

Leiden LL.M. Students and the Legal and Policy Aspects of Space Resource Utilization

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Abstract

The International Institute of Air and Space Law (“IIASL”) at Leiden University in the Netherlands has offered its Master of Advanced Studies in Air and Space Law since 2000. Each year, students from all over the world join this program and engage in an intense year of studies as a highly diverse group in terms of geography, gender, age and background. Legal and policy aspects of space resource utilization (“SRU”) forms a prominent part of the teaching program and is run during several consecutive days of teaching activities. After students receive an introductory overview of scientific aspects of SRU, an in-depth overview of relevant provisions of the 1967 Outer Space Treaty and the 1979 Moon Agreement is provided. The Hague International Space Resource Governance Working Group and the 20 ‘Building Blocks’ it adopted in November 2019 is also discussed. Finally, an interactive class exercise is held, whereby three groups of students debate several questions from different perspectives before reporting to the full class. Because students are encouraged to take on the perspectives of various stakeholders, interesting and original views are presented and offer a useful contribution to the international debate on SRU. In this paper, the staff and students of the IIASL explain and assess the interactive and multi-faceted educational method used. The student’s approaches to the questions are outlined and the outcome of their discussions are presented.

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1. Introduction

During the academic year 2019-2020, the students of the Advanced Master of Laws in Air and Space Law at Leiden University participated in an interactive activity concerning space resource rights, The Hague International Space Resources Governance Working Group (“The Hague Working Group”) and the creation of The Hague Working Group’s Building Blocks. In this class, the work of The Hague Working Group and the content of the Building Blocks were introduced to the students, who then were split into groups to discuss specific topics before presenting their views to the rest of the class. The aim of this manuscript is to describe and explain the outcomes of the interactive group exercise and to show the uniqueness and value of the exercise.

First, a small overview of the requisites for the exercise will be given, showing why the exercise is unique. The questions presented during the exercise will be discussed and examined as well as the perspective from which those questions were addressed. The final paragraph will focus on the outcome of activity and discussion where new ways to thinking are presented and where feedback is given to the drafters of the Building Blocks to consider in The Hague Working Group's next stages.

2. Requisites for the Activity

2.1. Introductory Remarks

This section 2 shows the relevance, value and uniqueness of the exercise as the input of the participants, the activity administrator and The Hague Working Group were given.

2.2. What is the LL.M.?

The class participating in this exercise was comprised of students from the Advanced Master of Laws in Air and Space Law at Leiden University (“LL.M.”). The students from the 2019-2020 class of the LL.M. consisted of twenty-eight individuals from approximately twenty nationalities across various regions of the world. Due to this variety of nationalities, the input given to the exercise was extremely broad and creative solutions were presented. In addition, the individuals in the class came with varying levels of expertise in the aerospace sector and academic fields. This allowed discussion from various viewpoints and opinions, making the exercise valuable and unique.

2.3. What is the IIASL?

The International Institute of Air and Space Law (“IIASL”) is a leading research center considering matters on aviation and outer space law and policy. The IIASL is based at Leiden University where it addresses policy, legal and commercial issues regarding aviation and space activities. The subject activity was administered by the IIASL, which created an environment guided by experts on the topic of space resource utilization (“SRU”).

2.4. What is The Hague Working Group?

The Hague Working Group was established in 2016 to establish the first step in working towards an international framework to govern space resources. In December 2019, its members adopted by consensus a set of 20 principles (Building Blocks) intended to lay the foundation for the future regulation of commercial SRU. The IIASL was the principal consortium partner of The Hague Working Group.¹

The dynamics of the LL.M. students under the tuition of a leading authority on space resource utilization made the exercise unique and valuable. The exercise not only offered students a first-rate introduction to the issues of SRU but also gave an opportunity to the IIASL as the principal partner of The Hague Working Group to learn how the next generation of space leaders and how non-experts in the field think about the topic.

3. Questions for Activity

3.1. The Two Questions and the Perspectives Considered to Address These Questions

After an introduction to the fundamentals of SRU law and policy, the students were presented with the following two questions:

- 1) Are national laws granting ownership rights over space resources legitimate (“question 1”); and
- 2) How can the sharing of benefits be realized? (“question 2”).

The students were divided into groups and encouraged by the IIASL to consider the interests of the following stakeholders:

- 1) Less developed countries, or countries that are not active in outer space or not pursuing SRU activities (“perspective 1”);
- 2) Developed countries and countries with space-faring capability and which are pursuing SRU activities (“perspective 2”); and
- 3) Industry (“perspective 3”).

