outer space does not hamper space activities.\(^6\) So far, no country protested against a space object overflying (during launch or re-entry) its sovereign airspace.\(^7\) However, this question may gain more significant practical meaning if aerospace vehicles start operating because they would be able to fly and operate both in air and in outer space.\(^8\) Leaving the delimitation of outer space unanswered may presently thwart the proper and orderly governance of outer space and the certainty and strength of international law governing space activities.\(^9\)

Taking into account that there are satellites which can operate in an altitude of about 95–110 km, and the centrifugal force exceeds the aerodynamic lift at 84 km above sea level, it

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2. Australia’s *Space Activities Act 1998* (No. 123 of 1998) refers to “the distance of 100 km above mean sea level to Earth” in its definition of what is a “launch” and “launch vehicle”: see sect 8. See also Dean N Reinhardt, “The Vertical Limit of State Sovereignty” (2007) 72 J of Air Law and Commerce 65. See also International Aeronautical Federation, “100km Altitude Boundary for Astronautics”, online: Fédération Aéronautique Internationale www.fai.org/icare-records/100km-altitude-boundary-for-astronautics.
4. The issue remains unresolved and was discussed extensively, like in previous years, by the Legal Subcommittee of the UNCOPOUOS in 2015: see UNCOPOUOS, *Report of the Legal Subcommittee on its fifty-fourth session, held in Vienna from 13 to 24 April 2015*, UN Doc A/AC.105/1090 (2015) at 14 et seq.
7. As all space objects must traverse national air space on its ascent/descent into outer space, Lachs notes the freedom of innocent passage through airspace must be “a necessary corollary” of the freedom to explore and use outer space: Lachs, ibid. at 60–61.
11. See Cheng, supra note 17 at 94 et seq.
can be argued that outer space starts somewhere between 80 and 110 km above sea level.28

The non-appropriation principle

Whereas a State retains “complete and exclusive sovereignty over the airspace over its territory”29, outer space, including celestial bodies, similar to other “global commons”, is completely excluded from national sovereignty.30 The so-called “non-appropriation principle” is contained in Article II of the Outer Space Treaty and provides that “outer space, including the moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means”.31 Thus, States Parties to the Outer Space Treaty are prohibited from declaring sovereign or territorial claims over outer space and on celestial bodies.32 With respect to celestial bodies, the non-appropriation principle is reaffirmed in the Moon Agreement under Article 11.33

The exact meaning of the non-appropriation principle, however, is not clear. It does prohibit States to appropriate outer space and celestial bodies,34 but it is a subject of further interpretation whether only the surface of the celestial bodies or also what lies underneath (such as resources) is protected by this provision.35 In principle, thus, any appropriation of territory is


30 Particularly, the high seas, the deep seabed and Antarctica. See infra II4b.


32 According to Lachs, the phrase “any other means” makes the prohibition of sovereignty absolute: neither use, nor occupation, can constitute legal titles justifying the extension of sovereign rights by any States over outer space, over the moon and other celestial bodies … [w]hatever criteria one adopts […] claims are bound t be considered as devoid of legal foundation.

Lachs, The Law of Outer Space, supra note 24 at 43.

33 Article 11(2) of the Moon Agreement, supra note 7, provides:

The moon is not subject to national appropriation by any claim of sovereignty, by means of use or occupation, or by any other means.

34 Equatorial States Brazil, Colombia, Congo, Ecuador, Indonesia, Kenya, Uganda and Zaire in 1976 attempted to lay claim to the geostationary orbit above their respective territories: see Declaration of the First Meeting of Equatorial States (3 December 1976) [Bogotá Declaration], ITU Doc WARC-BS (1977) 81–E. States did not recognize such a claim, and the Equatorial States eventually abandoned their stance on this.

35 Cf. Lachs, who notes that non-appropriation must be understood as “including not only sovereign rights but also property rights” and that States “are thus […] barred from establishing proprietary links in regard to the new dimension” of outer space and celestial bodies. See Lachs, The Law of Outer Space, supra note 24 at 44.
prohibited. Moreover, the expression “appropriation by use” can be interpreted in the light of Article I which provides for the freedoms of outer space. In November 2015, in an unprecedented detraction from international space law, the US adopted domestic legislation which guaranteed private actors rights in an “asteroid resource or space resource obtained, including the right ‘to possess, own, transport, use, and sell the asteroid resource or space resource’”.  

