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# PROPERTY ON SPACE RESOURCES: THE SEARCH FOR A TERMINOLOGY

## A FOCUS ON THE MOON AND ITS MINERAL RESOURCES<sup>1</sup>

### *Abstract*

By the end of one or two decades, several competing lunar bases will be installed or in the process of being installed, most probably located around the Moon's South Pole and its water resources. By the end of three decades, companies will probably be extracting resources from the moon with a commercial and lucrative objective. But already on Earth, some states are taking the lead and intervening in the regulation of this future exploitation. Of these, the United States and Luxembourg admitted the existence of property rights over space resources through national laws in 2015 and 2017, in each case assuming the compliance of the resulting provisions with existing international law and more particularly with Article II of the Outer Space Treaty, dedicated to non-appropriation.

Our article seeks to analyse that appealing hybrid notion of space property in a strategic legal and geopolitical environment that is in the process of renewal. Indeed, space is undergoing a paradigm shift with a synchronous movement of nationalisation and privatisation. A global legal pluralism obliges space stakeholders to adopt a multiple-front strategy when dealing with legal questions arising out of new space activities, placing new space law interrogations that have arisen at the right level of normativity *ab initio*.

As for the latter, it will be seen that space property is not so much a concept of public international law but of private international law - we suggest space property is a domestic law regime coordinated in its international dimensions by private international law - and that it is only by understanding it as such that its effects can be deployed beyond the mere creation of a space market to constitute an embryo of decentralised governance of space resources. However, one issue of public international law remains necessary to ensure the full effectiveness of space property: the coordination of occupations. The coordination of occupations and the organisation by law of a space resources economy based on property are in fact of different orders. To circumvent this issue by a questionable opposition between commons and property of space resources is to undermine the legal security of the exploitation of these resources, which is at the very foundation of the Luxembourg and American legislative efforts.

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<sup>1</sup> Unless otherwise stated, translations from French to English and the underlining of certain quotations are by the author. When the translation is the one of a particularly technical text, the original French version is proposed in footnote. The websites were last consulted in April 2023.

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## SUMMARY

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## 1 Introduction

*“In our field of research, a new problem can be a result”.*  
Paul Valéry<sup>2</sup>

When it comes to the forthcoming return of a few space powers to the Moon, what should attract the attention of the jurist is not so much the destination itself but the willingness to exploit its resources.<sup>3</sup> It is no longer a question of a few astronauts surviving for some days on the Moon, but rather of contemplating a permanent installation with sustainable expansion on the Selene ground. The «*envoys of mankind*»<sup>4</sup> and their robots will be given the mission of extracting, collecting, exploiting, using<sup>5</sup>, and eventually reselling the resources available *in situ*. And although under the banner of space-mining, a diversity of projects with protean techniques co-exist<sup>6</sup>, the goals are well known: the use of frozen water at the poles of the natural satellite, the production of liquid propellants from this water and from regolith, and the extraction of metals deposited on the Moon by various celestial bodies that have crashed there over the past

<sup>2</sup> Paul Valéry, *Cours de Poétique, Tome I - Le corps et l'esprit, 1937-1940* (Gallimard 2023). In French : «*Dans notre genre d'étude, un embarras nouveau est un résultat*».

<sup>3</sup> Our article focuses on space mineral resources, particularly those on the Moon. However, a debate on the ownership of space data also needs to take place, especially as the exploitation of such data, particularly in synergy with that of mineral resources, is much closer in time.

<sup>4</sup> Outer Space Treaty, UNOOSA 2222 (XXXI) 1966 Art. V.

<sup>5</sup> Exploiting and using relate to two different elements to the extent using may also relate to the process of refining and processing resources to obtain a product from the said resources.

<sup>6</sup> For the purposes of convenience, the term space-mining is considered here as equivalent to space resource capture. However, we agree with the authors quoted below when they refer to the confusion that exists in the contemporary debate on the subject. The infrastructures needed for the extraction and processing of resources will be different according to the evolution of technology and demand and their imposing size correlates with the large quantity extracted. The question of commerciality is also at stake in these confusions: a true Rubicon of the debate around ISRU and its law, it changes the parameters from as scientific/life-support use, the legality of which is not in doubt, and commercial cost-effective use, a debate occupying entire libraries on the trade in space resources. See on this subject Zac JS Wager and others, 'Defining the Notion of Mining, Extraction and Collection: A Step toward a Sustainable Use of Lunar Resources' (2022) 201 *Acta Astronautica* 592; Eytan Tepper, 'Structuring the Discourse on the Exploitation of Space Resources: Between Economic and Legal Commons' (2019) 49 *Space Policy* 101290.

billion years. As we briskly enter the second age of space exploration<sup>7</sup>, the Moon is no longer just a territory to be explored but also an ore deposit to be exploited. And from this dialectical tension between exploration and exploitation, a profound change in space law will undoubtedly emerge, moving, like other international spaces laws, from a "law of movement" to a "law of control".<sup>8</sup>

But we are not yet back on the Moon. And although the first sale of regolith by the company *iSpace* to NASA is expected soon<sup>9</sup>, the first manned missions to the satellite's ground will not take place before the flight of Artemis III in 2025 (for an optimistic prognosis). The exploitation of space resources on a substantial scale is unlikely to be a reality for at least a decade. However, this has not prevented some States from taking the lead and intervening in the regulation of this future exploitation. Of these, the United States and Luxembourg admitted the existence of property rights over space resources through national laws in 2015<sup>10</sup> and 2017<sup>11</sup>, in each case assuming the compliance of the resulting provisions with existing international law and more particularly with Article II of the Outer Space Treaty, dedicated to non-appropriation. In addition to the two States, the United Arab Emirates and Japan have also adopted national regulations on space resources.

Numerous motivations were at play in the domestic enactment of these standards. We shall have the opportunity to return to these strategic considerations in the section 2 of our article. But the choice of resorting to national laws to set up a regime for the exploitation and appropriation of space resources, admittedly modest at present but nonetheless existing, is characteristic of the most important contemporary mutation in space law: the synchronous movement of privatisation and nationalisation that runs through the field. We shall discuss this further, but it should be observed that this synchronous movement, insofar as it leads to a diversification of the sources of space law, places the framework and governance of the second space age under different auspices and renewed legal strategies compared to the last century.

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<sup>7</sup> In the words of William E. Burrows in his monograph on the history of space in the 20th century, *This New Ocean*. Indeed, in our view, contemporary space activities and operations are undergoing a reconfiguration that goes far beyond the New Space while including it in the scope of these same reconfigurations. The second space age includes, in a non-exhaustive way: the renewal of the structures of the space economy by the New Space, the emergence of new space powers in the South, the return of a bloc dynamic after a multipolar post-Cold War period, the emergence of new practices in the conduct of a multilateral dialogue in space affairs and in the elaboration of international space law, the opening of space to non-space. William E Burrows, *This New Ocean: The Story of the First Space Age* (Modern Library 1999).

<sup>8</sup> In the words of the French jurist Denis Alland, who was interested in the evolution of the law of the sea. In : Denis Alland, 'La Représentation de l'espace En Droit International Public' [1987] Archives de Philosophie du droit 163.

<sup>9</sup> At the time of writing, April 2023. For more information: 'iSpace Receives License to Conduct Business Activity on the Moon from Japanese Government' [2022] <<https://ispace-inc.com/news-en/?p=3829>> accessed 30 March 2023.

<sup>10</sup> US Public Law 114-90 on Commercial Space Launch Competitiveness Act, 25 Nov. 2015 (US Space Act) Pub. L. No. 114-90, 129 Stat. 704.

<sup>11</sup> Law of July 20<sup>th</sup> 2017 on the exploration and use of space resources, JOURNAL OFFICIEL du Grand-Duché de Luxembourg MÉMORIAL A - 674 du 28 juillet 2017.



It is against this background that must be appreciated the inclusion in space law of a hybrid<sup>12</sup> legal notion, “*property of space resources*”. The use of a traditional institution of Western law is not trivial or meaningless. It can only appeal to the lawyer, and even more to the privatist than to the publicist.

With the Moon in mind, our article seeks to analyse space property in a strategic legal and geopolitical environment that is in the process of renewal. Our first section (**Sec. 2**) attempts to insert the question of how the exploitation of space resources should be regulated into this renewed landscape. Based on its conclusions, we will demonstrate that this renewed diversification of the sources of space law presents an opportunity to envisage a multi-level governance of space resources by distributing the questions arising from the exploitation of space resources to the right normative level (**Sec. 3**). It will be seen that space property is not so much a concept of public international law but of private international law and that it is only by understanding it as such that its effects can be deployed beyond the mere creation of a space market to constitute an embryo of decentralised governance of space resources. However, one issue of public international law remains necessary to ensure the full effectiveness of space property: the coordination of occupations<sup>13</sup>. The coordination of occupations and the organisation by law of a space resources economy based on property are in fact of different orders. To circumvent this issue by a questionable opposition between commons and property of space resources is to undermine the legal security of the exploitation of these resources, which is at the very foundation of the Luxembourg and American legislative efforts. This is all the truer since 1979 and the failure<sup>14</sup> of the Moon Agreement, the literature on the commons has evolved and no longer covers the same realities as then.

## 2 Space resources at the heart of a multi-front legal strategy

Today, the legal strategies of space stakeholders and the foreign legal policies<sup>15</sup> of States in outer space policy have changed. The space lawyer of the 21st century is moving from chamber music to orchestra and must become a conductor capable of harmoniously - ie strategically - mobilising the various sources of law concerned with

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<sup>12</sup> On the justification of this label, see Sec.3 below.

