

# Space Mining: The Delineation between National and International Jurisdiction

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## Abstract

The milestone provisions in the Outer Space Treaty designate outer space and celestial bodies as an area beyond national jurisdiction in which national jurisdiction extends only to space objects and persons in outer space. In view of upcoming commercial space mining activities and the recent national legal developments, it is of crucial importance to delineate the different levels of legal authority over space resource activities and to analyze them systematically.

What is indisputable, in the first place, is that any national appropriation in outer space is prohibited by Article II OST, while the appropriation of resources is not explicitly mentioned.

More specific provisions are formulated in the Moon Agreement. Its Article 11 prohibits **the appropriation of resources on celestial bodies and states that such activities** — as soon as they become feasible — must be regulated by the international community of States. While this *moratorium* on resource exploitation is binding only for the 18 ratifying State parties to the Moon Agreement, there is no doubt that the legal authority to regulate over outer space lies with the international community and not with single States.

Unilateral legislative acts must conform to existing international provisions as outer space is an area beyond national jurisdiction. Where such explicit provisions are lacking – as is the case with the appropriation of space resources – the lawful scope of national authority must

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nevertheless be delineated through international regulation as States lack the national prescriptive authority to regulate over outer space and celestial bodies.

## 1. Introductory remarks

The legal discussion on the regulation of activities for the exploitation of space resources has been occupying the community of space lawyers and policy makers during the past few years very intensively. Especially after the adoption of two national laws on space mining activities in 2015 and 2017<sup>1</sup>, numerous articles and book chapters have been published, and many presentations and talks have been given, from which two main streams of opinion can be differentiated: first, the view that these laws are fully compatible with the Outer Space Treaty<sup>2</sup>, space law and international law in general and, second, that such unilateral acts are legally void.

In the opinion of the present authors, the existing national legislative initiatives that attempt to provide a legal basis for national space mining activities are indeed flawed, and this is regardless of the word interpretation of Article II Outer Space Treaty<sup>3</sup> or of the fact that Article VI Outer Space Treaty indeed requires from States to authorize and supervise the space activities of their nationals. Thus, in order for a State to have the authority to prescribe and enforce laws over a certain area and persons, it must, in the first place, have sovereignty there over as jurisdiction results from and is a consequence of sovereignty.<sup>4</sup> However, as outer space, including celestial bodies as well as their natural resources is a domain beyond national jurisdiction,<sup>5</sup> no single State has the needed legal power of jurisdiction that

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1 See, the US law, and the Luxembourg Law, U.S. Commercial Space Launch Competitiveness Act, U.S. Congress, H.R.2262, 25 November 2015 and Loi du 20 juillet 2017 sur l'exploration et l'utilisation des ressources de l'espace, Official Gazette of The Grand Duchy of Luxembourg, No. 674 (28 July 2017).

2 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, 610 UNTS 205, adopted on 27 January 1967, entered into force 10 October 1967 (Outer Space Treaty).

3 See, for an overview on the ongoing discussion on the legal effect of the words "national appropriation", Lyall, Francis/Larsen, Paul B., *Space Law – A Treatise*, 2nd ed., Routledge, London/New York, 2018, p. 169 et seq.

4 See, on the concept of jurisdiction of States, Oxman, Bernhard H., 'Jurisdiction of States', in *Max Planck Encyclopedia of International Law*, Oxford University Press, Oxford, 2007.

5 According to Article I and II Outer Space Treaty. For a detailed account, see Freeland, Steven/Jahku, Ram, 'Article II Outer Space Treaty', in Hobe/Schmidt-Tedd/Schrogl (eds.), *Cologne Commentary on Space Law*, Vol. I, Carl Heymanns Verlag, 2009, pp. 44-63. Cf. Wolfrum, Rüdiger, 'Die Internationalisierung

would allow them to regulate over the acquiring, the administration and the distribution of natural resources in outer space.