The non-appropriation principle is a rule of customary international law. However, it might be challenged in the light of its formulation allowing broad interpretation. A systematic interpretation of Article II of the Outer Space Treaty by means of looking at the formulation of Article 11 of the Moon Agreement allows the assumption that exploitation of natural resources is not appropriation per se if such activities are governed by a regime established by the international community. 

Generally, the non-appropriation principle prohibits claims to ownership in outer space, unless an international regime for exploitation of the resources of the Moon and other celestial bodies is established. A parallel in international law may be found in the UN Convention on the Law of the Sea (UNCLOS), which establishes a regime to govern the exploitation of deep seabed resources. In telecommunications law, which in many instances is interwoven with space law, the allocation of slots in the geostationary orbit (GEO) by the International Telecommunication Union (ITU) represents a regime for governing the exploitation (use) of resources such as the limited orbital slots in GEO. Therefore, the non-appropriation principle which is indeed a fundamental rule not only in space law but also a rule of customary international law, provides room for further elaboration of its exact meaning according to the specific uses which space actors (be they governmental, non-governmental entities or natural persons) aim for.

The freedoms of outer space

The Outer Space Treaty sets out a framework for human activities in space. States are not the only subjects of these provisions. Articles VI and XIII clearly provide that international intergovernmental organizations and private actors are also subject to the provisions of the Outer Space Treaty. “Mankind”, which is named in the first paragraph of Article I of the Outer Space Treaty is, however, not a subject of international law. Individuals can benefit from the


37 It was already affirmed in the Declaration of Legal Principles, supra note 2, para 3. See also Lachs, The Law of Outer Space, supra note 24 at 44, 47–48.


39 R. Wolfrum, “Die Internationalisierung staatsfreier Räume” in XX Beiträge zum ausländischen öffentlichen Recht und Völkerrecht, Band 85 (Springer 1984), 328 et seq. See UNCLOS, supra note 11, art 137(1).


42 For a discussion on ‘mankind’ as a subject of international law, see: A Cocca, “Mankind as a New Legal Subject”, 13th Colloquium on the Law of Outer Space 211 (1970).
freedoms of outer space but only in as much as States entitle them to do so through national space legislation.\footnote{Indeed, the US \textit{SPACE Act of 2015}, \textit{supra} note 36, is a clear example of private space actors being endowed with the rights to enjoy freedom of use and exploration – some would argue above and beyond the original purpose and intent of the Outer Space Treaty.}

The right, and the scope of such a right, of States (and other subjects of international law) to engage in such activities is confirmed by Article I of the Outer Space Treaty, which guarantees States the freedom to i) explore outer space; ii) use outer space; and iii) to conduct scientific investigation in outer space.\footnote{Respectively, the second and third paragraphs of Article I of the \textit{Outer Space Treaty}.} It is thus clear that the freedom of exploration, freedom of use and freedom scientific investigation are distinct activities.

The term “freedom” means that all entities which are addressees of these provisions are entitled to use, explore or scientifically investigate in outer space without the need to ask for permission from other States or an international entity.\footnote{Indeed, the \textit{Lotus} case held that under international law, States are by default free to act and that “restrictions upon the independence of States cannot […] be presumed”: \textit{The S.S. Lotus (France v. Turkey)}, (1927) PCIJ, A/10 at 18.} However, also this fundamental provision of space law is formulated in a very broad manner, and a closer look at its exact meaning and legal consequences is needed. Any consideration of the scope of these freedoms should start with an interpretation of the terms used to describe human activities.

Exploration, however, stipulates not so much consuming or profiting from space but rather the discovery of something new or yet unknown. Scientific investigation might, but must not necessarily overlap with “exploration” as scientific activities might be aiming also at already discovered objects or areas.