<sup>13</sup> By this notion, we relate to the fact that in a limited space, ie hereafter, the Moon and more specifically its poles, it is necessary, in the event of the installation of several competing bases, to ensure that they communicate both on their locations and the area they tend to be considering as occupied by their base. It is even more necessary to do so since access to resources highly depends on where one installs its base. It is about deconflicting competing and divergent interests in a limited space in favor of the security of the strategic missions and assets at stake.

<sup>14</sup> Fabio Tronchetti, *The Exploitation of Natural Resources of the Moon and Other Celestial Bodies: A Proposal for a Legal Regime* (Martinus Nijhoff Publishers 2009) 39; Carl Q Christol, ‘The 1979 Moon Agreement: Where Is It Today’ (1999) 27 *Journal of Space Law* 1. This article, notably starting with a noteworthy quotation from Hughes Mearns, “As I was going up the stair I met a man who wasn’t there. He wasn’t there again to-day. I wish, I wish he’d stay away”. Bin Cheng, *Studies in International Space Law* (Clarendon Press, Oxford University Press 1997) 160,162.

<sup>15</sup> As defined in Guy de Lacharrière, *La Politique Juridique Extérieure* (Economica 1983).

space, encompassing the spectrum from international law to national law, including private and hybrid sources.<sup>16</sup> And, contrary to the historical trend, it is no longer even certain that it is up to international law to set the pace... In this respect, it can be said that the law of the second space age is a law of “*global legal pluralism*”.<sup>17</sup> This new pluralism transforms the legal strategies of the actors who must now play “*on multiple fronts*”<sup>18</sup>: and the issue of regulating the exploitation of space resources is a typical example, with the mobilisation of international law, national law, and hybrid sources, together and in relation to each other. And *in fine*, it is especially this last point, the relations between norms, which will constitute the crucible of the questionings of space law of tomorrow and the day after tomorrow: the interactions<sup>19</sup> between the various levels of normativity (international, transnational, national, contractual) more than these levels of normativity considered in themselves; on the condition, however, of placing the legal questioning at the most adapted scale right at the beginning of the questioning.<sup>20</sup>

Space resources law is an emerging topic of the highly composite field of space law.<sup>21</sup> It is characteristic of this new momentum of pluralism of the sources within the subject. Indeed, it lies at the (conflicting) interaction of international and national law. Yet if public international law is no longer the main forum for debate, it is because with the resumption of a certain global economic competition for New Space<sup>22</sup>, law has been

<sup>16</sup> As the Artemis Accords (Principles for Cooperation in the Civil Exploration and Use of the Moon, Mars, Comets, and Asteroids for Peaceful Purposes <<https://www.nasa.gov/specials/artemis-accords/img/Artemis-Accords-signed-13Oct2020.pdf>> accessed 26 June 2023).

<sup>17</sup> The notion has admitted several meaning through continental and anglo-saxon debates. We tend here to relate to the definition given by Jean-Sylvestre Bergé in *L'application Du Droit National, International et Européen* (Dalloz 2013). “*Global legal pluralism*” is defined as “*a particular form of legal pluralism, induced by the phenomena of globalisation of law and its different variations (globalisation, transnationalisation, fragmentation, regionalisation, etc.). Even if this pluralism does not escape forms of standardisation/domination, it describes the multiplication of the places where law is made and applied (...). Several laws developed in a national, international, or European environment are likely to be applied together to a given legal situation*”. See also: Ralf Michaels, ‘Global Legal Pluralism and Conflict of Laws’ in Paul Schiff Berman (ed), *The Oxford Handbook of Global Legal Pluralism* (Oxford University Press 2020) <<https://academic.oup.com/edited-volume/34238/chapter/290315445>> accessed 13 April 2023.

<sup>18</sup> *ibid* 72. The “*multi-front strategy*” is defined as follows: “*The ultimate point of the multi-level comparison must enable the lawyer to define a legal strategy. Roughly speaking, he must determine whether the resolution of his case requires the opening of one or more fronts of discussion in different legal contexts (...). In complex cases where the political, social, and economic stakes are high, it is common for several fronts to be opened at the same time in different legal contexts. Each context often has its own particularity, so that the use of several contexts reflects a plurality of objectives. The means of action present in the different contexts are not necessarily the same. The time to implement them is not the same. The opening up of several fronts can thus be based on a logic of competition between the contexts present in the hope that they will interact with each other*”.

<sup>19</sup> P Blount, ‘Renovating Space: The Future of International Space Law’ (2011) 40 *Denver Journal of International Law & Policy*.

<sup>20</sup> See, *infra*, the case of space property.

<sup>21</sup> Or, to use Mireille Couston’s expression, “*a median legal space that gathers in its confluence singularities as different in substance as in form*”. (in M Couston, ‘Défis et perspectives pour le droit spatial du XXI<sup>e</sup> siècle’ (2002) 3 *Revue Française de droit aérien et spatial* 256.

<sup>22</sup> New Space is a catch-all term with a variety of meanings. We define it by the conjunction of three dynamics, limited to the Western space sectors: (i) the diversification of space financing sources, (ii) the transfer of innovation



leveraged as tool of economic rivalry. National space laws have thus become, more than ever, a support for the national economic strategies of space-faring nations.<sup>23</sup> Destabilisation of the international framework (2.1), ascendancy of the national framework (2.2): the exploitation of space resources has not escaped this contemporary dialectic of space law.

## 2.1 The international strategic front: overcoming the uncertainties of positive law

If international law is no longer the main forum, it is because it has been deemed uncertain or even hostile<sup>24</sup> by the proponents of space resource exploitation. But it should be remembered that uncertainty is not silence and that international space law remains important and relevant to the second space age.

When, in the elaboration of a space legal strategy, the international strategic front is involved, it is obviously the major space treaties that are primarily consulted; the five leading texts of the *corpus juris spatialis*, ie the Outer Space Treaty (1967), the Agreement on the Return of Astronauts and the Restitution of Space Objects (1969), the Convention on Liability for Damage Caused by Space Objects (1972), the Convention on the Registration of Space Objects (1975) and, finally, the Moon Agreement (1979). They are the result of a prodigious legal effort carried out in less than thirty years in the midst of the Cold War and laying the foundations of international space governance. However, of the five texts, it is mainly the first and the last that we are interested in, the Outer Space Treaty (hereafter, OST) and the Moon Agreement, insofar as they directly address the issue of the global status of the Moon and celestial bodies, either partially as in the case of the former, or entirely as in the case of the latter.

The main reason for mentioning the Moon Agreement here is to dismiss it. Indeed, even though it contained a very useful embryo of lunar governance, it did not meet with the expected success since no space power took the trouble to sign it, or for the few that did sign it (such as France), to ratify it. If it did come into force, it was only because of the credit granted to it by a few States with a more limited space commitment. Among the reasons regularly put forward to explain this failure are the principles set out in Article 11 of the agreement. These enshrined the Moon as the common heritage of mankind<sup>25</sup> and proposed a broader formulation of the non-appropriation principle than the one found in Article II OST. But in the end, and contrary

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risk from the public to the private sector, (iii) the rise of services in the space sector. See also: Philippe Clerc *et al.*, 'L'insertion des activités spatiales dans la sphère économique' (2021) 102 *Entreprises et histoire* 172.

<sup>23</sup> Lukas Rass-Masson, 'Stratégies étatiques et lois nationales dans le droit international de l'espace' in Clémentine Bories and Lucien Rapp (eds), *L'espace extra-atmosphérique et le droit international* (Pedone 2021).

<sup>24</sup> Frans von der Dunk and Henry R Hertzfeld, 'Bringing Space Law into the Commercial World: Property Rights without Sovereignty' (2005) 6 *Chicago Journal of International Law* 81.

<sup>25</sup> This is not insignificant when one considers that the Agreement was negotiated in parallel with the Montego Bay Convention on the Law of the Sea.



to what has sometimes been reported, the Moon Agreement was not hostile to the exploitation of space resources: it should be noted that it is the only one of the five space treaties to mention literally such exploitation<sup>26</sup>, while supporting the importance of the benefits that could be derived from it. Put simply, to take up the dichotomy proposed in a French treatise on public international law<sup>27</sup>, the agreement shifted the Moon from a negative to a positive internationalisation, from a simple common to a common heritage of mankind - a positive internationalisation that was nonetheless partial<sup>28</sup>, insofar as the agreement postponed the elaboration of a complete governance regime for the exploration and exploitation of the Moon.<sup>29</sup> And yet, it was this shift of status that caused the West to fear too many constraints on the economic exploitation of the Moon and other celestial bodies, and that led the East to note the difficult compatibility of the notion of the common heritage of humanity with Soviet law.<sup>30</sup> Thus, historically, the Moon Agreement started off on a fragile basis, and the subsequent developments did not improve its situation.

As the moon re-emerged on the agendas of the Chinese and American space agencies in the late 2010s, the United States took care to recall its interpretation of the Moon Agreement. To this end, notably, an Executive Order from the White House dated 6 April 2020<sup>31</sup> reiterated that the country did not consider the Moon Agreement to be customary international law, taking care to secure the lack of scope bestowed on it by the world's leading space power. Moreover, by announcing a few weeks later the release of its own Moon agreement mechanism, the Artemis Accords, the United States completed the process of limiting the influence of the 1979 Agreement while remaining within the bounds of international law by referring explicitly to the OST. Being a constellation of bilateral agreements<sup>32</sup>, the Artemis Accords now<sup>33</sup> include twenty-five State Parties from all continents and remain open for signature. Thus, shortly after signing the Artemis Accords, Saudi Arabia withdrew from the Moon Agreement. The Moon Agreement has been in force since 11 July 1984, but even as a positive law, its influence remains limited for all the reasons mentioned above and at best it is a source of influence or

<sup>26</sup> Once in the preamble, twice in Article 11. To quote the preamble: “*taking into account the advantages which may be derived from the exploitation of the resources of the Moon and other celestial bodies*”.