## 2. The application of Article II Outer Space Treaty

The legal argumentation on why national regulation of the administration and distribution of space resources cannot take place without a respective specific sanction by international law, starts with Article II of the Outer Space Treaty<sup>6</sup> which reads:

*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.*

Although this provision does not explicitly mention natural resources in outer space and on celestial bodies, or on asteroids,<sup>7</sup> they fall under the applicability of the prohibition as the Outer Space Treaty is formulated in a very broad sense to encompass *all* spaces and natural bodies in the Solar system.<sup>8</sup> Therefore, natural space resources are subject to the same legal regime as outer space and celestial bodies.<sup>9</sup>

It is difficult to argue that there is doubt as to what the drafters of the Outer Space Treaty meant in 1967: The wording “outer space, including celestial bodies” is to be read as a term encompassing everything that is found in outer space and is non-man made. With this, through Article II, it establishes clearly that the areas and natural objects in outer space – meaning the orbits around celestial bodies, including the celestial bodies themselves, as well as natural resources found on them, are not subject to national appropriation.

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Staatsfreier Räume’, in Veröffentlichungen des Max-Planck-Instituts für ausländisches öffentliches Recht und Völkerrecht, Vol. 85, Berlin/Heidelberg, 1984.

6 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), entered into force on 10 October 1967.

7 There is no definition of “celestial bodies” or “asteroids”. For a detailed analysis from the legal perspective, see Marboe, Irmgard/Friedl, Michael, ‘What are Space Resources? What are Celestial Bodies?: The Need for Refined Legal Definitions in View of Recent Regulatory Efforts Concerning Space Resources’, *Proceedings of the International Institute of Space Law*, Vol. 61 (2018), pp. 749-760.

8 See Art. I Outer Space Treaty and Art. 1 of the Moon Agreement.

9 On a detailed account on the various opinions expressed in literature on the applicability of Article II Outer Space Treaty to space resources, see Hobe, Stephan/De Man, Philip, ‘National Appropriation of Outer Space and State Jurisdiction to Regulate the Exploitation, Exploration and Utilization of Space Resources’, *ZLW (German Journal of Air and Space Law)* Vol. 66 (2017), pp. 460–475 and Lyall, Francis/Larsen, Paul B., *Space Law – A Treatise*, 2nd ed., Routledge, London/New York, 2018, p. 171.

By imposing an explicit prohibition on the national appropriation of outer space and celestial bodies “by claim of sovereignty, by means of use or occupation, or *any other means*”, Article II Outer Space Treaty clearly indicates that the possibilities to exercise national appropriation are not restricted to a certain type of means.

Article II Outer Space Treaty does not impose a prohibition on a certain type of use of outer space, but on its appropriation through use – be it through sovereignty claims, occupation or any other (possible) means of use.

Moreover, as Art. 31 para. 1 of the Vienna Convention of the Law of Treaties<sup>10</sup> suggests, Article II has to be read together with the other provisions of the Outer Space Treaty in its context and the light of its object and purpose, thus in particular with Article I.

A distinct look the specific language used in Article I para. 1 Outer Space Treaty (exploration and use of outer space and celestial bodies as “the province of all mankind”), leads to the conclusion that while outer space and celestial bodies shall be free for exploration and use by any State, this freedom as such is not limitless with regard to the freedom of other States. Any kind of exploration and use of outer space is subject to certain limitations in order to ensure that the freedom of single actors is in line and does not infringe the freedoms of others.<sup>11</sup> First, such exploration and use should be – as the first paragraph of Article I stipulates – “carried out for the benefit and in the interest of all countries, irrespective of their degree of economic or scientific development”.

Even though the single terms used in Article I such as “for the benefit and in the interest of all countries” and “province of all mankind” are indeed not very specific in themselves, systematic interpretation<sup>12</sup> leaves no doubt the tenor and *telos* of Article I para. 1 Outer Space Treaty is, first, to promote the usability of and disposability over outer space for all States, and, second, to establish outer space and all natural bodies in outer space as areas beyond national jurisdiction<sup>13</sup> that are subject only to international regulation.