\textit{Freedom of use}

The “use” of outer space might include many different types of human activities, which may or may not be aimed at gaining economic profit.\footnote{S Hobe, “Article I (Outer Space Treaty)” in S Hobe, B Schmidt-Tedd & K-U Schrogel (eds), \textit{Commentary on Space Law; Vol. I} (2009) at 35, para 36.} For example, every single space operation begins with the launch of the space object from Earth and extends to operations and applications taking place in outer space, which could be gathering information, recording it on a satellite payload and transmitting it back to Earth. The notion of “use” of outer space underlines why clarifying the question of the delimitation of outer space is still relevant, for it is questionable whether operations taking place (partially or fully) in outer space can be considered to be “use” under the terms of Article I of the Outer Space Treaty. It is questionable whether space-related activities taking place on Earth, such as the construction of satellites or even when the space object is transiting through air space on its way to outer space, are also covered by this freedom. An opinion which is also supported by the subsequent State practice, favors the application of Article I for all activities intended for space, thus including Earth-based operations.\footnote{B Cheng “Revisited: International Responsibility, National Activities and the Appropriate State”, 27 Journal of Space Law (1998) at 19; F von der Dunk, “Private Enterprise and Public Interest in the European ‘Spacescape’” (Leiden University, Leiden 1998) at 13; HA Wassenbergh, “An International Institutional Framework for Private Space Activities” (1997) XXIII Annals of Air and Space Law 529 at 533; and HA Wassenbergh, “The Law Governing International Private Commercial Activities” (1983) 12 Journal of Space Law 97 at 108.}
Freedom of exploration

The exploration of outer space and its use are different terms but can overlap. However, exploration is a term which emphasizes not so much on the exploitative use or the use aimed at economic benefits. Rather, the term “exploration” as employed in the Outer Space Treaty places emphasis on gaining of knowledge about outer space which enables humankind to develop further its abilities to go to and carry out activities in outer space. In other words, one may circumscribe exploration as covering such activities that aim at the discovery of resources which eventually can be exploited (i.e. used).

Freedom of scientific investigation

This freedom is mentioned explicitly in the third paragraph of Article I of the Outer Space Treaty. Of course, scientific investigation and exploration both mean activities oriented and meant for gaining new knowledge about outer space, and therefore the scope of these distinct activities overlap. The fact that scientific investigation is named explicitly reiterates the fact that the drafters of the Outer Space Treaty saw it as a very important activity and stressed its significance by stating that “international co-operation” shall be encouraged.

Limitations to the freedoms of exploration and use

The freedoms of outer space as granted by Article I of the Outer Space Treaty are not without limitations. There are certain exceptions formulated in the corpus juris spatialis which provide limitations, under Article I itself as well as in other treaty provisions.

The province of mankind

The first paragraph of Article I of Outer Space Treaty and Article 4 of the Moon Agreement provide the use and exploration of space and celestial bodies are the “province of mankind”. There is no elaboration what the term “mankind” encompasses. However, the obligation that space activities must be “carried out for the benefit and in the interest of all States, irrespective of their degree of economic, social or scientific and technological development” does underline

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48 Hobe, “Article I(Outer Space Treaty)”, supra note 46 at 35, para 36.
49 Ibid.
50 For details on the principle of cooperation in space law, see below under II.
51 As Lachs opined, the freedom to use outer space “is neither absolute nor unqualified”, but is limited by the right and interest of other States: Lachs, The Law of Outer Space, supra note 24 at 117.
52 Such as, inter alia, the common benefit clause (Outer Space Treaty, art I); ibid, art III (applicability of international law to outer space activities); art IV (on the military uses of outer space); art VII (international liability); and Liability Convention, arts 2 and 3. The UN Charter also contains a provision on the need to ensure mutual respect and benefits for all Member States: Charter of the United Nations, 26 June 1945, CanTS 1945 No. 7, 59 Stat. 1031, 145 UKTS805, 24 UST 2225, TIAS No. 7739 (entered into force 24 October 1945), art 2(2).
53 This principle was again reaffirmed, some three decades after the adoption of the Outer Space Treaty in Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of All States, Taking into Particular Account the Needs of Developing Countries, GA Res 51/122, UNGAOR, 51st Sess, UN Doc A/RES/51/122 (1996), Preamble, para 9 and para 1 [Space Benefits Declaration].
54 See Cocca, “Mankind as a New Legal Subject”, supra note 42.
interest of all States and all generations (present and future) in the use and exploration of outer space and celestial bodies.55

This notion reiterates that in conducting of space activities, the interest of all mankind, without discrimination on the basis of space capabilities of certain nations, must be taken into consideration. The purpose of this limitation is to ensure that no State shall be discriminated in the use and exploration of outer space and that all States are entitled to share the benefits therefrom.56

The Common Heritage of Mankind concept

The concept of the Common Heritage of Mankind (CHM) is a principle of international law confined not only to space law.57 It is also reflected in the UNCLOS58 and, to a lesser extent, traces of the doctrine be found in the Antarctic Treaty.59 Its purpose is to provide special protection to and ensure the integrity of areas which lie beyond the limit of any national territory that are of great significance for present and future generations.60 According to the opinion of leading legal scholars, which is considered a subsidiary source of international law,61 the specific meaning of CHM in Article 11(5) of the Moon Agreement must be interpreted within the scope of the Moon Agreement, and not in the light of UNCLOS and other international agreements in which it can be found.62