<sup>27</sup> Mathias Forteau, Alina Miron, and Alain Pellet, *Droit International Public* (9<sup>th</sup> edn LGDJ 2022) 1724. See also: Cheng (n 14) 436.

<sup>28</sup> Frans von der Dunk, ‘The Dark Side of the Moon - The Status of the Moon: Public Concepts and Private Enterprise’ (1998) 40 *Proceedings of the International Institute of Space Law* 119.

<sup>29</sup> UNOOSA RES 34/68 (1979) art 11.5.

<sup>30</sup> Christol (n 14) 11.

<sup>31</sup> Executive Order 13914 on “Encouraging International Support for the Recovery and Use of Space Resources” E.O. 13914 of Apr 6, 2020 (85 FR 20381).

<sup>32</sup> It is also possible to relate the Artemis Accords to *minilateralism*, see: Alexandre Chazelle, ‘Le Minilateralisme Un Second Souffle Pour Le Multilatéralisme Dans La Régulation Économique?’ (La régulation économique, entre bilatéralisme et multilatéralisme Demi-journée de Versailles, Versailles, 8 April 2022) <<https://www.sfdi.org/wp-content/uploads/2023/01/Alexandre-Chazelle-Le-minilateralisme-un-second-souffle-pour-le-multilateralisme-dans-la-regulation-economique.pdf>> accessed 10 June 2023.

<sup>33</sup> As for June 2023. The last one being Spain.



inspiration for the multilateral governance of the Moon. Let us therefore venture to say that the number of major space treaties in the *corpus juris spatialis* should perhaps be limited to four.

We must then fall back on the 1967 Treaty, as international law has not yet said its last word. But, after all, it is a matter of falling back on the main international convention on space law, a veritable *magna carta* containing all the major principles governing the field. Resulting from a multilateral negotiation dominated by the United States and the USSR<sup>34</sup>, it came into force ten years and a few months after the launch of the first Sputnik satellite and only two years before the first human arrived on the Moon. It was the latter that invited the States to complete the negotiations, as the imminence of the small step for a man (but a large one for mankind) made it urgent to affirm in the Treaty the major principles governing the conquest of space. It is Article II OST, combined with Article I OST on the freedom of use of space, which will be the source of discord in the debates on the international framework for the exploitation of space resources. And it is appropriate to adopt the future in this regard, because when the treaty was drafted, space resources and their exploitation belonged to the prospective imagination. The international law that emerged from the Cold War is therefore more a law of exploration than a law of exploitation. Indeed, this distinction is not without impact on how international law is contemporarily able to cope with new activities emerging in the space sector: navigation in this “*new ocean*”<sup>35</sup> was at stake, with these new ships that were space objects, manned and unmanned. Hence, the first<sup>36</sup> and foremost issue of space law historically was the one of a right to overfly.<sup>37</sup> As for most international spaces law, the first task was the one of regulating movements and circulations, not occupations.<sup>38</sup>

When questioning space resources and space property, one shall focus on Article II of the OST. Quoting the text “*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*”. By prohibiting the national appropriation of outer space with a relatively ambiguous formula, Article II of the 1967 treaty has generated endless debates on its scope (one author does not hesitate to call it “*limping*”<sup>39</sup>): the worm was in the fruit. In an article published two years (only) after the space treaty, Stephen Gorove analysed:

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<sup>34</sup> Cheng (n 14) 156.

<sup>35</sup> Burrows (n 7).

<sup>36</sup> As demonstrated, notably, in Chap. 1 of Albert K Lai, *The Cold War, the Space Race, and the Law of Outer Space: Space for Peace* (Routledge 2021).

<sup>37</sup> *ibid.*

<sup>38</sup> Alland (n 8).

<sup>39</sup> Marco G Marcoff, *Traité de Droit International Public de l'espace* (Editions universitaires de Fribourg 1973). In French: «*boiteux*».



*“Even a perfunctory glance at this provision seems to suggest a number of fundamental questions which will have to be resolved if man's spatial explorations are to take place within a framework of law and order and with a minimum of friction. The first question relates to the subject matter of appropriation, that is, what can or cannot be appropriated. The second query involves the meaning of "national" appropriation in contradistinction to "nonnational," such as, individual, or international appropriation. The third inquiry centers around the meaning of the concept of appropriation. Finally, the fourth question, which is incidental to the third one, is whether there is any room for the exercise of some form or degree of sovereign authority, use or occupation which would be permissible despite the prohibition of Article I.”<sup>40</sup>*

Admittedly, it is also incumbent on the jurist to interpret the norms in the face of doubts and uncertainty, but it must be said that the four questions arising from Stephen Gorove's “*perfunctory glance*” concern almost each of the major terms of the article in its entirety. Indeed, the most fundamental questions are the first two, since contemporary debates around Article II crystallise around its *ratione materiae* scope - ie in the case of celestial bodies, is it space as a surface that is targeted? or space as a three-dimensional entity, thus including the resources of the soil and subsoil? - and its scope *ratione personae*, between applicability or not to the appropriation of private persons. To these four questions, one can add a fifth, which would consist in asking whether there is not, despite everything, a place for certain spatial properties in this article. For if national appropriation is prohibited, all other forms of appropriation are not.<sup>41</sup>

Another pitfall of Article II can be highlighted. Indeed, it would have been methodologically interesting to split the non-appropriation principle into two sub-principles, depending on whether it is the vacuum of space or the ground of celestial bodies that is targeted. Both the imaginations and the legal interpretation are not the same depending on whether a ground is involved. And the non-appropriation of a moving position of a space object - apart from geostationary orbits, for which the debate is well known - makes virtually no sense.

*In fine*, it is the behaviour of the States which enables us to partially answer the question of the real scope of Article II. Thus, interpretations of Article II from the perspective of Luxembourg and the United States might enlighten us but limiting their

<sup>40</sup> Stephen Gorove, ‘Interpreting Article II of the Outer Space Treaty’ (1969) 37 Fordham Law Review 349.

<sup>41</sup> Léopold Peyrefitte and Patrick Courbe, *Droit de l'espace* (Daloz 1993). “If all national appropriation is prohibited in outer space, this does not mean that the right of property itself is abolished in outer space”.



relevance to that of interpretations resolutely favourable to the exploitation of space resources. The scope of these two examples is then limited, but important nonetheless insofar as they involve States that will play an active role in the field concerned. When United States and Luxembourg recognise property rights over space resources, they are careful to assert the conformity of this recognition by providing that there is no territorial claim or proclamation of sovereignty on their part. The United States does this in section 402 of the Space Act of 2015 and Luxembourg in its referral to the Luxembourg Council of State on its draft law on space resources, a draft that became a law that came into force in 2017. Thus, it can be considered that in both cases there is an interpretation of international law by this unilateral act that is the national space law. Article II *may* therefore be seen first and foremost for what it might be: a deactivation of sovereign territorial claims<sup>42</sup> through a passive internationalisation of the space in question.

If one reduces Article II to this function, one may therefore legitimately ask whether Article II is indeed the most important issue at hand. In fact, the problem could rather be asking to what extent OST copes with exploitation of outer space, especially in the absence of any mention of the term “*exploitation*” of outer space that could help clarify. Article VI provides for the participation of “*non-governmental organizations*” (ie national enterprises) in space activities, the charitable nature of which may be questioned, and it is also possible, to place this exploitation under the banner of freedom of use from Article I. But from this absence *expressis verbis* of the exploitation of space and of its resources, some have thought it necessary to deduce a silence on this subject. This is the case in Luxembourg, for example, in the referral by its government to the Council of State of the Grand Duchy. It clearly states that “*while the legal status of the territories of the celestial bodies themselves is defined by [Article II of the Space Treaty] - namely that there is no room for national appropriation - the status of the resources is not dealt with, nor even addressed*”.<sup>43</sup>

However, the cleverness of the OST drafters consisted in proposing, rather than precise rules and detailed regimes, principles which would allow, by their generality and flexibility, to follow the technological and political evolutions of space, without becoming obsolete in a few decades. It is therefore a denial of both the interpretative capacity of lawyers and the possible scope of these articles to take a literal silence for a total silence. No, OST is not silent on the exploitation of space resources. The full mobilisation of the governance framework it imposes is relevant, and it has proven its worth over the past six decades. Namely, this framework proposes the

<sup>42</sup> See, notably: Stephan Hobe and others (eds), *Cologne Commentary on Space Law, vol I* (Heymanns 2009).