### **3. The Scope of the Outer Space Treaty vis-à-vis Commercial Activities and the Role of the Moon Agreement**

The Outer Space Treaty applies to any kind of use and exploration of outer space and celestial bodies and that thus not only governmental non-

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10 Vienna Convention on the Law of Treaties, 1155 UNTS 331, adopted on 23 May 1969, entered into force on 27 January 1980 (VCLT).

11 These limitations are maintained mainly by Art. II, IV, VI, VII, VIII and IX Outer Space Treaty.

12 Art. 31 and 32 VCLT.

13 Some authors use the term “global commons”. In both cases, the outcome is the same: no national jurisdiction can be extended to such international spaces.

commercial, but also commercial uses of outer space are covered.<sup>14</sup> However, the precise conditions under which future commercial uses that are not specifically mentioned should be carried out, were not specifically regulated in the Outer Space Treaty and left for future international legislation.

This intention to enact future international regulation was confirmed and put into law 12 years later, with the adoption of a treaty governing the activities on the Moon and other celestial bodies: the Moon Agreement of 1979<sup>15</sup> which, in its Article 1 extends the application of this agreement to all celestial bodies in the Solar system and the orbits around them.<sup>16</sup> At that time, the idea of exploiting natural resources on celestial bodies had become a specific topic on the agenda of UNCOPUOS.<sup>17</sup>

According to Article II Moon Agreement, all activities on celestial bodies are subject to the Charter of the United Nations and to the Friendly Relations Declaration of the General Assembly of the UN<sup>18</sup>, and must be carried out only for peaceful purposes.<sup>19</sup> Moreover, Article 4 para. 1 Moon Agreement reiterates Art. I para. 1 Outer Space Treaty in proclaiming that the use and exploration of the Moon and other celestial bodies are “the province of all mankind” and should be carried out for the benefit and in the interest of all countries.

However, one provision in the Moon Agreement explicitly relates to natural resources of the Moon and other celestial bodies: Article 11 Moon Agreement.

Its first paragraph declares the Moon and its natural resources be the “common heritage of mankind” and expresses what this means in the following parts of the article, namely:

- Corresponding to Art. II Outer Space Treaty and with an expressive mentioning of natural resources,<sup>20</sup> Article 11 Moon Agreement provides that celestial bodies and their natural resources are not

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14 Hobe, Stephan, ‘Article I Outer Space’, *in* Hobe/Schmidt-Tedd/Schrogl (eds.), *Cologne Commentary on Space Law*, Vol. I, Carl Heymanns Verlag, Cologne, 2009, p. 35, mn 36.

15 Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, 1363 UNTS 3, adopted on 18 December 1979, entered into force 11 July 1984 (Moon Agreement).

16 See Articles 1 and 2 Moon Agreement.

17 Hobe, Stephan/Stubbe, Peter/Tronchetti, Fabio, ‘Historical Content and Background of the Moon Agreement’, *in* Hobe/Schmidt-Tedd/Schrogl (eds.), *Cologne Commentary on Space Law*, Vol. II, Carl Heymanns Verlag, 2013, p. 341 mn 20 with further references.

18 Declaration on Principles of International Law Concerning Friendly Relations and Cooperation among States in accordance with the Charter of the United Nations, adopted on 24 October 1970 UN Res. 2625 (XXV), annex.

19 Art. 3 para. 1 Moon Agreement.

20 Art. 11 para. 1 Moon Agreement.

subject to national appropriation – be it by means of use, by means of or occupation or by any other means<sup>21</sup>;

- that neither the surface nor the sub-surface of the moon, nor any part thereof or natural resources in place shall become property of any State, entity or natural person;<sup>22</sup>
- that there is a right to exploration and use of the moon on a basis of equality and in accordance with international law<sup>23</sup> and
- that the Moon Agreement should serve as the basis for establishing an international exploitation regime to be established to govern the exploitation of the natural resources of the moon as such exploitation is about to become feasible.<sup>24</sup>