In space law, the CHM concept relates to the above-mentioned province of mankind clause and is specifically enshrined in the Moon Agreement. Both notions express the idea that space is an area with a special status which should be open and preserved for all States and the whole of humankind. However, it must be noted that the meaning of CHM under Article I of the Outer Space Treaty and in Article 11 of the Moon Agreement is not fully overlapping.63 Not only does the Moon Agreement generally prohibit the national appropriation of the Moon and other celestial bodies by any means,64 it also specifically provides that the surface, subsurface or any natural resources in place cannot become the property of any State or any other entity.65 Again, the right to explore and use the Moon is “without discrimination of any kind, on the basis of equality and in accordance with international law”.66 To ensure that natural resources are exploited in a way that is non-discriminatory and takes into consideration the interest of all

56 Space Benefits Declaration, supra note 53, Preamble, paras 8 and 9, and para 3.
58 UNCLOS, supra note 11, art 136. See also Jakhu, Freeland, Hobe & Tronchetti, “Article 11 MOON”, supra note 38, para 177 et seq.
60 Weiss, supra note 55.
63 Ibid. at 394, para 193.
64 Moon Agreement, supra note 7, art 11(2).
65 Ibid., art 11(3).
66 Ibid., art 11(4).
States, once the exploitation of lunar natural resources becomes feasible the Moon Agreement enjoins States to establish an international regime and procedures to govern such exploitation.\footnote{Ibid., art 11(5).}

Article 11(7) of the Moon Agreement lays down the objectives establishing an international regime to govern the exploitation of the natural resources of the Moon.\footnote{Specifically, Article 11(7)(a)–(7)(c) of the \textit{Moon Agreement} notes the purpose of the international regime includes: the orderly and safe development of the natural resources of the Moon, the rational management and the expansion of opportunities in the use of such resources.} Though the CHM concept is not expressly stated, in the exploitation of the Moon’s resources, States must ensure “equitable sharing” of the benefits derived from those resources and give “special consideration” to the interests and needs of developing countries.\footnote{\textit{Moon Agreement}, supra note 7, art 11(7)(4).} This obligation is reflective of the general principle to cooperate when engaging in outer space activities (which will be elaborated below). In summary, it can be assumed that the Moon Agreement does not prohibit the taking of resources \textit{per se} but leaves the distribution of benefits therefrom open for a future determined by a legal regime to be established as soon as this exploitation becomes feasible.\footnote{Jakhu, Freeland, Hobe & Tronchetti, “Article 11 MOON”, \textit{supra} note 38 at 397, para 194.}

\begin{quote}
\textbf{Other limitations}
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The freedom of action in outer space is further limited by Article III of the Outer Space Treaty, which provides that international law and the UN Charter are applicable to the exploration and use of outer space. Further, States must ensure that their outer space activities are “in the interest of maintaining international peace and security and promoting international cooperation and understanding”. Article III, in effect, denotes principles of space law, and implies that if there are no special laws governing a particular activity in outer space, general international rules are applicable to activities in outer space.

Another important limitation to the use of outer space is contained in Article IV of Outer Space Treaty. This provision limits certain military uses of outer space by specifically prohibiting, \textit{inter alia}, the placement of nuclear weapons and weapons of mass destruction in orbit around the Earth and the establishment of military bases and the testing of weapons on celestial bodies.\footnote{\textit{Outer Space Treaty}, \textit{supra} note 2, art IV.} While States are obliged to use celestial bodies “exclusively for peaceful purposes”,\footnote{Ibid. [emphasis added]. This language is reflective of the \textit{Antarctic Treaty}, \textit{supra} note 12, Preamble, para 1.} outer space need only be explored and used for “peaceful purposes”.\footnote{\textit{Outer Space Treaty}, \textit{supra} note 2, Preamble, paras 2 and 4.} The lack of the word “exclusively” to qualify activities in outer space has been the source of great contention with regards to what “peaceful” in reality entails. The predominant opinion is that peaceful means non-aggressive,\footnote{Carl Q Christol, “The Common Interest in the Exploration, Use and Exploitation of Outer Space for Peaceful Purposes: The Soviet-American Dilemma” (1984) 27 Colloquium on the Law of Outer Space 281 at 282–283.} signifying that certain military activities are acceptable if exercised lawfully.\footnote{An example would be the right to self-defense under Article 51 of the UN Charter. On the different military doctrines of States for the use of outer space, see K-U Schrogl & J Neumann, “Article IV (OST)” in S Hobe, B Schmidt-Tedd & K-U Schrogl (eds), \textit{Coloque Commentary on Space Law Vol. 1} (2009) at 90 \textit{et seq}. The importance of clarifying scope and legality of military activities that are considered lawful is discussed in Ram S Jakhu, Cassandra Steer & Kuan-Wei Chen, “Conflicts in Space and the Rule of Law”, \textit{Space Policy [forthcoming].}
The principle of cooperation