<sup>43</sup> Saisine du Conseil d’Etat Luxembourgeois par Guy Arendt, Ministre d’Etat, Secrétaire d’Etat à la Culture , en date du 15 novembre 2016

<<https://data.legilux.public.lu/filestore/eli/etat/projet/pl/10240/evenement/OpinionConseilEtat/1/doc/1/fr/pdf/manifestation/eli-etat-projet-pl-10240-evenement-OpinionConseilEtat-1-doc-1-fr-pdf-manifestation.pdf>> p. 9.

carrying out of activities and operations in an internationalised space under the responsibility of States that have authorised such activities and operations, and that have registered space objects under their jurisdiction and control, regardless of the commercial or non-commercial nature of such activities and operations. Armel Kerrest<sup>44</sup> also points out that a *bona fide* interpretation combined with the *effet utile* of the provisions of the space treaty necessarily leads to the identification of rules, or at least principles, governing the exploitation of space resources, even if the treaty does not mention them *expressis verbis*. Indeed, to those who argue that the lack of precision in the prohibition of resource exploitation makes it lawful<sup>45</sup>, the author counters that a *bona fide* interpretation of the Treaty, and of its preamble and Art. I, can only make the lawful exploitation of the said resources conditional on the establishment of an “international agreement” or an “international body representing humanity”.<sup>46</sup> He goes on to state that “Article II would be meaningless if this prohibition on appropriation did not contain a prohibition on the appropriation of mineral resources” because otherwise “this prohibition would not cover anything practical”. Armel Kerrest goes even further when he notes that the behaviour of States that allocate property rights over space resources is the behaviour of a sovereign, which would not be in conformity with Article II of the space treaty. Without having to agree with the author's interpretations, it should at least be seen as an opportunity to make the provisions of the treaty, which are far from having said their last word, eloquent.

Furthermore, we suggest that if the issue of private property of space resources is not directly addressed in public international law, it may be because the issue should not be of direct interest to the latter. For when the global legal pluralism described above determines the parameters for the development of a legal strategy, it invites the distribution of legal questions to the most effective level of normative intervention. Let us already note that if it is necessary for public international law to coordinate the occupations on this common that is the Moon, it is up to domestic law in general - associated with private international law - to be interested in space property in the first place.

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<sup>44</sup> Armel Kerrest, ‘L’appropriation des ressources minérales des corps célestes’ in Philippe Clerc and others (eds), *Le droit entre ciels et terres: mélanges en l’honneur du professeur Laurence Ravillon* (Éditions A Pedone 2022).

<sup>45</sup> *ibid.* “According to this theory, there should be an express prohibition as if the prohibition of appropriation obviously did not include the prohibition of the major practical consequence of the sovereignty claim”.

<sup>46</sup> *ibid.* “Even if it is clear that the notion of the prerogative of all mankind is different from that of the common heritage of mankind which has been used in Article XI of the Moon Agreement and in Part XI of the Law of the Sea Convention, the fact remains that an appropriation by companies belonging to the richest States of the resources of the celestial bodies cannot be carried out in accordance with these principles if no international agreement is adopted and if no international body represents all mankind”.



## 2.2 The national strategic front: enabling the legal systems to exploit space resources

Indeed, it is through national law that the issue of space property has reappeared with the greatest fanfare.

But first it must be remembered that national law is not a new source of space law. Very early on, the States involved in the space race armed their legal systems with internal provisions on the subject - this is notably the case, to mention only a few “*pioneer States*”<sup>47</sup>, The United States in 1958, Norway and Sweden in 1969 and 1982, and the United Kingdom in 1986. Since the end of the Cold War and the rise of the private space sector, the number of such national space laws has continued to increase. It is, according to one author, “*the fastest growing area of space law*”.<sup>48</sup> Today, about thirty States have national space laws. Traditionally, the existence of such laws is justified by two arguments.

The first is from the regime stipulated in Article VI OST, making States responsible for national space activities.<sup>49</sup> While the latter did not commit themselves to adopting national space laws, they had to provide for the conditions under which they would authorise and then supervise the space activities for which they would be responsible.

The second argument generally put forward relates to the rise of a private space sector: if the *corpus juris spatialis* is not directly applicable to it, the burden falls on the States under whose aegis the companies are placed to guarantee compliance with the international framework resulting from the treaties. This bridge from the international to the national would, according to one author, be the crucible of the stability of the major principles of international space law. We must therefore agree with Simone Courteix when she states that, basically, “*the multiplication of space activities could have been envisaged solely from the angle of public international law if it had not involved private companies*”.<sup>50</sup>

The combination of the two traditional arguments (Art. IV/relay of the international to the national) can be seen in the areas commonly covered by laws on space operations: the definition of space activities for which the State engages its responsibility, the authorisation and granting of authorisation, the conditions of registration and its effects as well as the liability and insurance regimes.

For States wishing to engage in the exploration and exploitation of space, national space laws have always been a prime strategic enabler. They provide a stable framework

<sup>47</sup> Irmgard Marboe, ‘National Space Law’ in Frans von der Dunk (ed), *Handbook of space law* (2017th edn, EE Elgar 2015).

<sup>48</sup> Paul Stephen Dempsey, ‘The Emergence of National Space Law’ [2013] *Annals of Air and Space Law* 303.

<sup>49</sup> See, notably: Annette Froehlich and Vincent Seffinga, ‘Rationale for the Enactment of National Space Legislation’ in Annette Froehlich and Vincent Seffinga (eds), *National Space Legislation: A Comparative and Evaluative Analysis* (Springer International Publishing 2018) <[https://doi.org/10.1007/978-3-319-70431-9\\_2](https://doi.org/10.1007/978-3-319-70431-9_2)> accessed 24 March 2023.

<sup>50</sup> Simone Courteix, *Droit de l’espace*, Répertoire de Droit International (Dalloz 1998).

as a concrete legal manifestation of their strategic ambitions.<sup>51</sup> And ultimately, as long as national space laws simply acted as a bridge between the international obligations of states and their private space sectors, no major problems emerged.

The situation changes, however, when national space laws move away from their traditional objects to apprehend new legal grounds, sometimes in a relative rupture<sup>52</sup> with positive law. As a matter of fact, contemporary changes in the space economy, supported by the political theme of *New Space*, have been accompanied by an evolution of the motivations on which national space laws were based<sup>53</sup>, colouring them with a certain economic opportunism.<sup>54</sup> The legislative or regulatory intervention of States in the space sector was then built on the idea that it made it possible “*to achieve a break with international law in order to create a normative environment more favorable to the development of commercial space activities*”<sup>55</sup>. The American Space Act of 2015 or the Luxembourg Space Resources Act of 2017 are the models of this new space law serving above all an industrial and economic policy, even if it means partially breaking with the principles derived from the *corpus juris spatialis*.<sup>56</sup> In the same vein, we can also mention the consultation launched in France at the beginning of 2023 by the three Ministries of Research, Economy, and the Armed Forces on “*adapting the framework for authorising space operations to the challenges of innovation and the New Space*”.<sup>57</sup> The first question put to the operators in the context of this consultation is interesting to note: “*What advantages do you derive from placing yourself under the aegis of the LOS [Loi sur les opérations spatiales]? What adjustments would be necessary to further encourage the establishment of space activities in France?*”<sup>58</sup>. This question affirms the industrial role of attractiveness and economic policy that space nations recognise in their national laws. It is also worth noting the claimed aim of the renovation of French space law announced by the ministries concerned: “*the updating of space law will enable French operators to develop their activities in a legally controlled context while remaining competitive*”<sup>59</sup>. From relaying the international obligations of States to national companies to securing an innovation ecosystem in the context of international economic competition, the functions of national space laws have evolved. In the new space age, space law is becoming a weapon of economic warfare. Indeed, the

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<sup>51</sup> Rass-Masson (n 23) 140.

<sup>52</sup> *ibid* 142.

<sup>53</sup> P Blount, ‘Renovating Space: The Future of International Space Law’ (2011) 40 *Denver Journal of International Law & Policy* 515 <<https://digitalcommons.du.edu/djilp/vol40/iss1/28>> accessed 15 April 2023.

<sup>54</sup> Dempsey (n 48).

<sup>55</sup> Rass-Masson (n 23) 142.

<sup>56</sup> *V. infra*.

<sup>57</sup> The joint press release of the three ministries <<https://www.enseignementsup-recherche.gouv.fr/fr/consultation-aupres-des-operateurs-spatiaux-sur-les-enjeux-du-new-space-89083>> accessed 15 April 2023.

<sup>58</sup> *ibid*.

<sup>59</sup> *ibid*.



reinforcement in France, since July 2020, of the role of the Ministry of Economy on space affairs tends to serve our argument.

Whereas, in the past, national space laws were the vehicle for the stability of international space law, the economic instrumentation of these laws may, on the contrary, lead to instability and insecurity of the international framework, through the multiplication of potentially divergent interpretations of what is permitted or not to do in this international space that is outer space. For it would be foolish to consider that laws only concern the legal order that enacts them: governing activities that are international in nature, they enrich the law of space activities with both extraterritorial and extraterrestrial scope. To quote PJ Blount “*as domestic law develops and defines items such as best practices for space flight providers, these developments can have influence at the international level*”<sup>60</sup>. Space law is now polycentric<sup>61</sup>, and this polycentricity should lead the actors to a multi-front strategy as mentioned above. Among these, the national strategic front plays a major role, both economic and legal.

From this strategic front, some space-faring nations have decided to regulate, albeit in a superficial way, the exploitation of space resources since the second half of the 2010s. The two most cited examples are the United States of America, with the Space Act of 2015 and Luxembourg, with its Space Resources Act of 2017. An investment policy in the space resources sector has accompanied the Luxembourg project: regulation and economic policy go hand in hand. In both above-mentioned texts, companies under the national umbrella are recognised as having a right of ownership over the extracted resources - even if in the American case, the right of ownership is not directly mentioned, this is nevertheless the objective when in paragraph 51303 it is stated:

*“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.”*

The Luxembourg version, on the other hand, is more summary. Before specifying the principles governing the granting of Luxembourg’s authorisation for the exploitation of space resources in the rest of the articles, the very first one states straightforwardly:

*«Space resources are capable of being owned.»*<sup>62</sup>

<sup>60</sup> Blount (n 19).

