

# **IISL Directorate of Studies**

## **Background Paper**

**DOES INTERNATIONAL SPACE LAW EITHER PERMIT OR  
PROHIBIT THE TAKING OF RESOURCES IN OUTER SPACE  
AND ON CELESTIAL BODIES, AND HOW IS THIS RELEVANT  
FOR NATIONAL ACTORS? WHAT IS THE CONTEXT, AND  
WHAT ARE THE CONTOURS AND LIMITS OF THIS  
PERMISSION OR PROHIBITION?**



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## **IISL Directorate of Studies Background Paper on the topic:**

### **DOES INTERNATIONAL SPACE LAW EITHER PERMIT OR PROHIBIT THE TAKING OF RESOURCES IN OUTER SPACE AND ON CELESTIAL BODIES, AND HOW IS THIS RELEVANT FOR NATIONAL ACTORS? WHAT IS THE CONTEXT, AND WHAT ARE THE CONTOURS AND LIMITS OF THIS PERMISSION OR PROHIBITION? \***

#### *Introduction*

Our future in outer space is emerging from beyond the horizon. What once were vague and visionary plans are now being firmed up and made concrete. Officials and regulators have put away their science fiction ideas about space ventures and have begun to rationally consider what policies and laws are needed for their respective countries and industries to further explore outer space. Entrepreneurs are meeting with investors and venture capitalists, seeking ways to monetize space activities in ways previously thought too abstract and improbable. Those with the dreams, those with the funds, and those with the technical and administrative “knowhow” are meeting and organizing. Others elsewhere might feel left out, and are suspicious of these plans to “mine outer space” by “planting a flag and claiming ownership” of an asteroid or even a planet. Some say that there will be a new “gold rush” in outer space, and others are wary of these ideas being possible before the laws and regulations are certain and clear.

In response to this growing uncertainty, the International Institute of Space Law (IISL) – the leading international academic institution for space law, first established in 1958 under the International Astronautical Federation (IAF) – has mandated the IISL Directorate of Studies to delve deeper into the question of resource rights in outer space.

A study of the international law applicable to outer space might yield many things. It might say that particular activities are authorized, permitted and regulated. It may say that other activities are explicitly prohibited. It might also be “silent” on the matter, saying essentially nothing directly useful or “on point” to the proposed activity.

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\* This is the concerted effort of the IISL Directorate of Studies under the editorship of Professor Stephan Hobe, Director of the Institute of Air and Space Law, Cologne, assisted by Ms Rada Popova. For some parts, Mr Christopher D. Johnson has as a non-member of the Directorate considerably contributed to the study. The contribution of Professor Mahulena Hofmann is confined to Part II. 2. F (Luxembourg). It should, moreover, be highlighted that specifically named authors take up responsibility for specific parts of the paper as indicated in the Table of contents. The overall coordination and editorship of this joint work has been done by the Head of the Directorate of Studies of the IISL Professor Stephan Hobe, who takes the overall responsibility for this study.

Finding out what the law says can be considered a “positivist” undertaking – where the legal scholar acts as a scientific explorer looking to find a “positive” hit amongst the wide and unwieldy field of legal content, seeking a source of law which is directly “on point” to the activity he or she wants to know about. This present study is the result of this search into the field of international and national law applicable to space activities. The group looked to find what space law has to say regarding the access, use and exploitation of resources in outer space. But this is just the first step. The study also discusses what is the likely impact of enacting national space legislation that allows for the taking of resources, both as a practical industrial and economic matter for space activities, and also in how it will be subsequently received in the legal field.

This study is meant to explain to interested readers (lawyers and non-lawyers alike) the content of space law regarding the use of resources in outer space; in clear and unambiguous terms — but without too much “legalese.” Additionally, this study is meant to impress upon the reader the “reflexive” nature of space activities and space law. It will be investigated whether, if a state passes national legislation permitting asteroid mining, this would have an impact on international law. Is the presumption allowed that national space legislation can not be created without consequences to international space law?

The Outer Space Treaty, and related legal instruments, were written in different geopolitical circumstances. Compared to treaties on other international and global commons (international airspace, the High Seas, and Antarctica), the treaty for outer space is relatively brief, which may explain the use of the wording ‘principles’ in its title. Thus, one of the basic characteristics of the Outer Space Treaty is the relatively general wording of its ‘principles’ – in many cases broad enough to cover even activities with today’s or tomorrow’s space technology, in other cases falling short of this adequate coverage of the future. So, while the treaty covers space activities, it is not exhaustive in its treatment.

The authors of this study invite the reader to reflect on space law and its treatment of resource use. We hope to be able to impart to you the various legal concepts for a broadened understanding of the legal side of outer space activities. Any nuanced and educated interpretation begins with an understanding of a treaty’s place within international law itself. It is hoped that this guide is illuminating in this regard.

## **I. THE GENESIS AND THE CORPUS OF INTERNATIONAL SPACE LAW**

### **1. The Phases of International Space Law Making**

The development of space law, as an area of the law governing activities in outer space, started with the beginning of the space era in the 1950s. Shortly after the launch of the first artificial satellite, Sputnik I on October 4<sup>th</sup> 1957, an *ad hoc* Committee on the Peaceful Uses of Outer Space was set up by the United Nations General Assembly (UN GA) in 1958 to govern the exploration and use of outer space which later became a permanent body of the UN (UNCOPUOS). It currently has 83 state members and is the largest standing committee of the UN.

Between 1967 and 1979, in its framework, five international treaties were adopted:

- Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies (Outer Space Treaty) of 1967<sup>1</sup>
- Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (Rescue Agreement) of 1968<sup>2</sup>
- Convention on International Liability for Damage Caused by Space Objects (Liability Convention) of 1972<sup>3</sup>
- Convention on Registration of Objects Launched into Outer Space (Registration Convention) of 1975<sup>4</sup>
- Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (Moon Agreement) of 1979.<sup>5</sup>

Since the 1980s, while the codification of binding norms was put on hold, other relevant legal instruments were adopted as legally non-binding Resolutions by the UN GA:

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<sup>1</sup> Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (UN GA Resolution 2222 (XXI), annex, adopted on 19 December 1966, opened for signature on 27 January 1967, entered into force on 10 October 1967).

<sup>2</sup> Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (UN GA Resolution 2345 (XXII), annex, adopted on 19 December 1967, opened for signature on 22 April 1968, entered into force on 3 December 1968).

<sup>3</sup> Convention on International Liability for Damage Caused by Space Objects (UN GA Resolution 2777 (XXVI), annex, adopted on 29 November 1971, opened for signature on 29 March 1972, entered into force on 1 September 1972).

<sup>4</sup> Convention on Registration of Objects Launched into Outer Space (UN GA Resolution 3235 (XXIX), annex, adopted on 12 November 1974, opened for signature on 14 January 1975, entered into force on 15 September 1976).

<sup>5</sup> Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, (UN GA Resolution 34/68, annex, adopted on 5 December 1979, opened for signature on 18 December 1979, entered into force on 11 July 1984).

- Principles Governing the use by States of artificial Earth Satellites for International Direct Television Broadcast (UN GA Res. 37/92 of 10 December 1982);
- Principles relating to Remote Sensing of the Earth from Outer Space (UNGA Res. 41/65 of 3 December 1986);
- Principles Relevant to the use of Nuclear Power Sources in Outer Space (UNGA Res. 47/68 of 14 December 1992);
- 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 (UNGA Res. 51/122 of 13 December 1996);
- Resolution 59/115 of 10 December 2004: Application of the Concept of the Launching State;
- Resolution 62/101 of 17 December 2007: Recommendations on Enhancing the Practice of States and International Intergovernmental Organizations in Registering Space Objects;
- Resolution 62/217 of 22 December 2007: Space Debris Mitigation Guidelines of the United Nations Committee of the Peaceful Uses of Outer Space;
- Resolution 68/74 of 11 December 2013: Recommendations on National Legislation Relevant to the peaceful Exploration and Use of Outer Space.

The development of legal instruments governing activities in outer space has not followed a constant pattern. While the five Treaties on space law were adopted in the course of only 12 years, half a century after the coming into force of the Outer Space Treaty (OST), almost 40 years have passed without a new treaty coming into existence. What is more, no draft text of a treaty is on the agenda of UNCOPUOS. Despite the fact that procedural rules for amending or reviewing the treaties are contained within them,<sup>6</sup> no amendments to any of the treaties have been made so far.

It can be observed that after an intensive and successful phase of creating treaty norms until 1979, only non-binding instruments have been adopted. The main reason is the fact that the consensus principle in UNCOPUOS seems not to be effective for creating new binding rules. Furthermore, the scope of space activities has been enlarging since the placement of the first cornerstones in the initial space race between the then Soviet Union and USA as the then only two space powers. Since the 1980s, at the latest since the Ansari X Prize competition in 2004, space activities are increasingly being characterized by commercialization and privatization.

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<sup>6</sup> See Article XV OST, Article 8 Rescue Agreement, Article XXV as well as the review clause in Article XXVI of the Liability Convention, Article IX Registration Convention and Articles 17 and 18 of the Moon Agreement.

Services which were originally governmentally controlled are now being commissioned to private enterprises.<sup>7</sup>

Therefore, the following phases of space law-making can be distinguished:

- The first phase of space law-making commenced soon after the start of Sputnik on Oct. 4<sup>th</sup> 1957, even before the creation of the Legal Subcommittee of UNCOPUOS in 1962, and ended in 1979 with the adoption of the last and least supported of the five treaties on space law, the Moon Agreement.
- The second phase is characterized by the adoption of a number of UNGA Resolutions (1982 – 1992) dealing with specific areas of space activities (television broadcast, remote sensing, nuclear power sources) which were not particularly addressed in the five treaties.
- The third phase started at the end of the Cold War and lasts until today. Newly adopted UN GA Resolutions re-interpret concepts contained in treaty law such as, for example, the notion 'launching state', the meaning of international responsibility for national activities in outer space under Article VI OST and registration practice.

## **2. Relevant Treaties**

Outer space, including the celestial bodies, due to its unique features is subject to a special subset of international law which must adapt to rapid technological developments which are constantly evolving and becoming more complex. The law of outer space can, in some relevant aspects, be compared to other domains of international law governing common spaces, such as the Law of the Sea and the Law of Antarctica as the High Seas, the Deep Seabed and the landmass of Antarctica, like outer space, are all excluded from claims of sovereignty due to their particular natural predispositions.

As shortly outlined above, space law comprises a number of international treaties and resolutions adopted by States under the auspices of the UN.

### **a. The Outer Space Treaty (1967)**

The Outer Space Treaty was the first international space law agreement to be adopted and contains the basic legal principles for space activities. With 104 ratifications and 25 signatories,

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<sup>7</sup> Such is most notably the case with the transport to the ISS for NASA which is being conducted by the private US company SpaceX since NASA retired its Space Shuttle in 2011.

it is one of the international treaties with the largest support.<sup>8</sup> Furthermore, it is considered to contain principles of customary international law which bind not only State parties to the treaty but also non-signatories.<sup>9</sup>

Article I states that there shall be freedom of exploration and use and of scientific investigation. Furthermore, the use and exploration of outer space shall be carried out for the benefit and in the interest of all countries and shall be the “province of all mankind”. Article II forbids the national appropriation of outer space and on celestial bodies and Article III implies that space law is not a self-contained regime as general international law is also applicable to space activities. Article IV prohibits the military uses of outer space (to be understood as all aggressive military uses). Furthermore, according to Articles VI and VII states are to be held internationally responsible for the private activities of their national persons or entities in space and to be internationally liable for damages caused by its space objects. Article VIII then foresees that the states of registry shall retain effective control and enforcement power of their space objects and personnel thereof. The generally formulated and rather programmatic Article IX requires from states to pay due regard to the interest of other states and to be guided by the principles of cooperation and mutual assistance; further, it lays out a general basis for environmental protection of outer space by encouraging states to avoid harmful contamination of the space environment.

#### b. The Liability Convention (1972)

The Convention on International Liability for Damage Caused by Space Objects of 1972<sup>10</sup> builds upon Article VII OST. In its Article I, it provides definitions of the terms “damage” (lit. a), “launching State” (lit. c) and “space object” (lit. d) and regulates how liability is imposed for damages caused by space objects in airspace or on Earth (Article II) as well as in outer space (Article III). It must be noted, though, that the definitions provided in the Convention are not entirely extensive and leave room for further interpretation, especially with regard to the scope of damage.<sup>11</sup> One of the aims of the Convention is to provide victims with a possibility to get compensation as broad as possible. This is ensured by providing a mechanism for presenting claims against the launching state(s) as laid down in Article V, Articles VIII-X and Articles XV *et seq.*

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<sup>8</sup> Number of ratifications as at January 2016; see [http://www.unoosa.org/documents/pdf/spacelaw/treatystatus/AC105\\_C2\\_2016\\_CRP03E.pdf](http://www.unoosa.org/documents/pdf/spacelaw/treatystatus/AC105_C2_2016_CRP03E.pdf).