1 International Institute of Air and Space Law, The Hague International Space Resources Governance Working Group. <https://www.universiteitleiden.nl/en/law/institute-of-public-law/institute-of-air-space-law/the-hague-space-resources-governance-working-group> (accessed 29.09.2020).

Due to the similarity in outcomes from perspective 2 and perspective 3, the present manuscript considers only the perspectives 1 and 2. Ultimately the students sought to find common interests between the perspectives 1 and 2 in order to facilitate international governance of SRU.

3.2. Question 1: National Laws on SRU

The first question discussed was “are national laws granting ownership rights over space resources legitimate”?

In order to answer this question, some students thought it necessary to first consider the meaning of the terms ‘ownership rights’, ‘space resources’ and ‘legitimacy’. Subsequent questions included consideration of whether ownership rights necessarily entail commercial rights, usage rights or the right to appropriate. Students also discussed whether space resources are purely physical or may they include data, knowledge and processes. The question was also raised of whether legitimacy may be established under national law, international law or soft law?

3.3. Question 2: Sharing Benefits

Question 2 considered how can the sharing of benefits be realized. Grounded in Article I of the 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”),² the exploration and use of outer space shall be carried out for the benefit and in the interests of all countries, while being free for exploration and use by all States without discrimination of any kind on the basis of equality. Considering the sharing of benefits in the context of the Outer Space Treaty, the students were required to discuss the interpretation of this principle from both perspective 1 and perspective 2.

4. Question 1: Rights, Resources and Legitimacy

4.1. Considering Interpretation

In considering whether national laws granting ownership rights over space resources are legitimate, the students discussed what *ownership rights* implies in the context of commercial rights, usage rights, and right to appropriate.

In relation to the meaning of space resources, the students discussed whether *space resources* implied tangible resources in space, manmade resources taken into or created in outer space, data and information used in space, and knowledge and processes created in space.

In relation to what is *legitimate*, students discussed the term in the context of the legally binding rules, such as national law and international law, non-

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

legally binding law (soft law), such as the guidelines, and commercial practice. The key was to determine what is measured against what. For instance, do we consider the national laws being legitimate with customs outside space law or particularly as per the Outer Space Treaty.

4.2. Ownership Rights and Space Resources

First and foremost, the articles of international space law must be considered. An example of finding those definitions is by looking at international space law framework, such as the Outer Space Treaty and the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (“Moon Agreement”).³ While the Outer Space Treaty may equated as the Magna Carta of space law, this treaty does not provide provisions specifically mentioning activities concerning SRU. Yet, as it includes important principles with regard to SRU, The Outer Space Treaty can be guiding in order to define the terms ownership rights and space resources. First of all, the principle of freedom of exploration and use of outer space by all States forms the basis of the Outer Space Treaty.⁴ States are completely free to conduct these activities. Furthermore, the non-appropriation principle prohibits the national appropriation of outer space by claim of sovereignty, by means of use or occupation, or by any other means. Therefore, no prior authorization is needed in order to conduct activities in outer space.⁵

A more complicated treaty is the Moon Agreement. The Moon Agreement is the only treaty specifically dealing with SRU. The treaty provides specific provision for SRU and gives a more restricted regime than the Outer Space Treaty. Article 11 (1) Moon Agreement mentions that, amongst others, natural resources are common heritage of mankind.⁶ In addition, Article 11(3) declares that States may not become property of any State.⁷ The difficulty of this treaty is that only 18 States are party to this Agreement and the main space-faring States, such as the United States of America (USA), Russia and China, are not.⁸

It becomes clear the international legal framework does not provide for a clear answer on the definition of ownership rights and space resources.

3 Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (adopted 5 December 1979, entered into force 11 July 1984) 1363 UNTS 21 (Moon Agreement).

4 Outer Space Treaty, Article I.

5 Outer Space Treaty Article II.

6 Moon Agreement, Article 11(1).

7 Moon Agreement, Article 11(3).

8 United Nations Treaty Collection. Agreement governing the Activities of States on the Moon and other Celestial Bodies, 5 December 1979. https://treaties.un.org/Pages/ViewDetails.aspx?src=IND&mtdsg_no=XXIV-2&chapter=24&clang=_en (accessed 29.09.2020).