<sup>61</sup> Lucien Rapp, ‘From Space to Spac’ in Clémentine Bories and Lucien Rapp (eds), *L’espace extra-atmosphérique et le droit international* (Pedone 2021). Eytan Tepper, ‘The Big Bang of Space Governance: Towards Polycentric Governance of Space Activities’ (2022) 54 *New York University Journal of International Law and Politics* 485.

<sup>62</sup> Article 1 is quoted here from its translation by Luxembourg in the English unofficial version of the law they propose on the *legilux* website. Its original French version is: “*les ressources spatiales sont susceptibles d’appropriation*”.



Besides, the *ratione personae* scope of application of the two laws should also be noted, as they demonstrate the willingness to accompany the emergence of a national space resources ecosystem by personally conditioning the grant of authorisations. On the Luxembourg side, Article 4 makes the possibility of coming under its umbrella conditional on being a “public company limited by shares, or a corporate partnership limited by shares or a private limited liability company of Luxembourg law or a European Company (société européenne) having its registered office in Luxembourg”. Some space-mining start-ups of foreign origin did not hesitate to open a subsidiary in Luxembourg. The scope *ratione personae* of the US law adds two criteria of applicability: to US citizen natural persons and, more importantly, to entities created abroad but controlled by an American. Indeed, to understand the term “US citizen” mentioned in paragraph 51303 of the Space Act, one must go to paragraph 50902 of Title 51 of the US Code, a title dedicated to national and commercial space programs. The US citizen, the one who is “*entitled to any asteroid resource or space resource obtained, including to possess, own, transport, use, and sell the asteroid resource or space resource obtained*”, is defined there as: “*an individual who is a citizen of the United States*”, “*an entity organized or existing under the laws of United States or a State*”, or “*an entity organized or existing under the laws of a foreign country if the controlling interest (as defined by the Secretary of Transportation) is held by an individual or entity*” described in the first two categories.

It is noteworthy that in both acts, the aim was to use the law to encourage the formation of an ecosystem of innovation around space resources. And to do this, the consecration of a property right on the extracted resources seemed to be the preferred path - even if it meant postulating the conformity of the said property right with public international law. For, even if it means getting ahead of the analysis of space property to which the last part of our section 3.2 is devoted, the consecration of space property must above all be seen as an industrial policy. One can only be surprised at the relatively premature nature of this consecration: after all, there is for the moment no extraction of a significant quantity, nor any transaction of resources or products of resources that would justify the urgency of guaranteeing property; and one can legitimately wonder if these national provisions will remain really satisfactory when the economy of space resources will be fully space-based and not only terrestrial as it is at present, and when the extracted resources will no longer be counted in kilos but in tons. In the same vein, what about the possibility of discovering an alloy or resource on the Moon such that the extraction of just a few kilos would be enough to meet the needs that led to its discovery?<sup>63</sup> Moreover, even if what is under the banner of space mining seems uncertain, one can only wonder about the choice made to limit the interest of

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<sup>63</sup> Our knowledge of the Moon's geological catalogue, beyond its surface, is extremely limited. This catalogue will provide invaluable information for scientific understanding and the economic development of lunar resources.



these laws to the final product of the exploitation of the resources, namely the resource itself, when, fundamentally, it is a whole chain of value and a multiplicity of infrastructures that make it possible to achieve this result. Indeed, space mining supposes almost all of what is necessary for mining on earth: extraction infrastructures and machinery, transportation, storage, refinement facilities; all of which having to be launched from Earth, maintained, and managed; the overall also using geolocating and telecommunications. Earth mining laws should extend to many more subjects than the mere economic value of a resource. But property is an essential institution for the creation of a market, and the two articles mentioned above, the American and the Luxembourg one, come to *encode in capital*<sup>64</sup> the chunks of infinity that will be taken from the Moon and elsewhere in a few years.

More precisely, it is the general economic enforceability of space activities that is at stake. As Lukas Rass-Masson states:

*“Commerciality thus constitutes a new impetus for space exploration. This is, moreover, not very surprising, since it makes it possible to mobilise new means, which allows to respond to the challenge of the scarcity of public resources available to cope with the immensity of the necessary investments. Yet the idea of commerciality is not neutral with regard to the sources of law. It implies, as in the case of investment, the search for a legally legitimate benefit by the economic operator. And where the benefit sought by the State may be prestige, even if the strategic and military dimension is never far away either, the benefit by the commercial operator is pecuniary: he acts with an assumed lucrative purpose, which enables him to attract and mobilise capital with a view to the expected economic gain. And this profit that the operator seeks to derive from his activity must indeed be realised in a national law, to be opposable to the other economic actors of the market in question and to serve as an element of exchange”.*<sup>65</sup>

<sup>64</sup> Katharina Pistor, *The Code of Capital: How the Law Creates Wealth and Inequality* (Princeton University Press 2019).

<sup>65</sup> Rass-Masson (n 23) 145. French original version : «La commercialité constitue ainsi une nouvelle impulsion de l’exploration spatiale. Ce n’est d’ailleurs pas très surprenant, tant elle permet de mobiliser de nouveaux moyens, ce qui permet de répondre au défi de la rareté des ressources publiques disponibles pour faire face à l’immensité des investissements nécessaires. Or, l’idée de commercialité n’est pas neutre au regard des sources du droit. Elle implique, comme pour l’investissement, la recherche d’un bénéfice juridiquement légitime par l’opérateur économique. Et là où la retombée recherchée par l’État peut être le prestige, même si la dimension stratégique et militaire n’est jamais loin non plus, la retombée par l’opérateur commercial est pécuniaire : il agit dans une finalité lucrative assumée, qui lui permet d’attirer et de mobiliser des capitaux en vue du gain économique escompté. Et ce bénéfice que l’opérateur cherche à retirer de son activité doit bien se réaliser dans un droit national, pour pouvoir être opposable aux autres acteurs économiques du marché considéré et lui servir d’élément d’échange.»

However, it is not certain that the legal - and therefore economic - certainty afforded by these national space laws is guaranteed. The analysis of the Luxembourg Council of State is enlightening in this respect. In their opinion on the first draft of the Grand Duchy's law on space resources<sup>66</sup>, the councillors made a demanding criticism of the government project. They expressed their doubts as to the opposability of property titles relating to space resources to third-party legal systems; this question is more important insofar as it is emphasised that Luxembourg does not have autonomous launch capacities and will therefore have to launch from a third-party State.<sup>67</sup> The Councillors of State are also doubtful as to the extent to which Luxembourg will be able to ensure the international scope of the exploitation permits, and how the areas from which the resources will be exploited and will be protected. The Luxembourg government has nevertheless adopted its law on space resources, with almost no major changes between the first draft (the basis for the Council of State's referral) and the corrected version currently in force.

The Council of State's questions, which we did not mention in extenso<sup>68</sup> are legitimate. They are those that naturally arise when the regulated economic activity takes place in an international space and by means of resources that can be considered at least as internationalised. The absence of an immediate response to these questions clearly demonstrates the primary nature of these national laws on space resources: to secure *ab initio* a market by guaranteeing the economic legal enforceability of the activity at stake.

The preceding discussion should allow us to reach two conclusions. The first conclusion is that the ambiguities of the US and Luxembourg domestic provisions, and the uncertainties as to what space mining projects, which are otherwise in their nascent

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<sup>66</sup> Avis du Conseil d'Etat du Luxembourg n°51.987 du 7 avril 2017 portant sur le Projet de loi sur l'exploration et l'utilisation des ressources de l'espace <<https://conseil-etat.public.lu/dam-assets/fr/avis/2017/07042017/51987.pdf>> accessed 15 April 2023.

<sup>67</sup> We will return to this important issue in our third section.

<sup>68</sup> To quote those we mentioned earlier: *"The fact remains that, even if it shares the position of the authors of the bill as to the possibility for a private person to appropriate and thus be recognised as having legal title to resources extracted from celestial bodies, following the example of the US legislature, The Conseil d'Etat wishes to highlight certain consequences of such recognition which may further weaken the "legal certainty" (to use the words of the authors of the draft law) necessary for persons wishing to invest in the exploitation of outer space resources. If Luxembourg puts in place a regime recognising a person's ownership of outer space resources, how can it ensure that other states will recognise the related title? This is more so since operators duly authorised in accordance with the provisions of the forthcoming law will necessarily have to use space launchers taking off from the territory of other States or landing on territories over which Luxembourg does not exercise any sovereignty. (...) In the same vein, how can we protect the areas over which these operators extract resources from outer space? Such protection could lead to a kind of sovereignty claim, which is prohibited by the Space Treaty, and violate Article I of the Treaty, which states in paragraph 2 that "outer space, including the Moon and other celestial bodies, may be explored and used freely by all States without discrimination on equal terms and in accordance with international law, all regions of the celestial bodies being freely accessible." Other questions as to the recognition of title to the resources of outer space will necessarily arise, such as the determination of competent jurisdictions and the recognition of such judicial decisions in other States."*



stages, entail, must be treated with caution when it comes to understanding the scope of the national space laws. The second, repeated several times, is that economic motivations have outweighed legal ones in the enactment of national space resource laws.