Another foundational principle embodied in space law is the principle of cooperation between States. It is found in the Outer Space Treaty under Articles III, IX and X, and was further developed and clarified in the four subsequent treaties on space law.76

The infusion of the cooperation principle in space law can be traced to the evolution of international law from its beginnings as a means to “regulate the relations between these co-existing independent communities”77 to a global governance structure aimed at fostering cooperation between States.78 This is particularly true in domains, such as outer space, where there are recognized communal interests and obligations necessitating joint efforts of States to realize or enhance.79 Despite the idealistic spirit of the outer space treaties and resolutions, it was clear from the beginning of the space age that even though all States are endowed with the freedom to explore and use outer space, in reality not all have the economic and technological capabilities to profit from space activities.

However, the body of space law does not provide a definition of the exact scope and meaning of the cooperation principle. It is formulated in the Outer Space Treaty in a rather broad sense, providing that States shall be “guided by” cooperation and mutual assistance and shall carry out space activities with due regard to the activities of other States.80 In the same text, the need to cooperate appears in the context of the freedom to conduct scientific investigation if outer space,81 and the provision which obliges States to carry out activities in outer space in accordance with international law, “in the interest of maintaining international peace and security and promoting international co-operation and understanding”.82 To better understand what the obligation to cooperate entails, another interpretation of the term “cooperation” must be sought not only in the provisions of the Outer Space Treaty but also in the texts of other outer space treaties and other legal instruments.

Article IX of the Outer Space Treaty is the basis for environmental protection of outer space. Apart from the principle of non-interference, this provision clearly embodies the cooperation principle and notes in conducting space activities, States must consider the common interest of

76 Namely, Declaration of Legal Principles, supra note 2, paras 4, 6; Registration Convention, supra note 7, art VI; of the Moon Agreement, supra note 7, arts 4(2) and 11(7)(d); and generally the Space Benefits Declaration, supra note 53.
77 Lotus, supra note 45.
78 As ICJ President Bedjaoui notes, “the face of contemporary international society” is being “markedly altered” with the “proliferation of international organizations, the gradual substitution of an international law of co-operation for the traditional international law of co-existence”: Legality of the Threat or Use of Nuclear Weapons, Advisory Opinion, [1996], ICJ Reports 226, Declaration of President Bedjaoui, para 13. See also Lachs, The Law of Outer Space, supra note 24 at 117–118. See generally, UN Charter, supra note 52, art 1(3); and Principles of International Law Concerning Friendly Relations and Co-operation among States in Accordance with the Charter of the United Nations, Res 2625 (XXV), UN GAOR, 25th Sess., Supp. No. 22, UN Doc. A/2212 (24 October 1970) [Friendly Relations Declaration].
80 Outer Space Treaty, supra note 2, art IX.
81 Ibid., art I.
82 Ibid., art III.
other States and have due regard to their activities.\textsuperscript{83} However, there are no specific requirements or guide to States as to how they can exercise their activities in a manner that would ensure that the standard of care towards activities of other States is considered enough.\textsuperscript{84}

The formulations found in the Outer Space Treaty and the Moon Agreement are rather broad and do not provide particular procedural mechanisms to facilitate such cooperation. Due to the fact that there is no central authority to direct and oversee acts of cooperation, it is left to the States how such cooperation as envisaged in the treaties shall be implemented.