Moreover, in paragraph 7, Article 11 of the Moon Agreement provides the main purposes of the regime to be established, as follows:

- the orderly and safe development of natural resources on celestial bodies;<sup>25</sup>
- their rational management;<sup>26</sup>
- expansion of opportunities in the use of these resources;<sup>27</sup>
- equitable sharing by all States Parties in the benefits derived from those resources, whereby interests of developing countries as well as the interests of investor countries should be taken into consideration.<sup>28</sup>

Thus, already in 1979 it had been formulated in a binding international agreement which was adopted by consensus of all UNCOPUOS Member States, that the exploitation of natural space resources in the Solar system is subject to international regulation.

#### **4. The Law Today: Can it Catch up with the Plans to Exploit Resources in Practice?**

Where are we today and what is the effect of the regulation that we have today with respect to natural resources?

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21 Art. 11 para. 2 Moon Agreement.

22 Art. 11 para. 3 Moon Agreement.

23 Art. 11 para. 4 Moon Agreement.

24 Art. 11 para. 5 Moon Agreement.

25 Art. 11 para. 7 lit. (a) Moon Agreement.

26 Art. 11 para. 7 lit. (b) Moon Agreement.

27 Art. 11 para. 7 lit. (c) Moon Agreement.

28 Art. 11 para. 7 lit. (d) Moon Agreement.

As of October 2019, the Outer Space Treaty has been signed and ratified by 109 States and the Moon Agreement by 18 States Parties.<sup>29</sup> Neither of these international agreements, however, provides a specific regime for space resources and the existing regulation in the Moon Agreement outlines only the main parameters and aims of such a regime, but leaves it to the international community to establish it in the future, as exploitation is about to become feasible.<sup>30</sup>

During the recent few years, plans have been announced for the exploitation of natural resources on the Moon, e.g. Helium-3,<sup>31</sup> and asteroids and this has raised various questions on the legal permissibility and the current status of the law as regards this issue. The lunar crust as well as some asteroids offer a variety of primary elements including uranium, thorium, potassium, oxygen, silicon, magnesium, iron, titanium, calcium, aluminum and hydrogen.<sup>32</sup> In the lunar soil and on asteroids also metals such as platinum, palladium, osmium and iridium could be found.

Private companies, such as Deep Space Industries and Planetary Resources, had been founded in the past decade to develop concepts for space resource mining. Today, they have changed their business orientation towards other space activities or have been merged with other companies.<sup>33</sup>

After a promising first phase of promoting plans for commercial exploitation of natural resources on celestial bodies and asteroids, and while the political and commercial interest in space mining was growing, as of now, it cannot be expected that resource exploitation will become practicable sooner than a few decades from now.

## 5. The Role of National initiatives

On the legal level, however, some significant development has taken place. Already two States – in 2015, the United States of America with the US

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29 Status of International Agreements relating to activities in outer space as at 1 January 2019, UN Doc. A/AC.105/C.2/2019/CRP.3, 1 April 2019.

30 Art. 11 para. 5 Moon Agreement.

31 Bilder, Richard. B., 'A Legal Regime for the Mining of Helium-3 on the Moon: US Policy Options', *Fordham Journal of International Law* Vol. 33 No. 2 (2010), pp. 243-299.

32 Tronchetti, Fabio, 'Legal Aspects of Space Resource Utilization', in Von der Dunk/Tronchetti (eds.), *Handbook of Space Law*, Edward Elgar Publishing, Cheltenham/Northampton, 2015, p. 771.

33 "ConsensSys Acquires Planetary Resources", published on 31 October 2018 on [www.planetaryresources.com/2018/10/consenssys-acquires-planetary-resources/](http://www.planetaryresources.com/2018/10/consenssys-acquires-planetary-resources/) and "Bradford Space Group Acquires Control of Deep Space Industries, Inc.", published on 2 January 2019 on [www.deepspaceindustries.com](http://www.deepspaceindustries.com).