<sup>9</sup> Such customary norms are considered to be especially Article II, Article III, Article IV, Article V, Article VI, Article VII and Article IX.

<sup>10</sup> *Supra* note 3.

<sup>11</sup> L. J. Smith and A. Kerrest, ‘Article I Liability Convention’, in: S. Hobe, B. Schmidt-Tedd and K.-U. Schrogl (eds), *Cologne Commentary on Space Law*, Vol. II (2013), pp. 105 *et seq.*

As of 2016, the Liability Convention has been invoked only once: in the 1978 Cosmos 954 case<sup>12</sup> when Canada filed a claim pursuant to Article II of the Liability Convention against the USSR. However, the Claims Commission did not get a mandate to decide on the case under the Convention. A payment was provided by the USSR which, however, did not reach the expenses filed for by Canada for the clean-up operation.<sup>13</sup>

c. The Registration Convention (1975)

Although the Registration Convention is not relevant specifically to space mining activities, it provides a general registration framework for all types of space activities. In its Articles II and III, the Registration Convention provides for the establishment of an UN Register for all space objects as well as for national registries in the State parties to the Treaty. Furthermore, in Article IV the single elements of information to be provided by States to the UN Secretary General are enumerated. The importance of the Registration Convention is emphasized by the need for information on registered space mining vehicles, as such activities become practicable, and by the necessity to access information for ongoing mining activities and their current location. However, it must be noted that the orbital parameters to be provided under Article IV para. 1 do not provide for the location of the space object in real-time and do not reflect changes in the original orbital position which will undoubtedly be important elements also for space mining missions and their tracking in terms of space traffic management.

d. The Moon Agreement (1979)

The Agreement Governing the Activities of States on the Moon and Other Celestial Bodies of 1979 has so far been ratified only by 16 States<sup>14</sup> despite the fact that consensus was reached on its contents and adoption. As with the other space treaties which build upon the principles laid down in the OST and develop them in more details, the Moon Agreement takes up on Article IV OST by foreseeing further demilitarization of outer space (Article 3) and further elaborates the principles entailed in Article IX OST by foreseeing measures for preventing adverse changes and harmful contamination in the environment of the Moon and on Earth (Articles 4 and 7).

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<sup>12</sup> For a background overview on the Cosmos 954 accident see: J. A. Burke, Convention on International Liability for Damage Caused by Space Objects: Definition and Determination of Damages After the Cosmos 954 Incident, *Fordham International Law Journal*, Vol. 8 No. 2 (1984), pp. 270-280; the full text of the Claim of Canada against Russia based on the Liability Convention is cited in original text in *International Legal Materials*, Vol. 18, No. 4 (July 1979), pp. 899-930.

<sup>13</sup> The text of the Protocol of 1981 settling the claim of Canada can be found at [http://www.jaxa.jp/library/space\\_law/chapter\\_3/3-2-2-1\\_e.html](http://www.jaxa.jp/library/space_law/chapter_3/3-2-2-1_e.html).

<sup>14</sup> *Supra* note 8.

With regard to space mining activities, Article 11 is one of the legal norms which needs to be looked at in more detail. Its para. 1 declares the Moon and its resources to be the “common heritage of mankind”<sup>15</sup> and para. 3 expressly prohibit the taking of resources *in situ* on the Moon and other celestial bodies. This prohibition should be valid until the international community sets a regime for the exploitation (para. 5). The basic parameters for such regime are laid down in the same Article and include the “orderly and safe development”, the “rational management” and the “equitable sharing” in the benefits of these resources. Thereby, the Moon Agreement is much more restrictive with regard to the exploitation of space resources and provides some more detailed parameters for such activities. However, it is not binding upon non-State Parties and due to the low number of ratifications it is difficult to attribute customary character to its norms.<sup>16</sup> Nonetheless, in the light of Article 31 para. 3 (a) Vienna Convention on the Law of Treaties (VCLT),<sup>17</sup> the Moon Agreement is an expression of subsequent state practice and its provisions can provide clarification in the interpretation of the Outer Space Treaty. It also has to be noted that, unlike the Outer Space Treaty which in a more general way refers to the exploration and ‘use’ of outer space, the Moon Agreement considers specifically the exploitation of space resources. As such exploitation ‘is about to become feasible’ States shall, under Article 11 para. 5, establish an ‘international regime, including appropriate procedures’ for governing such activities.

### **3. The Relevance of United Nations General Assembly Resolutions and Guidelines**

As can be seen in the historical development of the *corpus* of space law, there is a trend of replacing the establishment of internationally binding legal rules with non-binding resolutions, declarations and guidelines.<sup>18</sup> Commercialization and privatization of space activities is the new realm of space use and exploration, and thereby pose questions for the regulation of space and the use of the most densely populated orbits. Problems which need urgent attention are in particular the complex problem of space debris and space traffic management, the issue of attribution of liability and, the need for the inclusion of insurance policies in the existing legislation.

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<sup>15</sup> Although there is no uniform definition of the concept of the “common heritage of mankind”, its general aspects are seen as part of customary international law, see R. Wolfrum, “The Principle of the Common Heritage of Mankind”, ZaÖRV (1983), pp. 335-336.

<sup>16</sup> For the requirements of customary international law see inter alia the International Court of Justice in North Sea Continental Shelf Cases, ICJ Reports 1969, pp. 3 et seq. and in the Nicaragua Case, ICJ Reports 1986, pp. 116 et seq.

<sup>17</sup> Vienna Convention on the Law of Treaties, done 23 May 1969, entered into force 27 January 1980, 1155 UNTS 331, 8 ILM 679 (1969).

<sup>18</sup> See for example, M. Ferrazzani, ‘Soft Law in Space Activities – An Updated View’, in: Marboe, Irmgard (ed), Soft Law in Outer Space: The Function of Non-Binding Norms in International Space Law (2012), pp. 99-102.

Some attempts to regulate these issues can be partly found in national legislation and in some of the non-binding resolutions adopted by the UN GA in the third phase of law-making. Relevant for the issue of mining activities are, for example, the 2007 UNCOPUOS Space Debris Mitigation Guidelines.<sup>19</sup> Although the technical stages and parameters, and thereby the physical outcome of mining in space are not yet entirely clear, it can be anticipated that further space debris will be created in the course of extraction of materials. Thereby, further contamination of space will be most probably be one of the negative impacts of such new activities and will pose questions of space debris remediation and mitigation measures which can, given compliance by States, be addressed by applying the UNCOPUOS Guidelines.

As can be derived from Article 38 of the Statute of the International Court of Justice, treaties and customary law represent fundamental sources of international law. The five treaties on space law provide a solid, but not a perfectly sufficient legal framework for all types of uses of outer space. The existing non-binding resolutions and guidelines as adopted under the auspices of UNCOPUOS and endorsed by the UN General Assembly are, since 1979, the only further development of space law on the international level. The lack of legally binding character of these instruments does not prevent states to abide to them. Such compliance, however, depends on the voluntary action of states and cannot be legally enforced. At the same time, the fact that states reach consensus on the contents of such legal documents is an evidence for the existence of *opinio iuris*.

Customary law comes into existence when *opinio iuris* is coupled with state practice. However, this second element is often difficult to verify. The above sources of law can be used as subsequent state practice which interprets and gives meaning to treaty provisions, *as per* the Article 31 para. 3 (b) of the Vienna Convention on the Law of Treaties.<sup>20</sup> Alternatively, the observance of these guidelines may come, in time, to constitute state practice.

In the *corpus iuris spatialis*, some of the basic notions of space law are not clearly defined and thereby need interpretation. For example, this is the case with the principle of cooperation of Article I OST. The 1996 Space Benefits declaration is an expression of subsequent state practice in the application of this principle and thereby further contributes to the clarification of the exact meaning of this Article.<sup>21</sup> Also, the Resolutions adopted during the third phase of space law-making are examples of how notions entailed in treaties in general terms can be re-

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<sup>19</sup> Space Debris Mitigation Guidelines of the Committee on the Peaceful Uses of Outer Space, adopted by UN GA Resolution 62/217 of 22 December 2007.

<sup>20</sup> Article 31 para. 3 (b) reads: "any subsequent practice in the application of the treaty which establishes the agreement of the parties regarding its interpretation."

<sup>21</sup> S. Hobe and F. Tronchetti, 'Space Benefits Declaration', in: S. Hobe, B. Schmidt-Tedd and K.-U. Schrogl (eds), Cologne Commentary on Space Law, Vol. III (2015), p. 315.

interpreted; thus, clarification of their meaning can be provided by the formulation and adoption of legally non-binding documents.

Therefore, even if resolutions and guidelines adopted by the UN General Assembly do not evolve to customary international law, they may contribute to the interpretation and further development of existing legal concepts, terms and general programmatic principles to grant them a more precise legal meaning and thereby a more stringent applicability.

## **II. THE RELEVANCE OF INTERNATIONAL SPACE LAW FOR NATIONAL POLICY MAKERS**

### **1. Relationship between Public International Law and Domestic Law**

As can be seen from the above Section the body of space law is mostly rooted in public international law. It is therefore pre-eminent to understand what is the relationship of public international law and domestic law. In other words: In this coming section the attempt is made to give an understanding of how much international legal regulation matters for the citizens in the various countries. This verification will be made in three steps: First, this section will present theoretical approaches to the relationship between public international law and domestic law; second, the relevant state practice of certain states with regard to this relationship will be highlighted and then an interpretation of Article VI of the Outer Space Treaty as the basis for national space legislation will be given.

#### **a. The Theoretical Approaches (Monistic and Dualistic Approaches)**

Traditionally, the relationship between domestic law and international law is either explained through the monist theory or, alternatively, through the dualist theory. Whereas we will explain at the beginning the different dimensions and repercussions of each of these theories it may already be said at this point that the relevance of these theories is rather questionable since the concrete relevance of the specific sources of international law within national law very much depends on the specific constitutional order.

Public international law itself does not contain specific norms which explain this relationship in detail. Only Article 27 of the Vienna Convention on the Law of Treaties makes it clear that provisions of state internal law may never be invoked by a party of a treaty “as justification for its failure to perform a treaty”.<sup>22</sup> This makes it clear that from the perspective of public international law, there are two independent legal orders and there is a clear claim of supremacy of public international law over domestic law.

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<sup>22</sup> Article 27 Vienna Convention on the Law of Treaties.

The legal dogmatic has produced two fundamental theories as to the relationship between public international and national law: These are the monist as well as the dualist theory. According to the monist theory, public international law and national law are part of the general universal legal order.<sup>23</sup> Within this legal order some rather classic authors have regarded public international law as the external law of the state. This theory, as inspired by Georg Wilhelm Friedrich Hegel in the early 19<sup>th</sup> century, is contrasted by Hans Kelsen's monist theory<sup>24</sup> according to which public international law enjoys primacy as the original legal order from which all national orders derived their validity.

Dualist theories, however, are based on the premise that public international law and domestic law are autonomous legal orders, which are based on two very different levels.<sup>25</sup> Either public international law or national law would have their own legal bases. We can distinguish here radical dualist approaches that consider international law and domestic law as two circles which never cross. On the other hand, also a theory of limited dualism exists, which seems to be the governing theory today. According to this, then, there are certain linkages between domestic and international law. Here it can be stated that collisions between public international law and national law may take place.

## **b. State Practice**

More important than these theoretical distinctions is the legal practice of the various states. In addition, we must observe that most states do not grant international law priority over their own national constitutions. For example, Article 6 of the US Constitution holds in its second clause that "all treaties made (...) under the authority of the United States, shall be the supreme law of the land". This formulation goes clearly back to the famous Blackstone's Commentaries on the Laws of England, where he stated that "the law of nations... is here adopted in its full extent by the common law, and is held to be a part of the law of the land"<sup>26</sup>. So international treaties entered into by the United States executive branch do enjoy the same quality as Acts of Congress, whereby the younger law enjoys priority over the older law. It is important to note that the international treaties accept the supremacy of the Constitution and may be checked on their constitutionality by the Supreme Court.

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<sup>23</sup> K. Schmalenbach, in: Dörr, Oliver/Schmalenbach, Kirsten (ed), Vienna Convention on the Law of Treaties, A Commentary (2012), pp. 463-464.

<sup>24</sup> H. Kelsen, Principles of International Law, 2nd Edition (1967), p. 562; H. Kelsen, General Theory of Law and State (1945), p. 367; H. Kelsen, Die Einheit von Völkerrecht und staatlichem Recht, ZaöRV (1958), pp. 234-248.

<sup>25</sup> J. Crawford, Public International Law, 8<sup>th</sup> Edition (2012), p. 48.

<sup>26</sup> Blackstone, in: Commentaries on the Laws of England, 13<sup>th</sup> Edition (1809), Volume 4, p. 67.