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The new legal pluralism in space law could appear as a harmful fragmentation of the subject: in reality, it can be analysed as an opportunity for the efficiency of spatial governance. By opening several strategic fronts, pluralism makes it possible to distribute questions at the right normative level.

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### 3 The governance of space resources from global legal pluralism

In this respect, regulation of the exploitation of space resources provides an interesting example of a pluralism that can be described as distributive. Indeed, the two major questions that arise in connection with the exploitation of space resources, ie the coordination of occupations and the organisation by law of a space resources economy based on property, are in fact of different orders. The first is concerned with public international law, the second with national or private international law. And these two questions, even if distinctly distributed, are not hermetic: a question of public international law, the coordination of occupations, remains necessary to ensure the full efficacy of space property in national/private international law. It is this distributive pluralism that makes it possible to overcome a questionable opposition between the commons and resource property, which undermines the legal certainty of resource exploitation.

This section proposes to outline this approach in terms of distributive pluralism, applied to the law of space resource exploitation. It is then up to public international law, possibly through the prism of the commons, to coordinate occupations (3.1); and to domestic law and private international law to coordinate uses through space property (3.2).

#### 3.1 Coordinating occupations in public international law: the commons and the Moon

Whether or not the coordination of occupations on the Moon is done through public international law or through a simple multilateral dialogue, or whether it uses the conceptual framework of the commons, coordinating will be a *de facto* necessity. The Moon is paradoxically small, and the areas of interest in terms of resources are even

smaller. The Moon's poles, especially the southern pole, are targeted because of their wealth of frozen water - an essential resource for any space mission. The presence of several space powers in such a small space - just a few hundred kilometres<sup>69</sup> - with major competition for positions and resources, presupposes minimal information or cooperation on the distribution and location of missions. The tensions that emerged following the proposal of the safety zone concept in the Artemis Agreements are a clear example. The paradoxical smallness of space and the immediate terrestrial consequences of a space conflict had already been understood by the Americans and Soviets in their time when the need for common rules for the exploration and use of space emerged early on.

But asserting that coordination will be necessary and discussing its contours are two different questions. And it is this second question that the international strategic front of a pluralist legal strategy must answer.

Yet, when it comes to debating what law says about the nature of outer space - because that is what the question is really about - a series of concepts are regularly invoked, sometimes taken from Latin (and, as we say in French, “à en perdre son latin”), sometimes translated into the vernacular: *res communis*, *res nullius*, *territorium nullius*, commons, the common heritage of mankind, the international commons, etc. Most often, two synchronous movements are at work. On the one hand, it is an interpretation of the treaties, since it should be remembered that none of these terms is found *expressis verbis* in the *corpus juris spatialis*<sup>70</sup> (except for the common heritage of mankind enshrined in Article 11 of the Moon Agreement) which prefers the ambiguous “*province of mankind*”. On the other hand, these interpretations use legal concepts with uncertain contours but with a certain prescriptive<sup>71</sup> vocation when applied to the places they designate. This last movement can easily be seen in the use made by certain authors of a gradation in the common, from the simple international space to the common heritage of mankind, via the *res communis* and then the international commons<sup>72</sup>; this gradation in the commons is further embodied in the progressive

<sup>69</sup> Antonio Salmeri and Peter Weiss, ‘The Apple of Discord or The Fruit of Salvation? A Dialogue on the Practical and Legal Aspects of Safety Zones on the Lunar South Pole’ (73rd International Astronautical Congress (IAC), 18th - 22nd September 2022).

<sup>70</sup> For a critical perspective on the usage of the various expressions, see: Henry R Hertzfeld, Brian Weeden and Christopher D Johnson, ‘How Simple Terms Mislead Us: The Pitfalls of Thinking about Outer Space as a Commons’ (66th International Astronautical Congress (IAC), 12-16 October 2015). For an historical perspective on the use of the commons in international law: Charlotte Ku, ‘The Concept of Res Communis in International Law’ (1990) 12 History of European Ideas 459.

<sup>71</sup> Or, at least, “normative” see: John Goehring, ‘Why Isn’t Outer Space a Global Commons?’ (2021) 11 Journal of National Security Law and Policy 573.

<sup>72</sup> This is emphasised, for example, by Bin Cheng in his classic Studies of international space law when he states: “While *territorium extra commercium* and *territorium commune humanitatis* share the same characteristic that they cannot be territorially appropriated by any State, they differ in that the former is essentially a negative concept, whereas the latter is a positive one. In the former, in time of peace, as long as a State respects the exclusive quasi-territorial jurisdiction of other States over their own ships, aircraft and spacecraft, general international law allows it



addition of barriers and protection to the exploitation and management of said commons. Even if the outright prohibition of exploitation, in the end, is almost never completely on the agenda: these regimes are above all a framework for extractivism.

The main problem is that the prescriptive mission is above all that of concepts whose contours are currently uncertain and for which no real consensus seems to be emerging. Furthermore, some authors also note a series of confusions: between the commons in the economic sense and in the legal sense<sup>73</sup>, and between the qualification of the designated space and the resources found there.<sup>74</sup> As Eytan Tepper accurately points out, the debate around the space commons could not be satisfactory “*in the absence of a structured discourse*”<sup>75</sup> on the issue that would clarify the primary terms of the debate. For in “*Space as a common*”, the doubts concern both the first and the last word. Is it indeed all space that is concerned? Or would it not be better to distinguish the void from planets, natural satellites, and other celestial objects? One must agree with the above-mentioned author<sup>76</sup>: it makes no sense to call all of space a common in one block. Some space commons are less common than others and the Moon or Mars, or LEO/GEO positions should be analysed separately. This is also the case, for example, of lunar water - because if in the commons approach one can distinguish between the parts of space concerned, one must also distinguish between the resources concerned. We are not facing the same issue for a limited resource that will be needed for most future lunar missions, namely water, as other mineral resources are more abundant and whose utilisations is variant through mission plans. In addition, sometimes, the debate around the space commons compares space resources to fishes in the open sea.<sup>77</sup> However, space resources are neither renewable nor practically infinite<sup>78</sup>, as access to them is not the same from a few days' journey to the Moon as it is from several months' distance to Mars.

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to use the area or even to abuse it more or less as it wishes, including the appropriation of its natural resources, closing large parts of such space for weapon testing and military exercises, and even using such areas as a cesspool for its municipal and industrial sewage. The emergent concept of the common heritage of mankind, on the other hand, while it still lacks precise definition, wishes basically to convey the idea that the management, exploitation and distribution of the natural resources of the area in question are matters to be decided by the international community (or simply by the contracting parties? as in the Moon Treaty!) and are not to be left to the initiative and discretion of individual States or their nationals”, Cheng (n 14) 436.

<sup>73</sup> For instance in: Jean-Louis Combes, Pascale Combes-Motel and Sonia Schwartz, ‘Un survol de la théorie des biens communs’ (2016) 24 *Revue d'économie du développement* 55, Tepper (n 6); Samantha Besson, ‘Des « biens publics » internationaux: (p)oser la question institutionnelle | Collège de France’ (Collège de France, March 2022) <<https://www.college-de-france.fr/agenda/cours/le-droit-international-face-la-distinction-publicprive/des-biens-publics-internationaux-poser-la-question-institutionnelle>> accessed 9 April 2023; Goehring (n 71).

<sup>74</sup> Tepper (n 6).

<sup>75</sup> *ibid.*

<sup>76</sup> *ibid.*

<sup>77</sup> Franz Schilling, ‘Fishing in Outer Space - The Luxembourgish Interpretation of the Appropriation of in-Situ Ressources’ (2019) 2 *ZLW* 248.

<sup>78</sup> Carol R Buxton, ‘Property in Outer Space: The Common Heritage of Mankind Principle vs. the First in Time, First in Right, Rule of Property’ (2004) 69 *Journal of Air Law and Commerce* 689.



This lack of a structured discourse, confusing more specifically the notion of an economic common with a legal common, has already had repercussions in positive law. Indeed, in an Executive Order of 6 April 2020<sup>79</sup>, the White House clearly positions itself against an interpretation of space as a global common:

*“Americans should have the right to engage in commercial exploration, recovery, and use of resources in outer space, consistent with applicable law. Outer space is a legally and physically unique domain of human activity, and the United States does not view it as a global commons<sup>80</sup>. Accordingly, it shall be the policy of the United States to encourage international support for the public and private recovery and use of resources in outer space, consistent with applicable law.”*

As John S. Goehring stresses<sup>81</sup>, the White House decree did not take the time to grasp the complexities and nuances of the notion of the commons by relaying the American opposition to Article 11 of the Moon Agreement that we mentioned in Section 2 of our article. For the same author<sup>82</sup>, the global commons here refers to an economic understanding of the commons seen as a constraint to free economic exploitation. In fact, this is the whole point of the quoted excerpt from the Executive Order: to underline and then deactivate the opposition between a logic of commons and a logic of exploitation. However, this opposition does not have to be the case, as reflections are emerging today on the development, within the international commons, of regimes for the exploitation of the resources they comprise, with various already existing precedents.<sup>83</sup> Added to these points are the potential geopolitical threats and instabilities which result from this US unilateral declaration.<sup>84</sup>

In essence, it is perhaps the most cursory analysis of the facts that can only lead to the conclusion that space is an international common. In its most summary definition, outer space as an international common refers to cases of international spaces to which access cannot be restricted and where activities are conducted freely, these spaces being above all not subject to the sovereignty of States and where such sovereignty is

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<sup>79</sup> Executive Order on Encouraging International Support for the Recovery and Use of Space Resources 2020.