Commercial Space Launch Competitiveness Act<sup>34</sup>, and in 2017, Luxembourg with the Law on the exploration and utilization of space resources<sup>35</sup>, have adopted national laws concerning the exploitation of space resources by their nationals. Some further States are planning to follow while the discussions in UNCOPUOS on this topic have, as of yet, not produced a substantial result. Both the US and the Luxembourg law entitle their nationals to rights regarding space resources. The US Commercial Space Launch Competitiveness Act creates rights to acquire, possess, own and deal with space resources by stating that:

“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.”<sup>36</sup>

While stating that that no “sovereignty or sovereign or exclusive rights or jurisdiction over, or the ownership of, any celestial body” are asserted,<sup>37</sup> the law attempts to entitle US citizens engaged in commercial recovery of asteroid and space resources<sup>38</sup> “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.”

Also, the national law of Luxembourg in its first Article states that space resources are capable of being appropriated<sup>39</sup> and entitles Luxemburg citizens or those who are licensed by the Luxembourg government to gain property on space resources or asteroids.

Thus, in effect there is a dichotomy between what the international legal regime provides on the use of outer space, including celestial bodies and resources, and the recently adopted national laws of Luxembourg and USA. International law clearly provides that outer space is an area beyond national jurisdiction in which enforcement and prescriptive jurisdiction, according to

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34 U.S. Commercial Space Launch Competitiveness Act, U.S. Congress, H.R.2262, 25 November 2015.

35 Loi du 20 juillet 2017 sur l’exploration et l’utilisation des ressources de l’espace, Official Gazette of The Grand Duchy of Luxembourg, No. 674 (28 July 2017).

36 U.S. Commercial Space Launch Competitiveness Act, Section 51303 “Asteroid resource and space resource rights”.

37 U.S. Commercial Space Launch Competitiveness Act, Section 403 “Disclaimer of Extraterritorial Sovereignty”.

38 Section 51301 of the U.S. Act defines the term space resource as “an abiotic resource in situ in outer space” and that the term “asteroid resource “includes water and minerals”.

39 The original text in French reads: “*Les ressources de l’espace sont susceptibles d’appropriation*”.



Art. VIII Outer Space Treaty, can be extended to space objects and nationals of the respective State of Registry.<sup>40</sup>

National jurisdiction cannot, however, be extended to outer space and celestial bodies, or any non-manmade objects. As no single State has a title to outer space, celestial bodies and their resources, but only to their space objects and their nationals, the jurisdiction over this domain can only take place result from international regulation. Therefore, it is legally impossible to transfer any title to ownership, possession or any rights that derive therefrom by States, unless such a legal entitlement has been vested to them by means of an international agreement.

No State has jurisdiction to enact national legislation that grants its nationals with a title to property over (parts of) areas beyond national jurisdiction. With regard to outer space, the universal principle of law “*Nemo plus iuris transferre potest quam ipse habet*” is fully valid. As a result, there is a sheer legal impossibility of States to unilaterally regulate over and to provide title to ownership over such areas as the jurisdiction to do so is not vested in any State actor<sup>41</sup>, but lies within the community of States.

Therefore, although the enacted national laws of Luxembourg and the USA have, from a national perspective, become law, they are not in accordance with international law as regards the provisions on space resources. Thus, in the system of international law that governs the rights of sovereign States among each other, these unilateral legal acts fail to unfold any legal significance. By attempting to transfer to nationals a non-existent legal title to ownership and possession over space resources that cannot be derived from State jurisdiction, such national legal initiatives are creating a legal “*nullum*” (nothing) and are void.

Moreover, the effects that they attempt to create are exceeding the scope of legal rights that any State can have under international law with regard to areas beyond national jurisdiction.<sup>42</sup> Also the argument heard often during UNCOPUOS meetings and other fora that as long as resource have already been “extracted” or “removed” from the celestial body or asteroid, they would cease to fall under the international legal regime is groundless because

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40 Schmidt-Tedd, Bernhard/Mick, Stephan, *Article VIII Outer Space Treaty* in: Hobe/Schmidt-Tedd/Schrogl (eds.), *Cologne Commentary on Space Law*, Vol. I, Carl Heymanns Verlag, 2009, mn 44, p. 156.