While the international legal framework does not stipulate specific rules to SRU, it leaves room for interpretation. The USA, Luxembourg and the United Arab Emirates (“UAE”) all allow the commercial operators to lawfully acquire the space resources, which can be evaluated as the most revolutionary provision. Although, small differences can be found among provisions in these national laws, they all allow the commercial operators to acquire the space resources lawfully. As a result, it enables the commercial operators to use, sell, transport, store or carry out any other activity stemming from the right to acquire lawfully. Therefore, after the students discussed international space law, an examination of the USA, UAE and Luxembourg was encouraged. Those countries all have a legal framework regarding SRU. The legal framework of the USA is laid down in the U.S. Commercial Space Launch Competitiveness Act.⁹ Regarding ownership rights it mentions rights that are protected, such as possession, ownership, transportation, usage and sell.¹⁰ When looking at the framework of the UAE, it becomes clear that it is different from that of the USA, as it mentions that ownership rights entail extraction, exploitation and utilization, including ownership, purchase, sale, trade, transportation, storage.¹¹ In addition, the Luxembourg legal framework states that ownership rights involve appropriation and utilization for commercial purposes.¹² It becomes clear that those definitions are all somewhat different and do not provide clear answers as to the definition of ownership rights.

When looking at the definitions given by those States of *space resources*, approaches vary. The U.S.

Commercial Space Launch Competitiveness Act defines space resources as “an abiotic resource in situ in outer space”, including water and minerals.¹³ The UEA defines space resources as “non-living resources present in outer space, including minerals and water”.¹⁴ Similarly, Luxembourg mentions space resources to be abiotic resources, which can be found in situ in outer space and can be extracted, including mineral resources and water.¹⁵ By looking at those definitions, the meaning of space resources is pretty clear and there exists no ambiguity in it.

9 U.S. Commercial Space Launch Competitiveness Act (2015). <https://www.congress.gov/114/plaws/publ90/PLAW-114publ90.pdf> (accessed 29.09.2020).

10 U.S. Commercial Space Launch Competitiveness Act § 51303.

11 Federal Law No. 12 on the Regulation of the Space Sector (2020), Article 18. https://space.gov.ae/Documents/PublicationPDFFiles/SpaceSectorFederalLaw_EN.pdf (accessed 29.09.2020).

12 Law of July 20th 2017 on the Exploration and Use of Space Resources. https://space-agency.public.lu/en/agency/legal-framework/law_space_resources_english_translation.html (accessed 29.09.2020).

13 U.S. Commercial Space Launch Competitiveness Act § 51301.

14 Federal Law No. 12 on the Regulation of the Space Sector, Article 1.

15 The Law on the Exploration and Use of Space Resources.

4.3. Legitimacy

With regard to the right to extract, recovery and use of space resources, the question arises whether space resource rights are compatible with the Outer Space Treaty. One can argue that Article I of the Outer Space Treaty, which states that freedom for exploration and use of outer space is not necessarily a sound basis for the right to acquire space resources. This is because space resources may be used without any rights. For instance, merely sharing space resources among states as a common heritage. Furthermore, one may argue that space resource activities for commercial purposes go beyond the meaning of this principle, because the principle of freedom in Article I should be read as freedom for scientific purpose or in the context of a State's mission. This view is also in line with a view that the non-appropriation principle in Article II of the Outer Space Treaty applies to anything in outer space, as such it includes space resources extracted from celestial bodies.¹⁶ From this view, Article II of the Outer Space Treaty prohibits space resource utilization activities.

From the right of freedom of *use*, however, the Outer Space Treaty does not expressly exclude the right to use space resources and their commercial use. As such, it is possible to interpret Article I of the Outer Space Treaty as a basis for resource rights. Moreover, the Outer Space Treaty merely states that the non-appropriation principle applies to outer space. The Outer Space Treaty is otherwise silent about whether the principle also applies to space resources without any appropriation or possession of outer space itself. In this regard, Article II should be read that the non-appropriation principle only applies to the territory, and not to space resource itself.

Given that the purpose of space resources utilization is considered to be neither an appropriation of parts of outer space nor of space resources in situ, the sole aim of any such activities is said to be the *use* of outer space. In other words, the extraction, recovery and acquisition of space resources do not link with the national appropriation of outer space itself. From this view, Article II of the Outer Space Treaty does not prohibit any space resource utilization activity. This view is in line with the legal regime of the high seas under the 1982 UN Convention on the Law of the Sea ("UNCLOS").¹⁷ Under Article 89 of the UNCLOS, States are prohibited from exercising rights of sovereignty over the high seas.¹⁸ However, States are allowed to access to the high seas freely and 'the freedom of fishing' under Article 87 of the UNCLOS.¹⁹ In this regard, the Position Paper On Space Resource Mining ('IISL Position Paper') issued by the International Institute of Space Law

16 Outer Space Treaty, Article II.

17 Convention on the Law of the Sea (adopted 10 December 1982, entered into force 16 November 1994) 1833 UNTS 397 (UNCLOS).