Moreover, the Russian constitution of 1993 contains Article 79 that reads: “The Russian Federation may participate in inter-state associations and delegates some of its powers to them in accordance with international agreements if this does not restrict human and civil rights or liberties or contravenes the fundamentals of the constitutional system of the Russian Federation.” This supremacy of the Russian Constitution was confirmed by the Russian Supreme Court which held that international law has priority over the laws of the Russian Federation but not over the Russian Constitution, “except maybe for the generally recognized principles of international law, deviation from which is impermissible”, the so-called *jus cogens*.<sup>27</sup>

Also in France the Constitution enjoys clear priority over statutes. Moreover, there is a clear hierarchy as the French Constitution enjoys a higher rank than the international treaties. This was for example explicitly spelled out by the Council of State (Conseil d’Etat), *Sarran, Levacher et autres*, Judgement of 30 October 1998, RFDA 1081-1090.<sup>28</sup>

According to English law which is still ruled by the formula of William Blackstone from this 18<sup>th</sup> Century, “International law is part of the law of the land”. Any adoption of international law into English law often makes it clear where this specific international legal rule finds itself in the ranking of the domestic norm hierarchy. In principle, the supremacy of the English law under this rather monistic approach is firmly established whereby the European Community Act of 1972, which led the UK into the EC and the Human Rights Act of 1998 by incorporating the European Convention on Human Rights (ECHR) into the Law of the United Kingdom for the first time, introduced some brought hierarchy into this constitutional system.

In the German constitutional systems international law treaties have the rank of a Federal Act, which makes it subject to constitutional examination by the Constitutional Court.<sup>29</sup>

The Chinese concept of the relationship of international law and domestic law is primarily guided by the so-called dialectical model, which is borrowed largely from the previous Soviet legal doctrine.<sup>30</sup> According to this perspective, international law and municipal law are separate systems that may supplement each other rather than conflict with each other. It may be interpreted in the sense of differentiating dualism in that states consider their international law perspective from a standpoint of domestic law. The question of norm collision between

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<sup>27</sup> Supreme Court of Russian Federation, decision of 10 November 2003, 25 HRLJ, 108-11, paras. 1 and 8.

<sup>28</sup> Conseil d’Etat, *Sarran, Levacher et autres*, Judgement of 30 October 1998, RFDA 1081-1090.

<sup>29</sup> M. Will, *Völkerrecht und nationales Recht*, JA No 11 (2015), p. 1168.

<sup>30</sup> B. Ahl, *Die Anwendung völkerrechtliche Verträge in China*, in: *Beiträge zu ausländischem öffentlichen Recht und Völkerrecht*, Band 207 (2009), p. 356.

municipal law and international law is flexibly solved by a way of differentiating dualism.<sup>31</sup> Thereby, in general, the rank of a treaty is the same as the rank of the law that has been adopted by the state organ participating in the treaty making process. Insofar this interpretation does not deviate very much from the previous approaches of other major countries.

As a preliminary result, we can thus state that all constitutions under review show a growing awareness for public international law and public legal international obligations. However, if it comes to the ranking of international treaties it is clear that they all are ranked below the constitution as an act of federal law for most countries. For example, as to the applicability of international law, the United States system allows the entering into international agreements that are domestically categorized as treaty or executive agreement. If these agreements are formally entered into in an appropriate way, they can provide law in the United States under two conditions: Firstly, they must be self-executing, that means that further decisions by the party to the treaty must not be necessary in order to carry out the requirement. Moreover, the respective treaty or executive agreement must not violate norms of the constitution of the United States. If these two requirements are met, this particular treaty is recognized as the law of the United States.

**c. Article VI of the Outer Space Treaty as the Basis for National Licensing Regimes  
– a Necessary Prerequisite for any Commercial Activities in Space**

The Outer Space Treaty of 1967 holds in its Article VI, sentence 2 that “the activities of non-governmental entities in outer space, including the Moon and other celestial bodies, shall require authorization and continuing supervision by the appropriate state party to the treaty.” This is an international legal obligation incumbent upon such countries that have ratified the Outer Space Treaty. It is a question on whether this obligation of providing specific national legislation for the regulation of authorization and continuing supervision comes into existence immediately upon ratification of the Outer Space Treaty or at a later point. In principle, this obligation needs to be activated only at a time when a state becomes “the appropriate state party to the treaty”. The Outer Space Treaty thus leaves it open to determine exactly which state needs to enact specific legislation. However, the denomination as appropriate state party makes it clear that such states are under particular scrutiny with regard to this obligation, which may have a particular responsibility for such national activities in outer space. Such countries are naturally the ones that qualify to become a launching state, encountering liability under Article II and III of the Liability Convention or Article VII of the Outer Space Treaty. A launching state is a state which launches, procures the launch, and from whose territory or facility the space object is

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<sup>31</sup> *Ibid.*

launched to outer space. Whenever a state qualifies as launching state in combination with a private space activity it is under an obligation to have respective national legislation in place that regulate questions of authorization and supervision according to a specific standard.

**d. Summary: The relevance of international space law for national policy makers**

Most domestic legal orders follow a dualistic model and prioritize domestic constitutional law. According to this model national constitutional law determines the rank of international treaties in the domestic legal order. In most countries international treaties have a rank like statutory law, and thus below the constitution. In this respect, it is important to see that an obligation to enact national space legislation as contained in Article VI Outer Space Treaty is an incomplete obligation as long as countries are not considered to be “launching states”. If they are “launching states”, however, they are under such obligation.

**2. Some Examples of National Space Laws**

**a. United States of America**

The US is a party to the 1967 Outer Space Treaty and three of the subsequent treaties promulgated by UNCOPUOS. However, the USA is not a party to the 1979 Moon Agreement. Incentivized by the duty in the Outer Space Treaty to oversee national activities, the US has a very developed and comprehensive body of national space legislation, largely consolidated into Title 51 of the United States Code (USC) entitled “National and Commercial Space Programs.”

US national space legislation regulates activities including satellite telecommunications, export controls, private launch services, spaceports and earth observation. Organizationally, US governmental regulation and activities in space are divided between various agencies: The Department of State, the Department of Transportation (housing the Federal Aviation Administration), the Department of Commerce (housing the National Oceanic and Atmospheric Administration), the Department of Defense, and NASA the civil space agency. The US has regulated domestic commercial space launch activities since 1984, giving regulatory oversight to the FAA. In anticipation of resource use in outer space, the USA is actively developing a regulatory regime that it sees as conducive to the peaceful and orderly use and exploitation of celestial resources.

On 25 November 2015, US President Barack Obama signed into law the US Commercial Space Launch Competitiveness Act. Part IV of the Act, the Space Resource Exploration and Utilization Act of 2015, defines both asteroid resources and space resources, the former a subset of the latter. For the purposes of the act, a *Space Resource* is defined as an “abiotic resource in situ in

outer space”, and includes water and minerals. Concurrently, an *Asteroid Resource* “means a space resource found on or within a single asteroid.” (§51301. Definitions).

The Act directs the executive branch to facilitate commercial exploration for and commercial recover of space resources by US citizens, and to “discourage governmental barriers to the development in the United States of economically viable, safe, and stable industries for commercial exploration for and commercial recover of space resources in manners consistent with the international obligations of the United States.” It also instructs the executive branch to promote the rights of US citizens to engage in commercial exploration for and commercial recovery of space resources free of harmful interference, in accordance with the USA’s international obligations, and subject to the US’s authorization and continuing supervision. (§51302. Commercial exploration and commercial recovery).

Notably, the Act creates both rights to acquire, possess and deal in space resources. It states “A United States citizen engaged in commercial recovery of an asteroid resource or a space resource under this chapter 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 in accordance with applicable law, including the international obligations of the United States.” (§51303. Asteroid resource and space resource rights). Additionally, the Act contains a disclaimer of extraterritorial sovereignty, stating “[i]t is the sense of Congress that by the enactment of this Act, the United States does not thereby assert sovereignty or sovereign or exclusive rights or jurisdiction over, or the ownership of, any celestial body.”

Upon entry into force, it directs the President to submit to Congress, within 180 days, a report that specifies the authorities necessary to meet the international obligations of the US, including governmental authorization and continuing supervision, as well as recommendations for the allocation of responsibilities among US agencies to fulfill those oversight obligations.” (§51302. (b) Report).

What can be made of this law? For one, it explicitly states its intention to comply with international law, striking a balance between the freedoms to access, explore, and use outer space as contained in Article I OST with the prohibition against national appropriation contained in Article II. However, an intention or opinion enshrined by national law to not violate international law does not affect whether that national law is actually violating international law. Weighing against this, in turn, is the understanding that elaborating the rights and freedoms of the OST is the sovereign purview of states parties to the treaty, and that the US has merely interpreted and applied its rights and obligations on a national level as it understands them.

Whether or not national legislators or regulators acknowledge it, national legislative and regulatory action may constitute US state practice on these matters.

Much may depend on the actual implementation of the US's domestic regime over the use of celestial resources. On balance, if US commercial users are or appear too rapacious or unmanaged, or out of step with the other obligations in the Treaty, including obligations that activities be "without discrimination of any kind," "in accordance with international law," "guided by the principle of cooperation and mutual assistance," and others (as discussed *infra* at III), then international opprobrium may arise. However, other States planning similar regimes may refrain from pleading that commercial resource use is actually violative of space law.

On the national level, oversight for commercial use requires deciding which agency will be licensing and authorizing celestial resource use. This also will constitute state practice as to how States implement the government authorization and supervision of non-governmental entities role as mandated by Article VI of the Outer Space Treaty.

#### **b. Russia**

The modern Russian legislation in the area of exploration and exploitation of outer space, the basis of which being the 1993 Law of the Russian Federation on Space Activities,<sup>32</sup> does not provide any specific regulation of resource mining in outer space. At the same time, the existing definition of space activities given in Article 2(1) of the above Law states that "space activities shall imply any activities connected with direct operations on the exploration and exploitation of outer space, including the Moon and other celestial bodies". This formula is quite broad, especially that the list of the main directions of space activities is not exhaustive and may include "other activities performed with the use of spacecraft" (Article 2(2) *ibid.*).

It is interesting that space resource mining is mentioned in one of the key political documents of Russia in the area of space activities – the Keystones of State Policy of the Russian Federation in the Area of Space Activities for the Period till 2030 and with a Further Perspective.<sup>33</sup> The document in its Clause 5(c) proclaims that "state interests of the Russian Federation in the area of space activities shall be as follows, *inter alia* <...> obtaining scientific data on space, Earth and other celestial bodies for the utilization of extra-terrestrial resources".

Following the above provisions, one could conclude that in principle the current space law and policy of the Russian Federation does not expressly forbid resource mining beyond the Earth. However, the question is how to interpret the norms mentioned above in full conformity with

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<sup>32</sup> Law No. 5663-I, adopted on 20 August 1993, last amended on 13 July 2015 [*Law on Space Activities*]. – The Russian Gazette, No. 186, 6 October 1993.

<sup>33</sup> Document No. Pr-906, approved by the President of the Russian Federation on 19 April 2013.

the established legal traditions of Russia. First and foremost, it should be always remembered that, according to Article 15(4) of the 1993 Constitution of the Russian Federation,<sup>34</sup> one of the fundamental legal principles in this country is primacy of international law over national law, which reads as follows:

*“The commonly recognized principles and norms of international law and treaties of the Russian Federation are a component part of its legal system. If a treaty of the Russian Federation sets forth rules other than prescribed by national law, the rules of the treaty shall apply”.*

This constitutional principle is fully applicable to international space law as a branch of the general international law,<sup>35</sup> which means that the fundamental international space law principles and provisions of the 1967 Outer Space Treaty<sup>36</sup> and other space treaties, to which Russia is a party,<sup>37</sup> have a predominant legal force in respect of the national space legislation. Thus, the freedom of exploration and use of outer space for peaceful purposes for the benefit and in the interests of all countries, without discrimination of any kind, on a basis of equality and in accordance with international law, and all the other fundamentals of space law are applicable to national space operations. The 1993 Law on Space Activities confirms this conclusion by stating that:

*“The area of space activities is regulated in accordance with the Constitution of the Russian Federation, generally recognized principles and provisions of international law and international agreements of the Russian Federation, the present Law, other federal laws and other regulatory acts of the Russian Federation”<sup>38</sup>*

in its Article 1 and further in Article 4 listing the principles of space activities which fully correspond to those declared by the Outer Space Treaty.

Special attention is given to the obligation which the Russian Federation undertook under Article II of the Outer Space Treaty, namely:

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<sup>34</sup> Adopted by referendum on 12 December 1993, last amended on 21 July 2014. – The Russian Gazette, No. 237, 25 December 1993.

<sup>35</sup> See, for example: International Law: A Treatise (5<sup>th</sup> edition) / Edited by S.A. Egorov. Moscow, Diplomatic Academy of the Russian Federation (2014), p. 359.