41 Hobe, Stephan/De Man, Philip, ‘National Appropriation of Outer Space and State Jurisdiction to Regulate the Exploitation, Exploration and Utilization of Space Resources’, *Zeitschrift für Luft und Weltraumrecht (German Journal of Air and Space Law)* Vol. 66 (2017), pp. 460-475.

42 Hobe, Stephan, ‘Why National Space Laws on the Exploitation of Resources of Celestial Bodies Contradict International Law: Unilateral Space Legislation versus ‘the Province of All Mankind’’, *ROOM Magazine*, Issue No. 1 (15) 2018; and Jakhu, Ram, ‘Legal Issues Relating to the Global Public Interest in Outer Space’, *Journal of Space Law* Vol. 32 (2006), pp. 31-110.

*the primary action* – removal with the intent of possession - contradicts Art. II Outer Space Treaty.

While the freedom of use of outer space covers space mining activities and, according to Art. VI Outer Space Treaty, States have to authorize and supervise the space activities of their nationals, in the case of space mining it is not enough to focus the discussion around the legal obligations under Art. VI Outer Space Treaty. It is important to note that the general jurisdiction of States with regard to their national space activities does not automatically encompass space mining activities, as the very subject of such activities is outside the scope of any national jurisdiction. States have no jurisdiction over space resources and therefore, they are not entitled to transfer any legal rights to such resources to their nationals.

## **6. Perspectives for the Future Law on Resource Mining**

The above considerations do not in any way preclude the emergence of (national) regulation of resource exploitation in the future. Nor do the authors intend to say that space mining activities should not become a legal reality in the future. However, before internationally valid national laws can exist without contradicting international law and without possibly infringing the rights of other States in the exploration and use of outer space, the international community must have sanctioned such a type of regulatory power. Currently, the power of jurisdiction of States over outer space, celestial bodies and space resources does not exist and is contingent on a respective decision of the international community of States.

Regardless of the limited number of ratifications of the Moon Agreement, it should not be disregarded. First, it is binding law which was adopted by consensus by all States in UNCOPUOS, including the USA. But what is even more important in the context of the above considerations, it provides a basis for creating a specific legal regime for the exploitation of resources.<sup>43</sup>

Considering the possible outline of such a regime, many important questions are worthwhile discussing, for example whether an international authority should be mandated to govern the exploitation of space resources, as is the case of the Deep Seabed authority.<sup>44</sup> In fact, Article 11 of the Moon Agreement, by listing a few objectives, provides an excellent starting point for States to come up with such an international order.

It must be considered that the legal and the political discussion on the delineation between national and international regulation with regard to outer space, celestial bodies and natural resources in outer space is not merely an academic exercise. First, it is in the interest of all States and private entities

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<sup>43</sup> Hobe, Stephan, *Space Law, Nomos/Hart*, Baden-Baden/Oxford, 2019, pp. 165 et seq.

<sup>44</sup> United Nations Convention of the Law of the Sea (UNCLOS), 3 UNTS 136, adopted on 10 December 1982, entered into force 16 November 1994, Art. 136.

wishing to invest in space mining activities to have legal clarity and predictability instead of uncertainty and fragmentation.

An international framework to be yet established should formulate and set the basic elements that any space resource national law should observe. Such a common basis in the form of a binding agreement will be beneficial for any national effort and will provide for some basic legal certainty.

Therefore, it is herewith suggested that

- (1) Single States should enact national space resources laws only after certain common international standards have been agreed upon and tailored specifically for mining activities (e.g. environmental impact assessment; mitigation measures; planetary protection; non-interference, to name but a few);
- (2) Only after the international community has come up with framework solutions on how these activities should be performed, national laws shall regulate the nationally relevant details.