18 UNCLOS, Article 89.

19 UNCLOS, Article 87.

(IISL) on 20 December 2015, illustrates about Article II of the Outer Space Treaty that “[...] it is less clear whether this Article also prohibits the taking of resources.” and “[...] in view of the absence of a clear prohibition of the taking of resources in the Outer Space Treaty[...]”.²⁰ Therefore, the Outer Space Treaty does not include any provision expressly allowing or prohibiting space resources utilization. Based on such an interpretation, the Outer Space Treaty should be interpreted in accordance with the needs and the stream as well as the development of the space resources utilization.

5. Question 2: Benefit-Sharing

5.1. What is Benefit-Sharing?

The second question discussed during the exercise was how can the sharing of benefits be realized? In order to answer this question, students found it necessary to determine the authority for benefit-sharing. Benefit-sharing is based on Article I of the Outer Space Treaty. Even if national laws allowing space resource rights are not inconsistent with international law, law-making at the international level may be used to secure benefit-sharing based upon Article I of the Outer Space Treaty.²¹ However, Articles 4 and 11 of the Moon Agreement also refer to a concept of benefit-sharing, mentioning that exploration is “for the benefit and in the interests of all countries” and equitable sharing is required with the focus on the “interests and needs of the developing countries”.²² This indicates a stronger calling for international frameworks. Concerning the advent of space resource activities is just around the corner, states must come to an understanding on what benefit sharing is and whether international agreements are necessary to achieve that sharing.

Another important way to find the meaning of benefit-sharing is by looking at the perspectives presented in paragraph 3.1 above. When concentrating on perspective 1, covering the countries that are not active in outer space, it becomes clear that the benefit and the interests from space resource activities should be shared by all States. The benefit-sharing mechanism may be a means to increase and promote opportunities to enter into space resource activities by all countries. In addition, it can ensure that the data and information collected through space resource activities should not be exclusive to limited countries. This is also in line with the Outer Space Treaty and the Moon Agreement as mentioned above. Focusing on perspective 2, which covers space-faring countries, it is likely that economic incentives (first mover’s advantages) should be ensured in order to sustain the development of

20 International Institute of Space Law, Position Paper On Space Resource Mining, 20 December 2015, 2, <http://iislwebo.wwwnls1.a2hosted.com/wp-content/uploads/2015/12/SpaceResourceMining.pdf> (accessed 30.09.2020).

21 Outer Space Treaty, Article I.

22 Moon Agreement, Article 4 and 11.

space resource activities. In this way, their space capabilities are protected. Monetary benefit-sharing should not be mandatory. It should be left to the discretion of each arrangement depending on purposes, type of activities or other multiple factors. Furthermore, the protection of the intellectual property of the commercial entities should be taken into account. Sharing information or data may cause an infringement on the intellectual property of private entities.

However, State to State transactions are not the only way non SRU-States may benefit from another State's SRU activities. The derivatives and spin offs created from SRU activities may greatly contribute to a non-SRU State's standard of living or economic opportunities. The benefits of earth observation from outer space, for instance, have had immense positive impact in the management of natural disasters occurring in nations which did not receive any transactional recognition from the State of the satellite's registry which provided the earth observation data. There is no reason the same cannot be said for SRU activities as with earth observation activities. Thus, merely because a State A is not receiving compensation from the State B which engages in SRU activities, it does not mean the State A does not benefit from State B's SRU activities. This is far from inconsistent with Article I of Outer Space Treaty.

This part 5.1 illustrates the definition of benefit-sharing from two perspectives leads to two distinct definitions. Accordingly, a discussion in the international arena must consider both perspectives. Such may reach a solution considering the benefits derived from SRU rights, rather than benefits mandated through a two-party transaction.

5.2. Building Block 13

The students of the LL.M. also found it necessary to look into the soft law instrument produced by The Hague Working Group, namely the Building Blocks.²³ Building Block number 13 shows non-exhaustive examples of benefit-sharing. It encourages benefit-sharing mechanism that enable all interested States enter space resource activities. For example, Building Blocks 13.1 (a), (b), (c), (d) and (f) can improve the development of space science and technology of interested States as well as existing space-faring nations. On top of that, Building Block 13.1 (e) recommends a mechanism for interested States to take part in space resource activities by means of setting up joint ventures. These recommendations are in line with perspective 1. Moreover, it should be noted that Building Block 13.2 explicitly states that monetary benefit-sharing should not be compulsory. It only recommends the establishment of an international fund in 13.1 (g). However, it remains to be

23 The Hague International Space Resources Governance Working Group, Building Blocks for the Development of an International Framework on Space Resource Activities (adopted 12 November 2019).

seen where the money comes from, how international fund will be used and who will manage the fund. These recommendations are in line with perspective 2.