<sup>36</sup> See *supra* note 1.

<sup>37</sup> The Russian Federation signed and ratified four out of five fundamental space treaties: the 1967 Outer Space Treaty, the 1968 Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, the 1972 Convention on International Liability for Damage Caused by Space Objects, and the 1975 Convention on Registration of Objects Launched into Outer Space.

<sup>38</sup> Italics added. – O.V.

*“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”.*

The use of the definition “national” in the above provision implies that such appropriation would be in the framework of *national activities* in outer space which in their turn are a subject of international responsibility of respective states in accordance with Article VI of the Outer Space Treaty. Due to the fact that national activities in outer space can be carried on both by governmental agencies and by non-governmental entities,<sup>39</sup> the space law doctrine in Russia<sup>40</sup> strongly supports the view that the prohibition of national appropriation of outer space, including the moon and other celestial bodies, is equally relevant to all non-governmental (private) entities, both legal and physical.

It should be added that despite the absence of an explicit legal definition of a celestial body (either in international space law or national legislation on space activities in Russia), it is assumed in practice that any reference to a celestial body implies the body as a whole, including its surface and all the substance (subsoil, depths) below the surface, unless specifically mentioned otherwise.

Thus, the principal approach to the exploitation of space resources remains traditional:

1) such activity can become a reality only if exercised through a wide international cooperation;

2) adherence to the basic international space law principles is essential;

3) practical exploitation of extra-terrestrial resources objectively requires a respective detailed and internationally accepted legal regime, as rightfully mentioned in Article 11 of the 1979 Moon Agreement,<sup>41</sup> in order to ensure a balance between the interests of the private sector eager to exploit new opportunities and gain profit, and the Government bound by its international obligations, including full responsibility for national space activities.

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<sup>39</sup> Further in Article VI of the Outer Space Treaty.

<sup>40</sup> See, for example: Gennady P. Zhukov, *International Space Law and the Challenges of the XXI Century. To the 50<sup>th</sup> Anniversary of the flight by Yuri Gagarin in outer space*. Moscow: RUDN, 2011, pp. 46-47.

<sup>41</sup> *Supra* note 5.

### c. China

In the current Chinese legal system, there are no specific laws or policies concerning taking of resources in outer space and on celestial bodies. With the development of the commercial use of outer space, the current Chinese regulation and policy system can provide legal sources for regulating the taking of resources in outer space and on celestial bodies. However, the system is not effective enough in promoting the taking of resources in outer space and on celestial bodies.

#### a) Introduction to the current space laws and regulations in China

Currently, there are no statutory laws or administrative regulations in China in terms of space legislation. Regarding civil space legislation, the Commission of Science, Technology and Industry for National Defense (thereafter COSTIND)<sup>42</sup> and the Ministry of Foreign Affairs jointly issued the *Measures for the Administration of Registration of Space Objects* on 8 February 2001. After that, COSTIND issued the *Interim Measures on the Administration of Licensing the Project of Launching Civil Space Objects* and the *Procedures for Examining and Licensing the Project of Launching Civil Space Objects* on 21 November 2002.

With regard to military space legislation, the State Council and the Central Military Commission jointly issued the *Regulations of the People's Republic of China Governing Export Control of Military Goods* on 22 October 1997, which is relevant to the export of military space products. Moreover, the State Council issued the *Regulation of the People's Republic of China on Controlling the Export of Guided Missiles* and the *List of Related Items and Technologies Subject to Export Control* in 22 August 2002.

Space policy in China mainly includes three White Papers on China's Space Activities,<sup>43</sup> two Five Years Plans for Space Development<sup>44</sup> and certain policy documents regarding lunar exploration project, satellite navigation, space infrastructure and so on. Such as the *National Civil Space Infrastructure and Long-term Development Plan (2015-2025)*.<sup>45</sup>

Furthermore, there is a rather mature policy system regarding space debris mitigation, mainly consisting of the *Space Debris Action Plan (2006-2010)*, the *Standard System Table of Science, Technology and Industry for National Defense*, the *Space Debris Mitigation Requirements*, the *System Table of the Space Debris Standards Framework*, and the *Interim Measures on the*

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<sup>42</sup> According to *The Scheme of Governmental Organization Reform of State Council* in 2008, State Administration of Science, Technology and Industry for National Defense (thereafter SASTIND) was established, the most functions of COSTIND have been transformed to SASTIND.

<sup>43</sup> The three White Papers include AEROSAPCE China 2001, China's Space Activities in 2006 and 2011.

<sup>44</sup> The two five years plans include the *11th and 12nd Five Year Plan for Space Development* issued by COSTIND.

<sup>45</sup> It was issued by National Development and Reform Commission, Ministry of Finance and SASTIND.

*Administration of Space Debris Mitigation and Prevention* issued by the Space Administration of Science, Technology and Industry for National Defense in 2009.

From the above, it is clear that there is still no comprehensive space legislation in China. The current space legislative level is quite low, and there is a lack of legislation on promoting the commercial development of outer space activities and space intellectual property protection. However, the space industry development policy has been established in China, and there has been a well-established space debris mitigation and prevention regulation mechanism.

b) Rules and policies concerning the taking of resources in outer space and on celestial bodies

The Rules and policies in China concerning the taking of resources in outer space and on celestial bodies mainly include:

- Space objects that are launched for the purpose of taking of resources in outer space and on celestial bodies must be registered. According to relevant provisions in *Measures for the Administration of Registration of Space Objects*, China carries out the system of registering space objects, and all government departments, juridical persons, other organizations and natural persons which launch or procure the launching of a space object shall have the obligation to register the space object.<sup>46</sup> The SASTIND takes charge of the administration of national registration of space objects.<sup>47</sup> The registration rules apply to all the space objects launched in the territory of China, and the space objects jointly launched abroad by China and other States.<sup>48</sup> The registration information in the National Register mainly includes: registration number, registrant, owner of the space object, an appropriate designator of the space object, basic characters of the space object, launching enterprise of the space object, name of the launch vehicle, date and territory or location of launch, basic orbital parameters of the space object, and the status of the launching and orbiting of the space object.<sup>49</sup> International registration information mainly includes: name of launching State or States, an appropriate designator of the space object or its registration number, date and territory or location of launch, basic orbital parameters and general function of the space object.<sup>50</sup>

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<sup>46</sup> Article 4, *Measures for the Administration of Registration of Space Objects*.

<sup>47</sup> This administrative body is transformed from the former Commission of Science, Technology and Industry for National Defense.

<sup>48</sup> Article 3, *Measures for the Administration of Registration of Space Objects*.

<sup>49</sup> Article 6, *Measures for the Administration of Registration of Space Objects*.

<sup>50</sup> Article 13, *Measures for the Administration of Registration of Space Objects*.

- Launch activities for the purpose of taking of resources in outer space and on celestial bodies must be licensed. According to relevant provisions in the *Interim Measures on the Administration of Licensing the Project of Launching Civil Space Objects*, any persons, natural or juridical, or organizations undertaking a launch project shall apply for examination and approval, and shall not carry out the project until it is found to be qualified upon examination and has obtained a license for the project. The general project contractor shall be the applicant for a license. Where there is no domestic general project contractor, the final owner of the satellite or other spacecraft shall be the applicant for the license. The applicant shall submit the application nine months prior to the scheduled launch of the project. For a project being executed in a foreign launching site, the licensee shall file the application sixty days prior to the scheduled date for launch. Launch activities taking of resources in outer space and on celestial bodies must conform to some basic conditions, such as: not to endanger national security; damage national interests; or violate national diplomatic policies or international conventions to which China is a State Party; or cause irremediable danger to public health, safety, or properties due to major negligence or intentional acts; a licensee must insure himself against liability incurred in respect to damage or loss suffered by third parties and against other liability incurred by launching a space object.
- Space activities involving the taking of resources in outer space and on celestial bodies must observe space debris mitigation measures. According to the *Interim Measures on the Administration of Space Debris Mitigation and Prevention* issued by the SASTIND in 2009, the design, production, launching, orbiting, re-orbiting of space objects taking resources in outer space and on celestial bodies must follow measures to monitor, warn, mitigate and prevent space debris. This obligation is not limited to the users and manufacturers of the space projects.
- Specific policies concerning lunar resources exploration and development. China has announced that the data resource obtained from lunar exploration and development will be made accessible worldwide. The data and data products from lunar orbiting will be published after the exclusive use period, which is one year after the successful lunar orbiting by a satellite. The data will be exclusively used by the project manufacturer and the Experts Committee for Lunar Exploration Project. Meanwhile, China is going to collect lunar resource samples. The White Papers on China's Space Activities in 2006 and 2011 have both made it clear that, based on the idea of "three steps" orbiting, landing and returning for continuing lunar probe projects, China will launch orbiters for lunar soft landing, roving and surveying to implement the second stage of lunar exploration. In

the third stage, China will start to conduct sampling the moon's surface matters and get those samples back to Earth.

#### **d. Brazil**

Despite its ambitious national space program, envisaged as early as the 1960s, Brazil still awaits the approval of proper domestic legislation regarding national space activities, including regulation on space resources. Indeed, a comprehensive federal law covering all aspects of governmental or non-governmental space activities undertaken not only in Brazil, but also by Brazilians abroad, must be positively advised.

As far as national space activities are concerned, Brazil, during the last decades, has contracted launch services for many satellites and even for the passage of an astronaut into outer space. Additionally, the Federal Government has developed launching facilities in Brazilian territory, strategically located near the Equatorial line. A relevant number of space objects were designed and assembled in Brazil, in whole or in part, often through joint missions contracted with other spacefaring nations, and Brazilian scientists are in the process of developing a national launching vehicle to finally assure autonomous access to outer space. The current National Program for Space Activities (“Programa Nacional de Atividades Espaciais, PNAE”), applicable to the 2012/2021 period, focuses on initiatives regarding geostationary and remote sensing satellites, and advocates the further development of the national space industry. Such bold objectives contrast with the vague applicable legal framework, denouncing that the Brazilian space legislation is still in its infancy.

In accordance with the Brazilian Constitution of 1988, Article 22, X, aerospace navigation shall be subject to exclusive federal legal jurisdiction, since it is considered a matter which is national in scope. Nevertheless, the regulatory structure remains, up to this moment, largely limited and insufficient. As far as federal laws are concerned, only those creating and constituting governmental bodies, such as the Brazilian Space Agency (“Agência Espacial Brasileira – AEB”),<sup>51</sup> in 1994, and the National System of Space Activities (“Sistema Nacional de Atividades Espaciais – SINDAE”), in 1996, are worthy of mentioning.<sup>52</sup> It is relevant to acknowledge that the AEB is responsible for developing the national space program, being a federal autonomous organization, subordinated to the Brazilian Presidency, with headquarters in the nation’s capital, Brasília.

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<sup>51</sup> Law no. 8.854 of 10 February 1994.

<sup>52</sup> Law no. 1953 of 10 July 1996.

Besides the referred documents, one should also acknowledge the AEB Administrative Edicts 27/2001<sup>53</sup> and 5/2002<sup>54</sup>, regulating, respectively, licensing and authorization of private launch activities on the Brazilian territory. Those edicts, actually, do not occupy a prime position that could be desired in the national legislation “pyramid of norms”; nevertheless, they are enforceable and do provide rights and obligations as long as no conflicts with superior norms are identified.

Regarding the most important international treaties on space law, celebrated under the auspices of the United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS), it is important to remark that Brazil is part of only four of them, i.e., the Outer Space Treaty, of 1967, the Rescue Agreement, of 1968, the Liability Convention, of 1972, and the Registration Convention, of 1974. Up to this moment, Brazil has not yet adhered to the 1979 Moon Agreement, of distinctive relevance to this study. Such situation may eventually change in the future, due to political and strategic considerations, but it remains clear that, up to this moment, Brazil is not party to the international regime provided by the 1979 convention.

In the eventuality of Brazil being somehow involved in space resources activities, *per se* or as part of a joint, multinational initiative, relevant questions would certainly present themselves, involving the domestic mining legal framework. Indeed, the Brazilian legislation solely provides about mining licenses vis-à-vis the exploitation of the national territory, with the Federal Constitution donating a clear concern in relation to the environmental impact of such activities (Article 225, para. 2).

Since Brazil respects the Outer Space Treaty principle of non-appropriation of celestial bodies by States, any space resources activities, including potential mining licenses to be granted to non-governmental entities, would require additional domestic legislation to be perfected, in order to assure legal certainty to all the parties involved.

#### **e. Japan**

As of March 2016, no space activities act which has licensing systems exists in Japan while two space activities bills were approved at the cabinet meeting and therefore, submitted to the Diet, Japanese Parliament, on 4 March 2016.<sup>55</sup> It is expected that these two bills, one on the launch and operation of satellites, the other on the distribution of remote sensing data would have been

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<sup>53</sup> Regulation AEB 27 of 20 June 2001.