<sup>80</sup> The “s” to *commons* is not a grammatical mistake by the author but originates from the executive order.

<sup>81</sup> Goehring (n 71).

<sup>82</sup> *ibid.*

<sup>83</sup> Fabio Tronchetti, ‘Legal Aspects of Space Resources Utilisation’, *Handbook of Space Law* (2017th edn, EE Elgar 2015).

<sup>84</sup> Fabio Tronchetti and Hao Liu, ‘The White House Executive Order on the Recovery and Use of Space Resources: Pushing the Boundaries of International Space Law?’ (2021) 57 *Space Policy* 101448.



outright prohibited.<sup>85</sup> This definition can easily be found in official statements by US government agencies, particularly defence agencies. Furthermore, on the Common Heritage of Mankind debate, it must be noted that between its first appearance in international law across the first two thirds of the 20<sup>th</sup> century to until now, the said notion has evolved towards a commercial-compatible approach as demonstrated by Fabio Tronchetti.<sup>86</sup> A balanced compromise is now proposed between the needs of cooperation between developed and developing countries, all in favour of “[attractivity] for enterprises from developed states to be an incentive for commercial activities in the area”.<sup>87</sup> The precited author also notes that a commercial-compatible approach of the Common Heritage of Mankind was also offered by the resolution 1/2002 of the International Law Association, a resolution about the interpretation of the concept when it relates to space law and the Moon Agreement.<sup>88</sup> We believe that the political debate on space matters would benefit from taking note of contemporary developments in the notion of the common heritage of mankind beyond the caricature that can be made of it, even more so with the rise in power of space faring nations from the South.

However<sup>89</sup>, at this stage of space exploration, and in the face of the hostility shown by certain stakeholders to the idea of commons, the reasoning to be adopted is in two stages. The first step is the following: if, indeed, space is factually (and economically) a common, the legal consecration of this qualifier seems to raise enough doubts or even hostility for it to be appropriate to carry it out at this stage of space exploration. If space law is the product of “*a realistic conception of the relations between States (...) corroborated by an appreciation of the new states of affairs that have arisen as a result of space activities*”<sup>90</sup>, it is not only useless but also risky to base the legal analysis on a notion contested by the first space power, regardless of whether its understanding is limited. The second step of the reasoning, based on the conclusions of the first, asserts that, it is possible to disengage from the debates around the notion of the commons and its avatars. The problem must then be approached, not from theoretical debates, but by a pragmatic approach based on a practical and political reality as well as on positive law: the international nature of outer space and the deactivation of territorial claims. This idea is, after all, what the Outer Space Treaty *expressis verbis* proposes when its Articles I, II and VIII are combined. Designating outer space as an international space is a sufficient first proposition to drive the rest of the reasoning on coordination of occupations since “*it thereby makes clear that, indeed, only the community of states*

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<sup>85</sup> See, for instance, but only for instance since this definition of international commons can be find in a lot of other articles: Kai-Uwe Schrogl, ‘Which Future for the Global Commons?’ [2018] Proceedings of the International Institute of Space Law 935; Ku (n 70).

<sup>86</sup> Tronchetti (n 14) 91, 125.

<sup>87</sup> *ibid* 123.

<sup>88</sup> *ibid* 125.

<sup>89</sup> Shall we say, sadly.

<sup>90</sup> Marcoff (n 39).

can establish the legal regime for outer space in principalem”<sup>91</sup>. Whether outer space is an international common or a common heritage of mankind is not useful for our debate and will be left to the fate of the evolutions of the *corpus juris spatialis* and particularly of the hypothetical renegotiations of the Space Treaty and the Moon Agreement.

Ultimately, the question, at the crossroads of law and geopolitics, is subtly different from that of the nature of space and its celestial bodies: insofar as space states decide to grant their nationals property rights over the space resources they extract while authorising the missions that lead to the said extraction, it is imperative for legal, economic, and global certainty *to consider the way in which the occupations must be coordinated*<sup>92</sup>. Indeed, it would be quite illusory to invest the national strategic front through national space resource laws without investing the international front in parallel. It is also important to do so on a truly multilateral scale, beyond the block logic currently at work in space, as demonstrated by the Artemis Agreements and the International Lunar Research Station. The fact that a handful of partner states agree on the main principles of lunar activities is an existing but insufficient effort.

This is essentially the idea expressed (once again) by the Luxembourg Council of State in its 2017 opinion when it notes the fragility of the approach adopted by the Luxembourg law when it says nothing about the way in which the various exploitation sites will be protected. Indeed, the concern to preserve the main principles of international space law should not so much be about space property as it should be about the terms of occupation underlying the exploitation of resources and in particular the concept of the safety zones<sup>93</sup> introduced by the Artemis Accords.

With regard to the question that concerns us, ie the contours of space property, the preceding developments lead us to the conclusion that a political and legal reflection on the coordination of occupations on the Lunar soil is an indispensable prerequisite for the coherence and efficacy of space property regimes.

### 3.2 Coordinating uses in private international law: space property and the Moon

The debate on property of space resources is premature. In fact, the exploitation of space and lunar resources has not yet begun and is not foreseeable for at least a decade. However, the property of these resources will not have the same effect depending on the scale of exploitation considered. Here the quantitative is also

<sup>91</sup> von der Dunk (n 28).

<sup>92</sup> von der Dunk and Hertzfeld (n 24). “Eventually, when true private business operations are feasible on the moon or on asteroids, there will have to be some form of intermediary established to guarantee the right to use the territory. Debating the form and type of agreements needed for an intermediary should be reserved for the future time when more is known about the types and value of the space resources in question. Only then can a meaningful arrangement be worked out. Since these potential business ventures are well beyond the five to ten-year normal business planning horizon, there is little need to attack the specifics of such arrangements today.”

<sup>93</sup> Jack Wright Nelson, ‘Safety Zones: A Near-Term Legal Issue on the Moon’ (2020) 42 Journal of space law 604.



qualitative<sup>94</sup>. The proposals outlined below will therefore quickly be put to the test of time and technological developments. But this is, after all, the fate of most analyses in space law and more generally in technology law. It is therefore in this last part that we wish to answer the question that serves as the title of our article, “*What is space property the name of?*”.

In our view, space property is the name of at least three things, all of which are inter-related: an economic policy, a legal regime of private international law and a decentralised governance of space resources scheme. We will analyse these three facets in turn. Let us bear in mind at the outset that this article is primarily concerned with the resources of the Moon, insofar as they are used *in situ* and not brought back to Earth - the remark is important because it means that all the activity takes place in an international space.

### 3.2.1 Space property as economic policy

Undeniably, the first (and probably foremost now) function of space property is economic. We have already discussed the economic instrumentalisation of national space laws and the key role played by the US and Luxembourg laws in the establishment of a space resources market. It was indeed complex for the economic actors to grasp the legal nature of space resources with which they were confronted during the emergence of a market linked to such an uncertain activity and requiring massive investments *ab initio*. It was thus necessary to provide legal certainty for the space resources market to promote its emergence. This is what emerges from the preamble of the American Space Act of 2015, whose stated objective is to “*facilitate a pro-growth environment for the developing commercial space industry by encouraging private sector investment and creating more stable and predictable regulatory conditions, and for other purposes*”, but also the opinion of the Luxembourg Chamber of Commerce on the draft law on the country's space resources. The latter clearly states that the purpose of such a law is the creation of a “*legal framework for the exploitation and use of space resources in order to guarantee legal certainty to private operators as to the property of space resources and, secondly, to regulate the approval and supervision of missions for the exploration and use of space resources*”.<sup>95</sup> Yet for the American and Luxembourg legislators, as well as for the resource exploitation lobbyists behind the two laws mentioned above, the most immediate path from market building to legal security was through property. Nevertheless, there is nothing surprising in this: as Jean-Philippe Robé reminds us,

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<sup>94</sup> Marcoff (n 39) 670.

<sup>95</sup> Avis de la Chambre du Commerce du Luxembourg sur le projet de loi n° 7093 sur l'exploitation et l'utilisation des ressources de l'espace, en date du 10 janvier 2017, n° 4755GKA/ZLY <<https://data.legilux.public.lu/filestore/eli/etat/projet/pl/10240/evenement/avis/1/doc/1/fr/pdf/manifestation/eli-etat-projet-pl-10240-evenement-avis-1-doc-1-fr-pdf-manifestation.pdf>> accessed 25 May 2023.

“property is a fundamental legal institution for the existence of any market economy”<sup>96</sup>. Thus, the first of the three names for property of space resources is economic: for it is through property that the economic existence of these resources is assured, thereby contributing to the emergence of a financeable market, or as Lukas Rass-Masson puts it:

*“(...) the economic operator who seeks to make a profit needs to be able to obtain, through his activity, legitimate wealth. And by legitimate wealth, we mean wealth corresponding to a subjective right, ie an asset or an individual prerogative recognised by law, enforceable and exchangeable, and therefore capable of circulation. Only this recognition by the law, particularly in the form of a monetary claim, makes it possible to transform the object of spatial activity into an asset capable of circulation and economic exchange. And it is only on this condition that wealth can be created and that investors will agree to embark on space activities, which are henceforth sources of profit prospects.”<sup>97</sup>*

### 3.2.2 Space property as a private international law issue

This economic feature is mirrored in the legal analysis of the concept of space property. The combination of property, a traditional legal concept in Western law, and space resources - a divisive subject in contemporary doctrine - can only limit our discussion to a sketch of the views that an internationalist privatist might have on the insertion in space law of a concept such as property. For, in fact, the area of international law most directly concerned by this concept is that of private international law, for at least two reasons. The first is the origin of the recognition of property titles: one of the diverse national space laws under which the operator of the space resource has placed itself. Yet it is precisely the task of private international law to coordinate legal institutions of heterogeneous origin <sup>98</sup>: the coordination of national space laws, here. The second reason, although of lesser importance, is the characteristics of the owner. While it is not necessary for the owner to be a private person according to the

<sup>96</sup> Jean-Philippe Robé, *Property, Power and Politics: Why We Need to Rethink the World Power System* (Bristol University Press 2020).