As mentioned, there are a number of references to cooperation in the Outer Space Treaty. The term, however, is not specified or interpreted further. An attempt to clarify the duty to cooperate under Article I of the Outer Space Treaty did not bear fruit.\textsuperscript{85} Another attempt clarify the meaning and significance of the principle of cooperation in outer space was undertaken in the 1996 Space Benefits Declaration, which empowers States to freely determine “all aspects of their participation in international cooperation in the exploration and use of outer space on an equitable and mutually acceptable basis”.\textsuperscript{86} In the years of negotiations on the exact formulation of this provision, developing and developed countries could not reach agreement on the modes of international cooperation. The position of the developing countries aimed at, \textit{inter alia}, ensuring that they could benefit from cooperation premised on being subject to “special treatment” by the space-faring nations. This did not meet acceptance by developed nations and agreement was reached only after an approach resembling the positions of the developed countries was adopted.\textsuperscript{87} The Space Benefits Declaration provides that the determination of international cooperation shall be based on “an equitable and mutually acceptable basis”, which, however, is broadly formulated and leaves room for further interpretation by the concerned States.\textsuperscript{88} This shows that the attempts to develop the notion of international cooperation in space and to come to a precise formulation of its structure and implementation did not result in a satisfactory development of the basis laid down in the Outer Space Treaty.

Despite the lack of clarity with regards to the meaning of and framework to realize cooperation, in reality cooperation in outer space has already taken place, especially when one looks at the existing institutionalized forms of cooperation, both at the global and regional level.\textsuperscript{89} At the global level, there are bodies in the UN family specifically dealing with space activities, such as the the United Office for Outer Space Affairs (UNOOSA) and the UNCOPUOS). Internationally, there are also organizations that deal with space applications,
such as the ITU and INTELSAT. At the regional level, organizations such as the European Space Agency (ESA), the Asia Pacific Space Cooperation Organization (APSCO), EUMETSAT, EUTELSAT and ARABSAT are all prominent examples of institutional frameworks that foster the principle of cooperation in space affairs. However, the legal framework of individual forms of cooperation among States needs further elaboration in order to ensure that the general principle of cooperation contained in the corpus juris spatialis is effectively applicable.

The responsibility of States for space activities

International responsibility

Under general international law, States, and international organizations, bear international responsibility for their activities. Responsibility for activities in outer space is laid down in Article VI of the Outer Space Treaty. Article VI can be seen as a further limitation to the freedoms set out under Article I of the same treaty. Whereas States are responsible for national activities, responsibility for space activities conducted under the auspices of international organization rests jointly on the organization and its constituent members. According to Article VI of the Outer Space Treaty, only State parties can bear international responsibility for any kind of national activities in outer space, namely for national activities both by governmental agencies and non-governmental entities. Thereby, private activities in space are allowed but States must provide authorization and continuing supervision in order not to evoke their international responsibility.

Responsibility for internationally unlawful acts must be differentiated from the liability regime set out in Article VII of the Outer Space Treaty and in the Liability Convention, which imposes damages caused by space objects and does not require any unlawfulness of the activity itself. Private entities are not a subject of international law and are not directly bound by international treaties.

What activities, it must be asked, fall under the scope of “space activities” for which States must bear international responsibility and liability? Here it must be considered which activities fall under the scope of Article VI as no definition, specification or enumeration is to be found in this or other articles of the treaties. In the terms of Outer Space Treaty and its foundational provision Article I, any human activity taking place in or intended for space is a space activity. Thereby all activities, from the launching to the operation and re-entry of a space object may entail international responsibility.

92 It was first identified under the Declaration of Legal Principles, supra note 2, para 5.
93 Outer Space Treaty, supra note 2, art VI; and Declaration of Legal Principles, supra note 2, para 5.
94 Declaration of Legal Principles, supra note 2, para 8.
State responsibility and national space law

In particular, it is mostly the launching State which bears international responsibility, thereby it is in the interest of countries to ensure that the activity planned by the non-governmental entity will be secure and can be properly supervised. This can be achieved by setting out rules in the national legislation which impose certain requirements on the private entity. In the course of the growing commercialization and privatization of outer space, the duty of States to authorize (license) and supervise activities of their national, non-governmental entities requires more detailed national regulation to outline in more detail how space activities are to be procured. Indeed, the UN has called upon States to enact and implement national laws authorizing and providing for continuing supervision of the activities in outer space of non-governmental entities under their jurisdiction.

Examples of national space laws

Currently, more than 20 States have enacted national space legislation. It is in the interest of the licensing State that the national law provides for the procedures and criteria applicable to the authorized activity, the continuing supervision, for the liability of the launched space object, the registration of the launched space object and to foresee an indemnification and insurance regulation in the context of liability so that the launching State can have adequate coverage if it has recourse against the private entity.