<sup>54</sup> Regulation AEB 5 of 21 February 2002.

<sup>55</sup> <http://www.kantei.go.jp/jp/kakugi/2016/kakugi-2016030401.html> (Decisions at the regular cabinet meeting, 4 March 2016 (in Japanese) (last accessed 14 March 2016). In Japan, either Cabinet or members of Parliaments (House of Representatives and House of Counsellors) can submit a bill to the Diet. Art. 72, The Constitution of Japan (1946); Article 56, the Diet Act (1947 as amended) Act No. 79).

voted into full-fledged acts within a year.<sup>56</sup> Should the former be made into an act, it is not possible to regulate the resource taking in outer space, at least not in an appropriate manner as such undertaking is outside the scope of the bill.

The only national space law, except that of establishing a space agency is the 2008 Basic Space Act.<sup>57</sup> Although this act plays an important role in restructuring organizational frameworks in space development, making comprehensive space policies and promoting commercial utilization of space, it is not a kind of national space law recommended by the 2013 General Assembly Resolution<sup>58</sup> without the function of “authorization and continuing supervision”. Under the circumstances, the below is the brief explanation of the Japanese domestic laws which regulate - or more precisely, do not regulate - the commercial resource mining/taking in outer space.

Granting that a private person with Japanese nationality plans to take resources in outer space, the first thing they have to do is to find whether it is a lawful use of outer space. Treaties as the legally-binding instruments are regarded as the “established laws of nations” under the Constitution of Japan<sup>59</sup> with or without the corresponding national laws. Thus, the interpretation of Article 2 of the OST directly affects the lawfulness of private resource mining in outer space. Currently, there is no authoritative interpretation in this regard by the Treaties Division, the International Legal Affairs Bureau of the Ministry of Foreign Affairs (MOFA) in Japan. If the MOFA, on behalf of the Japanese Government, interprets it is against a treaty obligation, then such a private person is likely to be rejected to procure a launch to place a space probe into outer space to take resources from the Japanese territory. However, the fact that the OST will not probably be judged as self-executing seems to weaken the governmental position if a rejected person files a complaint to the court, for the direct application of a treaty addressing a case is not allowed unless such a treaty is regarded as self-executing. Should the government find that the resource taking is against the Outer Space Treaty, and a private person tries to engage in this business, there is a likelihood that an act to prohibit a private undertaking in this regard will be adopted. Even if such an act is promulgated, a private Japanese person can yet launch its own probe from outside Japan if a license/authorization to do so is granted, for extra-territorial application of Japanese law is possible only to certain limited cases.

If the government finds that resource taking in outer space is not the violation of the treaty obligation, then a person can procure launch from the Japanese launch site. In that case, he/she

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<sup>56</sup> The formal title translated into English is: “Bill on the launch of satellites and the control of satellites” (bill no. 41 of the 190<sup>th</sup> Diet) and “Bill to ensure the appropriate treatment of records obtained from remote sensing satellites” (Bill No. 42 of the 190<sup>th</sup> Diet).

<sup>57</sup> Basic Space Act (29 May 2008), Act No. 43.

<sup>58</sup> Recommendations on national legislation relevant to the peaceful exploration and use of outer space /RES/68/74 (11 December 2013).

<sup>59</sup> Article 98 of the Constitution of Japan.

shall get an authorization from Ministry of Internal Affairs and Communications (MIC) under the Radio Act.<sup>60</sup> If the probe is planned to be launched from abroad, then the payload for exploiting resources in space is likely to be asked to obtain an export license pursuant to the Foreign Exchange and Foreign Trade Act (FEFTA),<sup>61</sup> comprehensive export control act of Japan, as items with such capability must be listed in Category 9 (aerospace and propulsion) and Munitions List 11 (spacecraft above a certain threshold) of the Wassenaar Arrangement (WA) of which Japan is a member.<sup>62</sup> (FEFTA reflects the guidelines of WA and other export control regimes.) Most probably, such payload will be the subject of re-export control of the US AECA/ITAR as well.

#### **f. Luxembourg**

Luxembourg is State Party to the 1967 Outer Space Treaty<sup>63</sup> and the 1972 Liability Convention<sup>64</sup>, and signatory to the 1968 Rescue Agreement<sup>65</sup>. According to Article VI of the Outer Space Treaty, each State Party is obliged to authorize and supervise national activities in outer space. Presently, the authorization and supervision of space activities of Luxembourg takes place on the basis of the 1991 Law on Electronic Media (as amended)<sup>66</sup> which states that “no one can establish a Luxembourgish satellite system” without having first obtained a concession (Article 20 para. 1). The concession is granted by the Government, on the proposal of the Minister responsible for telecommunication and media. According to Article 20 para. 3 of this law, a book of obligations must be attached to every concession. One or more Government commissioners are monitoring the activities of the “concessionaire” (Article 20 para. 7).

In February 2016, Luxembourg has announced its interest to explore the potential use of space resources, in coordination and collaboration with other nations, the scientific community, as well as commercial partners. Because the Law on Electronic Media enables to authorize only “Luxembourgish satellite systems”, a “Draft Law on the Exploration and Use of Space Resources” has been elaborated by the Government and presented on 14 November 2016 to the Parliament. This Draft legislation is composed of 17 Articles.

According to Article 1 of the Draft, space resources are capable of being appropriated in accordance with international law. Article 2 – 13 deal with the process of authorization of the missions of exploration and use of space resources for commercial purposes:

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<sup>60</sup> Articles 4, 6(1) (2) of the Radio Act (2 May 1950 as amended), Act No. 131.

<sup>61</sup> Esp. Arts. 25 & 48 of the FEFTA (1 December 1949 as amended), Act No. 228.

<sup>62</sup> List of Dual-Use Goods and Technologies and Munitions List, WA-LIST (15) I (3 December 2015).

<sup>63</sup> Ratified by Luxembourg in 2005 by Law of 31 July 2005.

<sup>64</sup> Ratified by Luxembourg in 1983 by Law of 9 June 1983.

<sup>65</sup> Signed by Luxembourg on 14 August 1968.

<sup>66</sup> Law on Electronic Media of 27 July 1991, accessible at <http://www.legilux.public.lu/leg/a/archives/2010/0241/a241.pdf>.

No one may explore or use space resources without holding a written authorisation of the mission by the minister or ministers in charge of economy and space activities. Performing a mission without any authorisation can be punished by a term of imprisonment of between eight days and five years and a fine of between 5000 and 1.250.000 Euros (Article 17).

The applicants must be legal persons incorporated under the law of Luxembourg and established in the form of a société anonyme or a société en commandite par actions (Article 4). The applicants must have robust internal governance arrangements, including a clear organisational structure (Article 7). The authorization is granted on the basis of information communicated by the operator, including the evidence of an insurance policy or other comparable guarantee to cover the risks related to the mission (Article 10). The authorization shall be accompanied by the book of obligations which specifies the manner in which the applicant meets the conditions of the authorisation (Article 12). According to Article 15 of the Draft, the operators are fully responsible for any damage caused at the occasion of the mission, including preparatory works and duties.

The supervision of the missions shall be performed by the ministers in charge of economy and space activities who may be assisted by one or several government commissioners (Article 14). The right of the Government to inspect the activities of the applicant can be defined in the book of obligations (Article 12).

The authorisation may be withdrawn if the conditions for its granting are not longer met, the applicant does not make use of the authorisation within 36 months, or the authorisation was obtained through irregular means (Article 13). The violation of the conditions of the authorisation can be sanctioned both by imprisonment up to one year and fines up to 500.000 Euros. If an operation would be contrary to the law, a court might declare its discontinuance (Article 17).

The specialized Draft Law on the Exploration and Use of Space Resources is part of a larger reform of space legislation of Luxembourg. In parallel to this Draft, legislation is under preparation which generally implements Article VI of the 1967 Outer Space Treaty and regulates the authorisation and supervision of space activities performed under the jurisdiction of Luxembourg. In addition, this planned legislation shall transpose the 1975 Registration Convention into the national law of Luxembourg.

### III. THE BASIC POINTS OF INTERNATIONAL SPACE LAWS WITH REGARD TO RESOURCE MINING

#### 1. Articles I and II of the Outer Space Treaty

The 1967 Outer Space Treaty is the principal international legal instrument regulating the activities of states in the exploration and use of outer space. As of 2016, 104 sovereign states, including the most important space-faring states, have ratified the treaty<sup>67</sup> and thereby accepted the rights and obligations it creates. Additionally, many of its provisions are considered to be so widely observed and regarded as binding that they have passed into the realm of “customary” international law, and are thus binding on all states (including those that are not parties to the treaty).<sup>68</sup>

The first article of the Outer Space Treaty establishes an all-important pillar of international space law. It enshrines the right, held by all states, to access, use, and explore outer space, including the Moon and other celestial bodies. It reads:

1. *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 economic or scientific development, and shall be the province of all mankind.*
2. *Outer space, including the Moon and other celestial bodies, shall be free for exploration and use by all States without discrimination of any kind, on a basis of equality and in accordance with international law, and there shall be free access to all areas of celestial bodies.*
3. *There shall be freedom of scientific investigation in outer space, including the Moon and other celestial bodies, and States shall facilitate and encourage international co-operation in such investigation.*<sup>69</sup>

It follows from this Article that the “freedom of use and exploration” by all states is guaranteed. This right is not only retained by states, but also by their citizens, which means that not only governmental but also private activities are allowed. This follows, among others, from Article VI of the Outer Space Treaty, as will be further discussed below. Even though there are some conditions mentioned in connection with that right, such as non-discrimination and the benefit and interest of all countries, the ‘freedoms’ represent a core aspect in the discussion of the legal principles governing space activities.

Article II of the Outer Space Treaty is another important basis in that context, a brief single sentence of merely thirty words, which contains the “non-appropriation-principle”. It reads:

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<sup>67</sup> See *supra* note 8.

<sup>68</sup> See F. Lyall and P. Larsen, *Space Law: A Treatise*, Ashgate (2009), pp. 70-80.

<sup>69</sup> Article I Outer Space Treaty.

*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.*<sup>70</sup>

The article is prohibitive in nature, reflecting a limitation to the freedoms placed upon states, which means restricting them from undertaking a particular action, namely “national appropriation”. Drafted in the 1960s, during the rapid decolonization following the postwar period, the drafters of the Outer Space Treaty did not want to open the door to a new era of colonialism in space, with space-capable states asserting territorial claims by planting flags on celestial bodies.<sup>71</sup>

Limitations to the treaties are obligations placed upon states requiring them to refrain from undertaking certain action. As such, they represent restraints upon state power and freedom. However, these negative obligations are included in treaties because states believe that binding themselves to refrain from undertaking these actions is in their long-term best interests. This includes preserving international peace and security, protecting the environment, having a clear and stable international legal order, and preserving the safety and dignity of human populations.

One could believe that the first article of a treaty is more important or overrules later articles. This is not the case however, as the entire treaty must be interpreted in a way that works together to form a coherent regulatory whole. The rules of treaty interpretation are enshrined in the 1969 Vienna Convention on the Law of Treaties and will be explored and applied in detail further below.

## **2. Treaty Interpretation According to Articles 31-33 VCLT**

As the Outer Space Treaty is an international treaty governed by public international law, its provisions have to be interpreted in accordance with the rules of treaty interpretation enshrined in Articles 31 to 33 of the Vienna Convention on the Law of Treaties.<sup>72</sup> Article 31 of the VCLT reads:

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<sup>70</sup> Article II Outer Space Treaty.

<sup>71</sup> For a detailed analysis see: S. Freeland and R. Jakhu, ‘Article II’, in: S. Hobe, B. Schmidt-Tedd and K.-U. Schrogl (eds), *Cologne Commentary on Space Law*, Vol. I (2009), pp. 48-53; M. Williams, ‘The Controversial Rules of International Law Governing Natural Resources of the Moon and Other Celestial Bodies’, in: Rafael Moro, P.J. Blount and Tanja Masson-Zwaan (eds), *Proceedings of the International Institute of Space Law 2015*, Eleven International Publishing (2016), pp. 521-532.

<sup>72</sup> The ICJ has stated on several occasions that Articles 31 and 32 of the VCLT reflect customary international law. See e.g.: *Legal Consequences of the Construction of a Wall in the Occupied Palestinian Territory*, Advisory Opinion, I. C. J. Reports 2004, p. 136. Therefore, the rules of interpretation set out in these articles also apply to the Outer Space Treaty, which entered into force long before the VCLT.