The above shows that Building Block 13 gives extensive examples of benefit-sharing and that both perspectives are in line with it. It is interesting to see the active discussion taking place at the international level based on the Building Blocks and other, such as the Vancouver Recommendations on Space Mining Outer Space Institute by the Outer Space Institute.²⁴

6. Outcome of Activity and Discussion

Thus far, there is no clear international legal framework regarding space resource activities. Therefore, the students came up with solutions and new ways to think on the development of SRU. Furthermore, feedback was discussed and presented for the drafters of the Building Blocks to consider in The Hague Group's next stages.

6.1. New Ways to Think

Below, several solutions and new ways to think are presented. However, some challenges come up as well. The first proposal of the students was the creation of a new treaty focusing on SRU. However, right away the question arises if this is realistic. Drafting a new treaty is a time-consuming process. It took several years with quite particular interest for the existing space treaties to be established. Furthermore, the Committee on the Peaceful Uses of Outer Space requires consensus approach. As States have different perspectives on SRU, this could be difficult to reach, particularly with varying definitions of “benefits” between states. Another solution could be the amendment of the Outer Space Treaty in order to create more specific rules concerning SRU. However, the same argument as above comes into play. Even though not an entirely new treaty will be established, amendments also are time consuming and consensus should be reached. Furthermore, a solution could be to establish an international regime in accordance with Article 11.5 of the Moon Agreement. This provision mentions the establishment of “an international regime, including appropriate procedures, to govern the exploitation of the natural resources of the moon”. The problem that arises is the fact that the Moon Agreement is ratified by only a few States, not including the space-faring nations. It is not likely that, in the future, States are willing to ratify this agreement, as there are some complicated provisions in it. In addition, a solution was presented to create soft law, such as UNGA resolution or guidelines, concerning SRU. The challenge here is that soft law is not legally binding. Probably the most realistic solution could be to create

24 Vancouver Recommendations on Space Mining. http://www.outerspaceinstitute.ca/docs/Vancouver_Recommendations_on_Space_Mining.pdf (accessed 28.09.2020).

bilateral /multilateral agreements based on the discussion on Building Blocks. This may consider benefits afforded through humanity by means of SRU rights rather than the direct provision of resources by those States protecting SRU rights.

6.2. Expert Guidance From IIASL Giving Authority to the Activity

As mentioned above, the activity was administered by the IIASL, creating an environment guided by experts on the topic of SRU. In this way, students were able to dive into the topic of SRU and understand the challenges that come with the topic.

6.3. Feedback to Drafters of the Building Blocks to Consider in Hague Group's Next Stages

After the discussion regarding the activity, the students came up with feedback and suggestions for the drafters of the Building Blocks to consider in The Hague Group's next stages. The first point of feedback is to encourage countries to adopt national legislation based on the Building Blocks. In this way, States are not obliged to adopted national legislation, which can cause aversion. States are given freedom to create national law in accordance with the Building Blocks. The next point of feedback entails the encouragement of States with space-faring capabilities and private actors to voluntary comply with the Building Blocks. Again, by not obliging entities to follow the Building Blocks, entities are more likely to comply with the Building Blocks on their own initiative. Even partial compliance with the Building Blocks will be a trigger for States. As SRU is developing and more States are interested in space mining, voluntary compliance with the Building Blocks could be the start of the development of an international legal framework regarding SRU. Furthermore, awareness/lobbying about the existence and applicability of the Building Blocks should be shared. By creating awareness, States become more familiar with the substance of the Building Blocks as well as with the positive aspects and usefulness for both States not active in outer space and States with active space-faring capabilities.

7. Conclusions

During the activity of the LL.M., students gained information on SRU in relation to the international and national legal frameworks. It was a unique exercise with outcomes presented by students with different backgrounds and administered by experts of The Hague Working Group and the IIASL.

In going forward, legal certainty concerning SRU is necessary. By presenting several solutions and feedback in order to find new ways to come to legal certainty, the students did not dismiss the challenges in achieving legal certainty. In dialogue with each other and the tutors from the IIASL, the students distinguished *appropriation* from *commercial usage*, how the benefit

of all countries is compatible with private investments, and how the common heritage of all mankind is compatible with exclusive rights of non-State actors. Such considerations may prove useful to The Hague Working Group's next steps in developing and implementing the Building Blocks for international co-operation in SRU in line with the Outer Space Treaty.