The existing national space laws are different in their scope and extent but there are some similarities. Many of the elements of national space legislation stem from the terms of the United Nations space law treaties themselves. While it is impossible to outline all the specificities of these various countries, below only the legislation of some of the major space-faring countries, namely France, Russia and the United States, are briefly outlined.

France

The French law on space operations contains provisions on the registration of a space object and requires a license by any operator of any nationality who aims at conducting a space operation from French territory or by means of installations located under French jurisdiction. It establishes a system of liability of the operator according to the Liability Convention. However, the liability may be reduced when fault of the victim is proven.

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97 These States are, inter alia, Australia, Austria, Belgium, China, France, Indonesia, Japan, Kazakhstan, the Netherlands, South Korea, Russia, United Kingdom, South Africa, Ukraine, and the US. For the collection of existing national space legislation, see UNOOSA, “National Space Law”, online: UNOOSA www.unoosa.org/oosa/en/ourwork/spacelaw/nationalspacelaw/index.html; and ESA, “National Space Legislations”, online: ESA www.esa.int/About_Us/ECSL_European_Centre_for_Space_Law/National_Space_Legislations.
100 France, French Space Operations Act (Loi relative aux opérations spatiales) of June 2008.
Russia

The Russian federal Law on Space Activities of 20 August 1993\(^{101}\) requires a license for all space activities. The licensing procedure is regulated in the Law on Licensing of Certain Activities and in the Statute on Licensing of Space Activities,\(^ {102}\) and includes provisions on safety standards, technical quality control, including guaranteeing the availability of qualified and professionally-educated specialists, and the observance of the international obligations of the Russian Federation. It also foresees environmental considerations as space activities should be performed with due regard to the permissible level of human-made contamination of the environment and near-Earth space. Russian law provides for a two-tier system of compulsory and voluntary insurance, which consists of an insurance for the health and life of the cosmonaut, the space infrastructure personnel and for the damage to the life, health or property of third parties. Voluntary insurance should be taken for space equipment and the risk of loss or damage to it.

The United States

The United States has enacted a number of space acts and their national legislation and their contents are by far the most comprehensive. The Commercial Space Launch Act of 1984\(^ {103}\) promotes of commercial space activities and launches by the private sector. It provides for an extensive licensing and foresees that policy and safety approvals from the Federal Aviation Administration (FAA) must be obtained. The Commercial Space Launch Amendments Act of 2004\(^ {104}\) furthermore requires commercial flight operators to make written informal disclosures as to, for example, informed consent of customers the so-called space flight participants.\(^ {105}\) Each license is required to provide the Office of Commercial Space Transportation with specific information for the registration in accordance with Article IV of the Registration Convention. More recently, the United States adopted legislation governing the exploitation of space natural resources.\(^ {106}\)

Suggestions for a model law

At its international conference in Sofia in 2012, the International Law Association adopted a model law for national space legislation.\(^ {107}\) This model law highlights the most important requirements for a national space law.

The ILA’s Model Space Law sets out a scope of application and requires a specific (genuine) link for the law to be considered falling under the space activities of a State. This link could be

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102 Respectively, Law on Licensing of Certain Activities of 8 August 2001 (as amended) and Statute on Licensing of Space Activities of 30 June 2006.
105 CRF §460.45 (Operator informing space flight participant of risk).
106 SPACE Act of 2015, supra note 36.
107 For a full text of the ILA Model Law, “Space Law”, Resolution No. 6/2012 [ILA Model Space Law]. For the explanatory note, see UNCOPUOS, Information on the Activities of International Intergovernmental and Non-governmental Organizations Relating to Space law, UN Doc A/AC.105/C.2/2013/CRP.6, Legal Subcommittee of UNCOPUOS, 52nd Session (26 March 2013).
either the nationality of the natural or the legal person involved carrying out of activities in a certain territory on the national register for ships and aircrafts.\textsuperscript{108} Further, the Model Space Law contains a working definition of what falls under the scope of “space activity”, and provides that this “includes the launch, operation, guidance, and re-entry of space objects into, in and from outer space and other activities essential for the launch, operation, guidance and re-entry of space objects into, in and from outer space”.\textsuperscript{109}