*Article 31 - General rule of interpretation*

1. *A treaty shall be interpreted in good faith in accordance with the ordinary meaning to be given to the terms of the treaty in their context and in the light of its object and purpose.*
2. *The context for the purpose of the interpretation of a treaty shall comprise, in addition to the text, including its preamble and annexes:  
  
(a) any agreement relating to the treaty which was made between all the parties in connexion with the conclusion of the treaty;  
  
(b) any instrument which was made by one or more parties in connexion with the conclusion of the treaty and accepted by the other parties as an instrument related to the treaty.*
3. *There shall be taken into account, together with the context:  
  
(a) any subsequent agreement between the parties regarding the interpretation of the treaty or the application of its provisions;  
  
(b) any subsequent practice in the application of the treaty which establishes the agreement of the parties regarding its interpretation;  
  
(c) any relevant rules of international law applicable in the relations between the parties.*
4. *A special meaning shall be given to a term if it is established that the parties so intended.<sup>73</sup>*

These principles of treaty interpretation concentrate on an objective interpretation of the treaty text, as well as its structure and purpose, and not on a subjective understanding which lays emphasis on the intention of the drafters, or the historic circumstances at the time of the drafting. The VCLT refers to the principle of “good faith,” to a verbal interpretation (“the ordinary meaning” of a term), a systematic interpretation (“in their context”), and a teleological interpretation (in view of the “object and purpose” of the treaty).<sup>74</sup>

The draft texts, the so-called *travaux préparatoires*, and circumstances at the time of negotiation, are only supplementary means of interpretation, where the interpretation resulting from the

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<sup>73</sup> Article 31 Vienna Convention on the Law of Treaties.

<sup>74</sup> O. Dörr, ‘Article 31’ in: O. Dörr and K. Schmalenbach (eds), *The Vienna Convention on the Law of Treaties. A Commentary*, Springer (2012), pp. 541-548; A. Aust, *Modern Treaty Law and Practice*, Cambridge University Press (2007), pp. 208-212.

application of Article 31 leaves the meaning ambiguous or obscure, or leads to a result which is manifestly absurd or unreasonable.<sup>75</sup>

If the treaty is written in more than one authentic language and a term is unclear, a meaning that best reconciles the texts, having regard to the object and purpose of the treaty, shall be adopted.<sup>76</sup> It follows from the above that the rights and obligations of Article I and II of the Outer Space Treaty must be read and understood as forming part of a regulatory environment consistent with the other articles of the treaty, and its negative prohibitions must be consistent with the freedoms, rights, and the positive and other negative obligations throughout the treaty. This is an insight that seems often lost by those who would read any one of the articles of the Outer Space Treaty in isolation to the surrounding text, including the other fifteen articles of the treaty, and without consideration of the treaty's preamble.

The rights and obligations in the Outer Space Treaty, as in any treaty, are balanced to reflect the values and to serve the long-term interest of states, and these values and long-term interests are reflected in the treaty's preamble. And while a treaty's preamble does not create legal rights or obligations, it lists the drafters and negotiators' understanding of the treaty's object (subject matter) and purpose (the reason for its creation, which changes from the pre-existing legal order).<sup>77</sup>

#### **a. Purposes of the Outer Space Treaty**

The purposes enumerated in the preamble of the Outer Space Treaty are aspirational in nature, forward-looking and expansive. They reflect a vision of the future where humankind's activities in space increase in regularity and sophistication, and where advances in space technology and capabilities benefit all of humankind, drive development and discovery, and inspire succeeding generations. In the preamble, states parties recognize the "common interest of all mankind in the progress of the exploration and use of outer space" and express their belief that "the exploration and use of outer space should be carried on for the benefit of all peoples".<sup>78</sup> Similar wording is also included in Article 1 of the Outer Space Treaty.<sup>79</sup> This highlights the importance states attach to the undertaking of space activities but at the same time makes clear that the use and exploration of outer space must be carried out for the benefit of humankind as a whole and not

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<sup>75</sup> Article 32 Vienna Convention on the Law of Treaties.

<sup>76</sup> Article 33 Vienna Convention on the Law of Treaties.

<sup>77</sup> O. Dörr, 'Article 31' in: O. Dörr and K. Schmalenbach (eds), *The Vienna Convention on the Law of Treaties. A Commentary*, Springer (2012), p. 544; A. Aust, *Modern Treaty Law and Practice*, Cambridge University Press (2007), pp. 366-368; S. Hobe and N. Hedman, 'Preamble', in: S. Hobe, B. Schmidt-Tedd and K.-U. Schrogl (eds), *Cologne Commentary on Space Law, Vol. I* (2009), p. 20.

<sup>78</sup> Preamble paragraphs 2 and 3 Outer Space Treaty.

<sup>79</sup> Article 1 para. 1 Outer Space Treaty.

only for the benefit of the small number of states capable of engaging in space activities.<sup>80</sup> The preamble as well as the first paragraph of Article 1 thus represent a limitation of the freedom of use and exploration of outer space which shall be taken into consideration.<sup>81</sup>

In understanding and applying the freedoms in space contained in Article I, and the negative prohibition contained in Article II, any correct interpretation must not subvert, obstruct, or otherwise confound the purposes of the treaty. These purposes of the treaty reflect the spirit of the law, which is just as important as the letter of the law.

### **b. International Law and Due Care in Space**

Article III of the Outer Space Treaty relates to the duty that states shall observe when carrying on activities in the exploration and use of space. Namely, states exploring or using outer space shall do so in accordance with international law, including the Charter of the United Nations. This important link shows that other rules of international law, whether treaties, custom, or general principles, also pertain to space activities.<sup>82</sup>

Another set of relevant obligations is contained in Article IX of the Outer Space Treaty, which establishes that states shall exercise due care in their activities in space. Article IX requires that states be guided by the principles of cooperation and mutual assistance when they explore and use space. It places a positive obligation on states to pay due regard to the corresponding interests of other states in all their space activities. States pursuing studies or conducting exploration of space and celestial bodies must do so in a way that avoids their harmful contamination, and must adopt appropriate measures to do so. If any activity or experiment is believed to risk potentially harmful interference with the space activities of other states, then international consultations are required beforehand. States can request consultations with other states whose space activities they believe would cause potentially harmful interference.<sup>83</sup>

In sum, the due care provisions in Article IX form part of the regulatory framework created by the freedoms of Article I, the prohibition on national appropriation in Article II, and the other provisions of the treaty (which are important, but of less direct relevance to the use of celestial resources). Additionally, exercising treaty rights and observing treaty obligations must serve the

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<sup>80</sup> S. Hobe and N. Hedman, 'Preamble', in: S. Hobe, B. Schmidt-Tedd and K.-U. Schrogl (eds), *Cologne Commentary on Space Law, Vol. I* (2009), pp. 22-23.

<sup>81</sup> S. Hobe, 'Article I', in: S. Hobe, B. Schmidt-Tedd and K.-U. Schrogl (eds), *Cologne Commentary on Space Law, Vol. I* (2009), pp. 36-39.

<sup>82</sup> Article III Outer Space Treaty reads: "States Parties to the Treaty shall carry on activities in the exploration and use of outer space, including the Moon and other celestial bodies, in accordance with international law, including the Charter of the United Nations, in the interest of maintaining international peace and security and promoting international cooperation and understanding".

<sup>83</sup> For a detailed analysis of Article IX see S. Marchisio, 'Article IX', in: S. Hobe, B. Schmidt-Tedd and K.-U. Schrogl (eds), *Cologne Commentary on Space Law, Vol. I* (2009), pp. 169-182.

lofty and aspirational purposes listed in the preamble, as discussed above. Any insightful understanding of the Outer Space Treaty and what it says about resources in space will understand the linkages between all of these provisions.

### ***Use as Province of all Mankind?***

While the appropriation of territory of celestial bodies is prohibited under Article II, it is less clear which rights are encompassed in the “freedom principle” of Article I. There seems to be some tension between paragraph 2 of Article I, which confirms that “[o]uter space, including the Moon and other celestial bodies, shall be free for exploration and use by all States”, and paragraph 1 of the same article, which emphasizes that 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 [...] and shall be the province of all mankind”.<sup>84</sup> The terms of paragraph 1 and 2 of Article I need to be analyzed and understood in light of the rules of treaty interpretation of the VCLT as described above.

### **c. Commercial Uses Included**

The freedom to use outer space and celestial bodies is the logical counterpart of the absence of territorial sovereignty of any state in outer space. If no state “owns” outer space and its resources, it follows that every state can explore and use it without prior permission or authorization from another state. The principle of “free use” is well known from the law of the sea, where the area of the High Seas is free from any territorial sovereignty of states, and every state has the right to enjoy the “freedom of the High Seas” as it is provided in the United Nations Convention on the Law of the Sea (UNCLOS).<sup>85</sup> Yet, unlike UNCLOS, the Outer Space Treaty does not give a more detailed explanation of which rights are contained in the “freedom” to use. While the freedom of the High Seas includes the freedom of navigation, the freedom of overflight, the freedom to lay submarine cables and pipelines, the freedom to construct artificial islands and other installations, as well as the freedom of fishing, the freedom of outer space is not defined in the Outer Space Treaty.

There may have been good reasons not to enumerate any particular uses in Article I of the Outer Space Treaty, as the constant and rapid technological development possibly leads to a variety of uses not envisaged at the time of its drafting. Any enumeration bears the danger of limiting the freedom. Yet, the comparison with the Law of the Sea shows that also “commercial uses” are

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<sup>84</sup> Article I paras. 1 and 2 Outer Space Treaty.

<sup>85</sup> Article 87 United Nations Convention on the Law of the Sea, done 10 December 1982, entered into force 16 November 1994, 1833 UNTS 3; 21 ILM 1261(1982).

included in the principle of “free use” under international law, fishing in the High Seas being the most prominent example.

In outer space, the use of frequencies and orbital positions of satellites has long been recognized by the international community as being in accordance with the principle of free use, whether for commercial or non-commercial purposes. In addition, Article VI of the Outer Space Treaty establishes the responsibility of States for national activities in outer space “whether such activities are carried on by governmental agencies or by non-governmental entities”, thereby also including private commercial activities in outer space.<sup>86</sup> It is therefore generally accepted that, under international space law, the “freedom of use” includes commercial uses.

#### **d. Use for the Benefit and in the Interest of All Countries**

A limitation of the freedom to use may be found in the formulation of paragraph 1 of Article I of the Outer Space Treaty, which provides that the use of outer space and celestial bodies “shall be carried out for the benefit and in the interest of all countries”.<sup>87</sup> The opinions are divergent as to what this exactly means. Some say that only detrimental uses which directly and immediately cause damage to other countries are barred, while others maintain that the “benefits” of the use should be shared - because only this would be “in the interest of all countries.”<sup>88</sup> An interpretation in accordance with the rules of treaty interpretation likely leads to the conclusion that states should pay due regard to the interests of other countries, and avoid harmful interference and respect environmental concerns, as provided for in Article IX of the Outer Space Treaty.<sup>89</sup>

In this context, the question rises whether and to what extent the use of limited or non-renewable resources is permitted. If space resources are used in a way that excludes their use by subsequent generations, one might ask whether this can be in accordance with environmental considerations, including the principle of sustainability, and the principle of “due regard of the interests of other countries”.

There seems to be no agreed-upon ordinary meaning of the word “use.” Some contend that “use” does not mean entirely consuming a resource, but merely using it for a time and then leaving it, perhaps to be used by others. Others think that the word by itself does not actually contain this

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<sup>86</sup> Article VI Outer Space Treaty.

<sup>87</sup> Article I para. 1 Outer Space Treaty.

<sup>88</sup> For a more detailed discussion see: S. Hobe, ‘Article I’, in: S. Hobe, B. Schmidt-Tedd and K.-U. Schrogl (eds), *Cologne Commentary on Space Law*, Vol. I (2009), pp. 36-39; F. Tronchetti, *The Exploitation of Natural Resources of the Moon and Other Celestial Bodies*, Brill Martinus Nijhoff (2009), pp. 23-26 and 220-225.

<sup>89</sup> R. Bilder, *A Legal Regime for the Mining of Helium-3 on the Moon: U.S. Policy Options*, *Fordham International Law Journal*, Volume 33, Issue 2 (2009), Article 1, pp. 257-258.

qualification, and that “use” can mean using a portion of a resource, or the entire resource.<sup>90</sup> Because there is a multiplicity of perceptions in how the word is employed in practice, it does not seem dispositive in creating an outcome.

The extent to which natural resources on celestial bodies, such as minerals and water, are not renewable needs be taken into account when assessing the “interests of all countries”. As regards the comparison with the freedom of fishing on the High Seas under the Law of the Sea, fish stock can be exhausted, and a lot of endangered species are subject to special protection, but, as a matter of principle, fish stock is renewable.

The question, whether celestial resources are “exhaustible” or “not renewable”, is not easy to answer. On the one hand, the universe is said to be infinite, and astronomers quantify the asteroid population of the solar system as being many times the mass of our planet Earth. On the other hand, the number of asteroids that are near and accessible enough to be exploited by human activity and the resources present on the Moon are much more finite.

In a systematic interpretation of the Outer Space Treaty, space activities involving the extraction of space resources should not hamper Article II, which prohibits appropriation by use or occupation (in the sense that construction sites which cannot be removed are erected, or at least hinder the erection of another construction site on the same place).<sup>91</sup> Furthermore, the activities of use should be carried out under the principle of cooperation and be accompanied by appropriate information as required by Article XI of the Outer Space Treaty.<sup>92</sup>

#### **e. Province of All Mankind and Common Heritage of Mankind Distinguished**

The formulation that the use of outer space and celestial bodies shall be “the province of all mankind” raises difficult questions in the legal assessment of space resource utilization.<sup>93</sup> The Outer Space Treaty nowhere explains this concept. The French language version speaks of “*l’apanage de l’humanité tout entière*”, in the Spanish version there is no specific term, but the treaty states that the exploration and use “*incumben a toda la humanidad.*”

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<sup>90</sup> For a discussion see: F. Tronchetti, *The Exploitation of Natural Resources of the Moon and Other Celestial Bodies*, Brill Martinus Nijhoff (2009), pp. 21-23 and 220-225.

<sup>91</sup> R. Bilder, *A Legal Regime for the Mining of Helium-3 on the Moon: U.S. Policy Options*, *Fordham International Law Journal*, Volume 33, Issue 2 (2009), Article 1, pp. 257-258.

<sup>92</sup> Article XI Outer Space Treaty reads: “In order to promote international cooperation in the peaceful exploration and use of outer space, States Parties to the Treaty conducting activities in outer space, including the Moon and other celestial bodies, agree to inform the Secretary- General of the United Nations as well as the public and the international scientific community, to the greatest extent feasible and practicable, of the nature, conduct, locations and results of such activities”.

<sup>93</sup> Article I para. 1 Outer Space Treaty.

It is important to distinguish the concept of “the province of all mankind” from the term “common heritage of mankind,” which is used in Article 11 of the Moon Agreement of 1979 to describe in more detail the ways and means of establishing a legal regime on the exploitation of natural resources of the Moon and other celestial bodies.<sup>94</sup> The principle of the “common heritage of mankind” appears also in the law of the sea where it is used to define the legal framework of deep seabed mining under the authority of an International Seabed Authority. The understanding of that principle within the body of the law of the sea, however, has no precedential effect in space law. Furthermore, as the Moon Agreement has been ratified by only 16 states, none of which are major space faring nations, the discussions on the contents of the “common heritage of mankind” with regard to space resources have come to a standstill. Additionally, it is a fact that while 16 states of the international system are parties to the Moon Agreement, this leaves 177 states, or 91.7 percent of the membership of the United Nations, including many developing countries, which have refrained from becoming a party to it for over three decades.

Some aspects of the concept of “province of all mankind” can be discerned by interpreting the Outer Space Treaty in a systematic and teleological way, taking into account the different authentic language versions. From this, it may be concluded that the use of space resources should not be done for the benefit of one state (and its nationals) alone without regard to the needs and interests of other countries. The language used in the treaty and in particular in Article 1 underlines the community aspects of space activities. Ultimately, the aspiration that *all* countries shall benefit from space activities can be regarded as the final goal of the provision referring to ‘the province of all mankind’.<sup>95</sup> Conversely, if states (or their citizens) are not allowed to use space resources, it is difficult to see how they actually enjoy the freedom to explore and use outer space. As the different language versions quoted above seem to imply, some sharing of the benefits of space resource exploration and use is imperative. How this sharing is done and organized remains an open question. International cooperation as addressed in several provisions of the Outer Space Treaty can play an important role in this regard.<sup>96</sup> Furthermore, state practice can develop and define states’ obligations in this context more in detail by establishing agreement on the interpretation of the treaty provisions.<sup>97</sup>

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<sup>94</sup> For a detailed analysis of the Moon Agreement see: S. Hobe, R. Jakhu, S. Freeland, F. Tronchetti and P. Stubbe, ‘The 1979 Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (MOON)’, in: S. Hobe, B. Schmidt-Tedd and K.-U. Schrogl (eds), *Cologne Commentary on Space Law*, Vol. II (2013), pp. 325-426.

<sup>95</sup> S. Hobe, ‘Article I’, in: S. Hobe, B. Schmidt-Tedd and K.-U. Schrogl (eds), *Cologne Commentary on Space Law*, Vol. I (2009), p. 39.

<sup>96</sup> See e.g. preambular paragraphs 4 and 5, Article IX and XI Outer Space Treaty.

<sup>97</sup> Article 31 Vienna Convention on the Law of Treaties.

## **f. Implementing the Treaty at the National Level**

Each state party to the treaty can enjoy the above-listed rights and must observe the obligations created by the treaty. States do this, first, through creating, by way of interpretation, their own understanding of the treaty. Once they have arrived at an understanding, they will proceed in a way they feel conforms to their treaty rights and obligations.

The establishment of a domestic legal framework is a concrete method to give effect to a state's international treaty rights and obligations. This is especially true for space activities by non-governmental actors, such as private companies and universities, for which the state is directly responsible and potentially liable according to Articles VI and VII of the Outer Space Treaty. Each State party to the treaty may do so in a slightly different way, depending on a number of factors.<sup>98</sup>

Some states conduct space activities of a purely governmental nature, while others mix governmental and private commercial activities. States engage in all manner of activities in space, from human spaceflight, to space sciences and cosmology, to remote sensing of their domestic territory for land management. So long as a state's space activities are not perceived to be in violation of space law or other applicable law, there are usually no negative international political repercussions from undertaking space activities.

## **3. Conclusion**

Considering the balancing of rights and prohibitions of the Outer Space Treaty, the use of space resources is not explicitly prohibited as long as the other obligations in the treaty are met. More concretely, the treaty guarantees the freedom of exploration and use, but under certain conditions, e.g. "for the benefit and in the interests of all countries", "without discrimination of any kind", "in accordance with international law", with "free access to all areas of celestial bodies", "guided by the principle of cooperation and mutual assistance", "with due regard to the corresponding interests of all other state Parties to the Treaty," and so as to "avoid harmful contamination." States should endeavor to ensure that these conditions are met before the "right to use space resources" can be exercised. This is necessary to ensure that space activities, including exploitation endeavors, will serve all humankind.

Missions that conform with international law, are otherwise peaceful and international in nature, that share data, discoveries and technological innovations, would certainly align with the

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<sup>98</sup> R. Jakhu (ed), *National Regulation of Space Activities*, Springer (2010); F. von der Dunk (ed), *National Space Legislation in Europe*, Martinus Nijhoff (2011); I. Marboe, 'National Space Law', in: F. von der Dunk with F. Tronchetti (eds), *Handbook of Space Law*, Edward Elgar Publishing (2015), pp. 127-138.

past fifty years of space activities by states and private actors. In addition, military and ecological considerations are important to be taken into account. If the benefits of space exploration flow to all sectors of society through spinoffs, and through a greater and deeper understanding of space, the use of space resources may contribute to this dynamic for succeeding generations.

#### **IV. SUBSEQUENT STATE PRACTICE**

##### **1. The Moon Agreement**

In 1979, the terms of the Agreement Governing the Activities of States on the Moon and other Celestial Bodies were concluded. Whilst this treaty contains a number of interesting and potentially significant principles – notably the concept of intergenerational equity in its Article IV - its principal *raison-d'être* was the formalization of the terms of a legal regime that would ultimately apply to the exploitation of the natural resources of the Moon and other celestial bodies.<sup>99</sup>

The main aspects of these terms are articulated in Article 11 of the treaty. This provision, for the first time in space law, introduced the principle of the common heritage of mankind and established the legal conditions for the exploitation of such natural resources. Article 11 para. 1 declares the natural resources of the Moon and other celestial bodies to be the 'common heritage of mankind'. It is important to note that the meaning of the common heritage of mankind concept in the Moon Agreement cannot be determined by its use in other instruments.<sup>100</sup> In essence, this principle is dynamic and diverse in nature, in the sense that there is not necessarily any one unique feature or specific meaning of the expression that can be said to automatically apply in its various manifestations in differing contexts. Different interpretations are and may be put forward, but the proper meaning of the common heritage of mankind can only be determined in the context, and for the purpose, of the applicable regulatory regime.

Consequently, the common heritage of mankind concept is to be interpreted exclusively within the provisions of the Moon Agreement itself, particularly its Article 11 para. 5 - which is expressly referred to when the concept is introduced in Article 11 para. 1 - whereby States

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<sup>99</sup> For a detailed explanation of the provisions of the Moon Agreement see Stephan Hobe, Ram Jakhu, Steven Freeland, Fabio Tronchetti and Peter Stubbe, 'The Moon Agreement', in S. Hobe, B. Schmidt-Tedd and K.-U. Schrogl (eds), *Cologne Commentary on Space Law*, Vol. II (2013), pp. 325-426. Some of the comments here are taken from that discussion.

<sup>100</sup> See United Nations Convention on the Law of the Sea, 1833 UNTS 3 (UNCLOS), Article 136. See also Article 1 of the UNESCO Universal Declaration on Cultural Diversity (2 November 2001), which provides that cultural diversity is the 'common heritage of humanity'.

Parties undertake to establish an international regime for the exploitation of such natural resources when such exploitation 'is about to become feasible'. The timing of the establishment of this regime is to be determined only by the States Parties on the basis of their actual exploratory and pre-exploitation activities related to such natural resources, and pursuant to the procedure established under Article 18, which envisages the convening of an international review conference of the States Parties to 'consider the question of the implementation of' the terms of Article 11 para. 5.

Article 11 para. 7 then specifies the main 'purposes' of this envisaged international regime for the eventual exploitation of natural resources. The first three of these, as expressed in lit. (a)-(c) of this provision, reflect a tendency towards a 'best practice' approach to the exploitation of such natural resources. Of course, the specific implementation of these purposes in the constituent documents outlining the functioning of the legal regime will reflect the precise scope of their applicability but, as a general matter of principle, they are relatively uncontroversial.

As is well known, however, Article 11 para. 7 (d) raises more difficult issues that have given rise to disagreement and, ultimately, a low take-up (by way of ratification by States) of the Moon Agreement.<sup>101</sup> It specifies that one of the main purposes of the regime to be established through the Moon Agreement is to be the 'equitable sharing by all States Parties in the benefits derived from those [natural] resources'. The notion of 'equitable' sharing raises complex questions of interpretation and application, although the provision does specify that 'the interests and needs of the developing countries, as well as the efforts of those countries which have contributed either directly or indirectly to the exploration of the [M]oon [and other celestial bodies], shall be given special consideration'.

Notwithstanding the prevailing uncertainty as to the precise scope of this benefit-sharing requirement, what is clear is that 'equitable' does not mean 'equal', and this purpose therefore does not envisage a totally one-sided approach solely for the benefit of developing countries. Rather, it seeks a balance between investing (contributing) and non-investing States Parties. From this latter group, it is particularly the developing countries whose interests should be taken into consideration. This represents an asymmetrical benefit for under-developed States Parties, insofar as they might eventually gain some 'benefit' due primarily to their economic status – although it must be noted that this might not necessarily be financial in nature.<sup>102</sup>

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<sup>101</sup> See *supra* note 8.

<sup>102</sup> This should be contrasted with Article 140 para. 2 of UNCLOS, which refers to 'the equitable sharing of *financial and other economic benefits* derived from activities in the Area' (emphasis added). The expression 'activities in the Area' expressly includes exploitation of the resources of the Area: UNCLOS, Article 1 para. 3.

The Moon Agreement also reiterates the non-appropriation principle, which is, of course, expressed in Article II of the 1967 Outer Space Treaty.<sup>103</sup> The meaning, nature and scope of the principle of non-appropriation in Article II of the Outer Space Treaty are very broad and to a large extent inflexible.<sup>104</sup> On the other hand, the terms of the Moon Agreement suggest that the exploitation of the natural resources of the Moon and other celestial bodies does *not* constitute a means of appropriation. Thus, even though Article 11 para. 2 of the Moon Agreement replicates the prohibitions contained in Article II of the Outer Space Treaty, this must be seen within the context of the objects of the Moon Agreement in terms of the exploitation of natural resources,<sup>105</sup> pursuant to its specific terms and the eventual establishment of an international regime.

It is clear, therefore, that the prohibition of national appropriation in Article 11 para. 2 of the Moon Agreement does not in and of itself restrict the exploitation of natural resources on the Moon and other celestial bodies, which will also involve removal of such resources from their 'place'.<sup>106</sup> Having said this, the conduct of such exploitation will always remain subject to the general principles of international space law and is to be carried out 'in a manner compatible with'<sup>107</sup> the purposes of the yet-to-be-established international regime, as well as with the right to collect and remove 'samples', as is provided for by Article 6 para. 2 of the same instrument.