The Model Space Law contains provisions governing the requirements and conditions of licensing,\textsuperscript{110} including the suspension or withdrawal of a license,\textsuperscript{111} and the obligation and procedure to supervise national space activities.\textsuperscript{112} Articles 7 and 8 specifically deal with the protection of the requirement and the requirement to mitigate space debris. Further, there are specific provisions dealing with the transfer of space activity and space assets to another operator,\textsuperscript{113} addressing the issue of registration,\textsuperscript{114} liability,\textsuperscript{115} mandatory insurance\textsuperscript{116} as well as sanctions for the breach of any provisions of the model law.\textsuperscript{117} In line with the requirement for supervision of Article VI of the Outer Space Treaty, Articles 3 and 5 of the Model Law foresee that a respective national authority shall issue license for space activities of national entities and shall supervise them. Article 4 then further enumerates which prerequisites have to be taken into account to make sure that the license applicant will be eligible to carry out the planned activity, for example proof of financial reliability, compliance with the requirements of the treaties on space law national security standards and public safety standards.

The provisions for environmental protection in the Model Space Law are reflective of the obligations under Article IX of the Outer Space Treaty, and requires that an environmental impact assessment before a space activity commences. Article 8 aims at binding States and their national entities to the rules for mitigation of space debris (e.g. by minimizing the potential risks for on-orbit break-ups, and with the post-mission disposal of non-usable space objects prevention of on-orbit collisions in accordance with international space debris mitigation standards) as this question is not regulated in the corpus juris spatialis and only non-binding international instruments thereto exist.\textsuperscript{118}

It is noteworthy to mention that enacting binding rules for space debris mitigation might be the only avenue available today to prevent and to minimize the growing orbital population of space debris. This issue is very pressing as the risks posed by space debris in the most populated orbits are constantly growing and, according to calculations, might hamper space activities and even make them impossible in the course of the next two or three decades.\textsuperscript{119}

\textsuperscript{108} Ibid., art 1.
\textsuperscript{109} Ibid., art 2 (“Space activity”).
\textsuperscript{110} Ibid., arts 3 and 4.
\textsuperscript{111} Ibid., art 6.
\textsuperscript{112} Ibid., art 5.
\textsuperscript{113} Ibid., art 9.
\textsuperscript{114} Ibid., art 10. In line with the provisions on registration of space objects in the Outer Space Treaty and the Registration Convention, the Model Space Law also provides with regulation on the information that has to be provided by the launching entity.
\textsuperscript{115} Ibid., art 11.
\textsuperscript{116} Ibid., art 12.
\textsuperscript{117} Ibid., art 13.
The general liability regime set out in Article VII of the Outer Space Treaty and elaborated in the Liability Convention is concretized by Articles 11 Model Space Law.\textsuperscript{120} A regime for a (limited) recourse by the State from the operator is foreseen. A crucial issue related to the authorization of private activities in space is insurance due to the fact that any space activity entails huge financial risks which must be taken into account. Thereby the operator is obliged by the Model Space Law to take out an insurance covering also damage to third parties.\textsuperscript{121} This gives more ground to States to effectively exercise their right of recourse.

As to dispute settlement, the Model Space Law foresees that disputes should be judged upon the national court system and provides rules for sanctions in case of violations of the obligations set forth by the national law.\textsuperscript{122}

**Conclusion**

Outer space is the final frontier of human activity, and its vital importance to States, commercial space actors, and indeed humanity, as a whole cannot be underlined enough. The economic, strategic, economic and social benefits space activities and space applications is immeasurable for modern society and life that is so dependent on technology. Therefore, the orderly regulation of space activities under clear and concrete rules of law is essential to fulfill the aspiration of States that space can be a realm to foster greater international cooperation, peace and security.

The foundations of international space law in fact already contain obligations to further those objectives. However, there are many unresolved and definitional issues, such as the delimitation of where outer space begins, the precise meaning of the notion of “non-appropriation” and “cooperation”, which continue to trouble jurists to this day. Though these issues remain unsettled, the main corpus of space law, and international space law in general, has been been able to guide and facilitate the peaceful uses of outer space to date. National space laws, including the Model Space Law adopted by the ILA, coupled with the practice of States in their conduct of space activities, continually help to refine and concretize definitions and principles in this growing field of jurisprudence and literature.

\textsuperscript{120} For an overview of the discussion on the Model Space Law, see UNCOPUOS, *Information on the Activities of International Intergovernmental and Non-governmental Organizations Relating to Space Law*, UN Doc A/AC.105/C.2/2013/CRP6 (2013) at 7–8.

\textsuperscript{121} *ILA Model Space Law*, supra note 106, art 12.

\textsuperscript{122} Ibid., art 13.