The prohibition of appropriation, as it is used in Article 11 para. 2 of the Moon Agreement is rather directed towards preventing a claim to 'property rights' over (a part of) outer space. The restriction on property rights extends to 'any State, international intergovernmental or non-governmental organization, national organization or non-governmental entity or ... any natural person.' The reference to this range of possible actors serves to underline that no entity whatsoever, public or private, is entitled to claim these rights. In addition, the restriction of rights in relation to ownership is reinforced by the terms of Article 11 para. 3, according to which the placement of inter alia personnel, facilities or installations on or below the surface of a celestial body 'shall not create a right of ownership ... thereof'.

However, these prohibitions would not prevent public or private entities from receiving – under an international regime to be established in the future – what might be termed 'extra-terrestrial exploitative rights' in relation to the natural resources of the Moon and other celestial bodies, although they must, of course, comply with the principles set out in the space treaties (and any

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<sup>103</sup> See *supra* note 3.

<sup>104</sup> For a detailed analysis of Article II of the Outer Space Treaty, see S. Freeland and R. Jakhu, 'Article II' in S. Hobe, B. Schmidt-Tedd and K.-U. Schrogl (eds), *Cologne Commentary on Space Law*, Vol. I (2009), pp. 44-63. Some of the comments here are taken from that discussion.

<sup>105</sup> The 5<sup>th</sup> paragraph of the Preamble to the Moon Agreement notes 'the benefits which may be derived from the exploitation of the natural resources of the [M]oon and other celestial bodies.'

<sup>106</sup> Moon Agreement, Article 11 para. 3.

<sup>107</sup> *Ibid.*, Article 11 para. 8.

applicable customary international law), as well as the rules and procedures under the envisioned international regime governing the way in which they exercise these rights. Such rights are consistent with the *res communis* nature of outer space.

In some respects, however, and bearing in mind that reference to analogies is not a particularly satisfactory methodology when considering the unique (legal) environment of outer space, these extra-terrestrial exploitative rights might also be considered as similar in nature to terrestrial ‘mining rights’ allocated by a State to public and/or national/foreign private entities to exploit the natural resources within its specific territorial jurisdiction. The terms of a typical exploration or mining (exploitation) licences granting these rights will dictate the precise scope of the rights, as well as the conduct to which a licensee must adhere in exercising them. However, in terms of the ownership of the (terrestrial) natural resources *in situ* to be exploited in such a situation, this will remain within the permanent sovereignty of the relevant State, in accordance with long-recognised principles of customary international law.<sup>108</sup>

It should also be noted that Article 11 para. 4 of the Moon Agreement, which reflects the wording of Article I para. 2 of the Outer Space Treaty, complements the provisions of Article 6 para. 1 of the Moon Agreement by expressly addressing the right of exploration and use. These provisions in the Moon Agreement confirm the right to freedom of exploration, use and scientific investigation on the Moon and other celestial bodies without discrimination of any kind, on the basis of equality and in accordance with international law but, once again, always subject to the express terms of the treaty itself.<sup>109</sup>

## 2. The Deep Seabed Regime

Brief reference was made above to the provisions of UNCLOS, which has at times been suggested as a comparable situation for the exploitation of natural resources in a *res communis* environment. Under the provisions of Part XI of UNCLOS, a regime has been established to

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<sup>108</sup> The principle of ‘Permanent Sovereignty over Natural Resources’ (PSONR) was established during the 1960s, and was initially focused on developing countries, although it was subsequently extended to include the rights of ‘peoples’ to regain effective control over their natural resources. There have been many United Nations General Assembly Resolutions relating to PSONR: see, for example, United Nations General Assembly Resolution 1803 (XVII) (14 December 1962) ‘Permanent Sovereignty over Natural Resources’, United Nations General Assembly Resolution 2692 (XXV) (11 December 1970) ‘Permanent Sovereignty over Natural Resources of Developing Countries and Expansion of Domestic Sources of Accumulation for Economic Development’ and United Nations General Assembly Resolution 3171 (XXVIII) (17 December 1973) ‘Permanent Sovereignty over Natural Resources’. The PSONR has also been expressly incorporated into significant documents relating to the exploration and use of outer space: see, for example, United Nations General Assembly Resolution 41/65 (3 December 1986) ‘Principles Relating to Remote Sensing of the Earth from Outer Space’, Principle IV of which provides *inter alia* that remote sensing activities ‘shall be conducted on the basis of respect for the principle of full and permanent sovereignty of all States and peoples over their own wealth and natural resources’.

<sup>109</sup> See also Bin Cheng, *Studies in International Space Law* (1997), p. 377.

govern the exploitation of the minerals of the 'Area', defined as the 'seabed and ocean floor and subsoil thereof, beyond the limits of national jurisdiction'.<sup>110</sup>

The exploitation of the Deep Seabed had become of interest, particularly to a number of industrialised countries, around the time that UNCLOS was being negotiated which, it must be noted, also coincided with the discussions leading to the conclusion of the Moon Agreement. As an important component of the legal regulation of the Area, the terms of UNCLOS incorporated and expanded upon the principles embodied in United Nations General Assembly Resolution 2749, which had been adopted by a majority of Member States in 1970,<sup>111</sup> and which declared that it was 'essential' to establish an international regime 'as soon as possible' in relation to the Area and its resources.

The Resolution declared that '[the Area], as well as the resources of the [A]rea, are the common heritage of mankind',<sup>112</sup> and this was reflected in Article 136 of UNCLOS.

As part of the system of regulation that was ultimately established under UNCLOS,<sup>113</sup> the International Seabed Authority (based in Jamaica) was established in 1994, with overall responsibility for the Deep Seabed regime. In this regard, UNCLOS sets out some quite specific rules relating to the development of the resources of the Area, granting the International Seabed Authority significant powers.<sup>114</sup>

### 3. Preliminary Conclusion

As noted above, States have already found different ways to address the need for a legal regime for the exploitation of natural resources in 'non-territorial' areas, on the basis of international cooperation and multilateral agreement. However, apart from the existence of international regimes for international commons, no uniform implementation on the issue of resource taking in such areas has been established. A structured regime has been agreed and is already in place

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<sup>110</sup> UNCLOS, Article 1 para. 1.

<sup>111</sup> United Nations General Assembly Resolution 2749 (XXV) (17 December 1970) 'Declaration of Principles Governing the Sea-Bed and the Ocean Floor, and the Subsoil Thereof, beyond the Limits of National Jurisdiction'. Note also that this Resolution was passed only a few days after Resolution 2692, referred to in *supra* note 108.

<sup>112</sup> *Ibid.* Resolution 2749, para. 1.

<sup>113</sup> There was considerable controversy with the structure and operation of the regime to be established under UNCLOS, so much so that the industrialised countries declined to sign/ratify the treaty in its original form. As a result, it became necessary to 'supplement' the Part XI regime through the finalisation of an additional agreement in 1994 – the United Nations Agreement Relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea of 10 December 1982, 33 ILM 1309 (New York Agreement), which entered into force in 1996 – following which most of the industrialised countries (apart from the United States) have subsequently become States Parties to UNCLOS.

<sup>114</sup> See generally UNCLOS, Articles 151–168.

in relation to the Deep Seabed, based on a multilateral management process underpinned by UNCLOS. The door is now open for States to access this regulatory process.

In the case of Antarctica, earlier territorial claims by various States – which would, if eventually accepted, presumably give rise to national rights for exploitation of the natural resources within the area of such claims - have been held in abeyance.<sup>115</sup> In essence, those States have agreed to a Moratorium against the exploitation of the national resources in Antarctica.

In relation to the exploitation of the natural resources of the Moon and other celestial bodies, the possibility exists that any activities in that sphere can also be conducted on the basis of widespread agreement. One possible structure could be based upon Article 11 of the Moon Agreement, which leaves it entirely open as to how the international regime for the exploitation of such resources might be structured by States Parties in the future, though it does provide some guidance in this regard.

The regime contemplated under the Moon Agreement does appear to provide an appropriate framework model for the determination of ‘extra-terrestrial exploitative rights’, since it contains basic principles for the initial phases of exploration and limited exploitation of these natural resources. The treaty creates a minor exclusion to the non-appropriation provisions of Article II of the Outer Space Treaty, in that it envisages the removal and collection by the States Parties of the Moon’s mineral and other substances and their limited use for scientific purposes and investigations, as well as for the support of their missions.

Moreover, as noted, the treaty contains a proposal for the eventual establishment of a detailed international regime itself, when determined necessary in the future. The envisioned regime could be further developed based on the principles already enunciated in the Moon Agreement, as well as the experience garnered in any activities undertaken prior to the point in time at which such levels of exploitation are ‘about to become feasible’, which will be dependent *inter alia* on various technological and commercial developments in the future.

Thus, the Moon Agreement has no restrictive impact on the existing exploration and use of the Moon and other celestial bodies, but it offers one possible way forward for a future exploitation regime. Given the express terms of this instrument, such a future regime would provide further clarity as regards the distinction between the already accepted rights to collect, remove and use

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<sup>115</sup> See 1959 Antarctic Treaty, 402 UNTS 71, Article IV of which has the effect of suspending all claims to territorial sovereignty in Antarctica for the duration of that instrument, as well as prohibiting any ‘new claim, or enlargement of an existing claim’. The Protocol on Environmental Protection to the Antarctic Treaty, 30 ILM 1455, augments the Antarctic Treaty by protecting Antarctica from commercial mining for a period of 50 years.

samples, minerals and other substances within the scope of the Article 6 para. 2, and much more expansive (commercial) exploitation activities in what always remains a *res communis* area.

Of course, the operation of any regime that may ultimately be established by the States Parties under the procedure specified in the Moon Agreement would (in the absence of any additional express agreement) only be binding on those States Parties. For all other States, the applicable minimum standard for the 'use' of natural resources on the Moon and other celestial bodies will be as set out in the Outer Space Treaty, and in particular in Articles I and II. Such use should accordingly be for the benefit and in the interests of all countries, and the Moon and other celestial bodies and their resources are not subject to national appropriation.

Thus, the current position as regards such resources is therefore not at all a 'lawless' one in the international sphere – indeed clear principles apply, in practice, to all space-faring nations, given the wide ratification of the Outer Space Treaty among those States that, at least at this time, appear most likely to (eventually) engage in an possible exploitation activities in the future. That said, there is sufficient scope to allow for careful and comprehensive discussions and negotiations among all interested parties to determine the most acceptable way forward.

## V. RESULTS

Under the existing international legal framework, mining of space resources raises a range of legal issues that need to be addressed adequately. Such use of outer space is not explicitly mentioned in the Treaties and there is no specific legal order for such activities. However, any prudent interpretation of the *corpus iuris spatialis* leads to the conclusion that space resource mining is not prohibited *per se* and that it is an activity falling under the freedom of the use of outer space as laid down in Article I para. 2 Outer Space Treaty, limited however by the fact that according to Article I para. 1 such use must be for the benefit of all mankind and according to Articles IV and IX must be in conformity with the provisions concerning military uses and environmental considerations.

However, such use and the "free access to all areas of celestial bodies" are to be exercised under the conditions imposed by the Treaty. Apart from being one of the international legal instruments with a considerable support,<sup>116</sup> the milestone norms in the Outer Space Treaty are widely accepted and may arguably even be customary law. Such are "the benefit and in the interests of all countries" clause of Article I para. 1, the prohibition of discrimination in Article I

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<sup>116</sup> See *supra* note 8.

para. 2, the requirement in Article III that space activities shall be carried out “in accordance with international law”, the principles of due regard and of “cooperation and mutual assistance” contained in Article IX. Thereby, the Outer Space Treaty provides a guarantee that States, in perceiving their freedom to use outer space, should ensure that these standards are met before resource mining activities can be exercised. All such uses may not amount to national appropriation of outer space or celestial bodies. Also in view of national legislation and the possible repercussions of following partly or more strictly the monist and dualist approaches in national legal orders, this seems to be a line of interpretation which can hope to find consensus.

The constitutional practice of almost all important space faring countries shows that the international law – mostly enshrined in international agreements – fits in hierarchical terms under the constitution and at the same level as statutory national law. But partly principles of customary international law and particularly principles of *jus cogens* may be more important than in hierarchy and even constitutional norms.

Subsequent state practice in interpreting the freedom of use and the non-appropriation principle enshrined in the Outer Space Treaty can be found in the Moon Agreement which in its Article 11 paras 5 and 7 allows for the exploitation of natural resources on the Moon and other celestial bodies only after an international regime to govern these activities is established. Thereby, both national legislation and the subsequent state practice to Articles I and II of the Outer Space Treaty entailed in the Moon Agreement do not lead to a different result: the legal framework governing activities in space does not prohibit the exploitation of resources as an activity open to States, but it nevertheless requires that such exploitation shall take place under the conditions laid down in the Outer Space Treaty which are to be shaped in an appropriate international legal order multilaterally.

Taking the fact that outer space law is not particularly outspoken with regard to space mining, the plea of the Moon Agreement to establish an international regime for mineral resource mining should be undertaken only as an effort of the international community.

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