<sup>97</sup> Rass-Masson (n 23). In French: «(...) l'opérateur économique qui cherche à réaliser un bénéfice a besoin de pouvoir obtenir, grâce à son activité, une richesse légitime. Et par richesse légitime, il faut entendre une richesse correspondante à un droit subjectif, donc un actif ou une prérogative individuelle reconnue par le droit, opposable et échangeable, donc susceptible de circulation. Seule cette reconnaissance par le droit, notamment sous forme de créance monétaire, permet de transformer l'objet de l'activité spatiale en actif susceptible de circulation et d'échanges économiques. Et ce n'est qu'à cette condition qu'une richesse peut être créée et que les investisseurs accepteront de se lancer dans des activités spatiales, désormais sources de perspectives de bénéfices.»

<sup>98</sup> Louis d'Avout, 'Les Phénomènes Collectifs et l'analyse Macro En Droit International Privé', *Le droit à l'épreuve des siècles et des frontières : mélanges en l'honneur du Professeur Bertrand Ancel* (LGDJ/Ipolex 2018) 151.



criteria of applicability *ratione personae* of the two model laws referred to above, it must be noted that the primary addressees of these laws, when they were drafted, were space-faring companies interested in space resources. An argument to which must be added that only commercial activities related to space resources are meant to be studied here. In the context of an internationalised and capital-intensive space economy, the legal operations of the sector's players are private legal operations with an international dimension, which are of direct interest to private international law.

Accordingly, private international law seems to call for taking a stand on the issue. And as we will demonstrate hereafter, we suggest space property is not a public international law regime, but a domestic law regime coordinated in its international dimensions by private international law.

And as soon as national space laws transform space resources into movable property<sup>99</sup> *ipso facto* the solutions developed by private international law to apprehend movable property can be mobilised, although not without difficulty. If, for private international law, space property is not a conceptual *terra incognita*, it is because several options<sup>100</sup> are at hand for the internationalist:

- One can, for example, consider the extraction and subsequent appropriation of space resources as the original appropriation of a movable asset for which no pre-constituted real right exists. One obstacle will be the requirement of a subsidiary connection to the one traditionally used for movables, ie the *lex situs*, which is lacking in the case of a primary acquisition made outside any State territory. Louis d'Avout asserts that there is, in this case “*a hypothesis of non-conflict of laws*” since “*the physical grasp of an unappropriated tangible thing located outside any State territory is in itself constitutive of a subjective right of property in favour of the occupant*”<sup>101</sup>. The latter author nevertheless sees in the existence of rules of public international law prohibiting appropriation a framing or a contradiction “*to the natural phenomenon of man-made apprehension outside any State territory*”<sup>102</sup>. If, in addition to this analysis, one adds the recognition by domestic law of the subjective right of property resulting from the taking of resources - which is what the laws of Luxembourg and the United States do when they recognise space property- it is appropriate to connect the subjective right then created to this specific legal order, either by considering the said connection as a simple priority connection for which the connection chosen by the owner could be substituted, or by considering the said connection as a unique and imperative connection with regard to the

<sup>99</sup> For they are in no way an immovable. See in this sense: Tronchetti (n 14) 196. About real estate property on celestial bodies, see: Virgiliu Pop, ‘Appropriation in outer space: the relationship between land ownership and sovereignty on the celestial bodies’ [2000] Space Policy 275.

<sup>100</sup> This list does not claim to be exhaustive.

<sup>101</sup> Louis d'Avout, *Sur Les Solutions Du Conflit de Lois En Droit Des Biens* (Economica 2006) 600.

<sup>102</sup> *ibid* 601.



original rights. This is indeed the meaning of the much-quoted national space laws when one combines their applicability *ratione personae* and the space property regime they implement: the American citizen and the Luxembourg company acquire title to space resources, with state authorisation for the conduct of activities, thus logically subjecting the related property title to state law.

If we leave the stage of original rights to arrive at that of derived rights, Louis d'Avout, again, affirms that "*outside the perimeter of the reference, the inexistent influence of a legal order that is primarily competent to ensure the territorial policing of economic rights, leaves more room for the principle of autonomy of the will*"<sup>103</sup>. And he continues, "*it is thus in principle that the holder of rights not subject to the principle of reference [to the *lex situs*] - [as for] rights in tangible things not situated on a state territory - will be able to transmit all or part of his rights under the conditions freely granted by him in the contract which binds him to the acquirer*"<sup>104</sup>. If one follows the theoretical analysis of this author, one arrives at the conclusion that the sale of space resources will be subject to the autonomy of the parties who will choose the applicable law, or even choose the absence of applicable national law. One can also arrive at the idea that the various rules of international trade law will be able to play a role in the international sale of movable property.

- It may also be proposed to link space resources to the status of things *in transitu*. This involves considering the space resource as a good transported on board a space object, registered with the authorising State, which keeps the object under its jurisdiction and control - the said State being, moreover, the one that has authorised the activity related to the resources in question. Thus, we can agree with Bernard Audit and Louis d'Avout, when dealing with things *in transitu*, they put forward the idea that "*the convenience of connection to the corresponding law encourages the application of the law of the flag to things transported as well*"<sup>105</sup>. However, it must be ensured that the lunar base or infrastructure that will host the stock of extracted resources can be considered a registered object, a question on which doubts remain<sup>106</sup>. Furthermore, in the context of international space collaboration, it is not a given that the infrastructure in question is under the control of the same state that

<sup>103</sup> *ibid* 632. In French: «hors du périmètre de la référence, l'emprise inexistante d'un ordre juridique prioritairement compétent pour assurer la police territoriale des droits patrimoniaux, laisse une place accrue au principe d'autonomie de la volonté».

<sup>104</sup> *ibid* 633. In French: «c'est ainsi en principe que le titulaire de droits non soumis au principe de référence - (...) les droits sur les choses corporelles non situées sur un territoire étatique - pourra transmettre tout ou partie de ses droits aux conditions par lui librement consenties par le contrat qui le lie à l'acquéreur».

<sup>105</sup> Bernard Audit and Louis d'Avout, *Droit international privé* (9<sup>th</sup> edn. LGDJ 2022) 845.

<sup>106</sup> George D Kyriakopoulos, 'Jurisdiction and Control over Installations and Facilities Serving Space Tourism Activities' (2014) 57 *Proceedings of the International Institute of Space Law* 445.



authorised the extraction. Let us imagine, for example, the case of an American lunar base hosting the stock of regolith extracted by a Luxembourg company.

- An intermediate solution would be to adopt a specific treatment for the case of space resources, mixing material and conflict methods. Logic would dictate that, about the original creation of title to space resources, the law of its owner should apply. After all, it would be a question of making the same legal system competent for the authorisation of exploitation, which is currently based in the two known cases on the nationality of the authorising State, and the creation of title to the proceeds of the exploitation. Ultimately, as soon as a Luxembourg company extracts space resources under a Luxembourg permit, it seems convenient that the property title to these resources (which will become part of the assets of the company in question) should itself be subject to Luxembourg law. Formulated as a bilateral conflict rule, the principle could be as follows: to the creation of an original title to space resources, the law of the nationality of the operator applies first if it is under this same law that the authorisation for exploitation was issued or, failing that, the law of the State that authorised the exploitation. If the goods are subsequently sold and remain in space, the same conflict rule will continue to be applied, but with a different scope of application: the law of the nationality of the operator, if it is under that law that the authorisation for exploitation was issued, or, failing that, the law of the State that authorised the exploitation, will apply as a matter of priority to the rights in rem derived from space resources.

The solutions proposed here are imperfect and prospective. They are to be considered only for what they are: hypotheses, even sketches of hypotheses. The only thing they demonstrate is that private international law could mobilise its methods and concepts in the service of the legal framework of space resources and their property. After all, these chunks of infinity are easily qualified in law: they are movables that have the particularity of being extracted from an international space with the vocation to remain there.

Perhaps we may also draw another conclusion as for the transnational effect of national space resources law. The question of the relation between national and transnational laws is rather a complex one. But, to use as a space-related assumption an expression of Ralf Michaels, written in another context, national space resources laws are typically the one “*domestic by source and yet transnational by scope*”<sup>107</sup>. Or, as Emmanuel Gaillard says, quoted by Ralf Michaels in the precited article, “*it is important not to confuse a national legal order with its domestic, as opposed to international,*

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<sup>107</sup> Ralf Michaels, ‘State Law as a Transnational Legal Order’ (2016) 1 UC Irvine Journal of International, Transnational, and Comparative Law 141.

*substantive rules*<sup>108</sup>. This approach is probably the one which would enable us to give an ontological response to the epistemological response we previously demonstrated: both as methodological framework and a day-to-day manifestation<sup>109</sup>, both as both of law and a theory of law<sup>110</sup>, the transnational legal order may be the one where the competing vocations of both public international law and private international law might be reunited. The limited scope of our article does not allow us to go into more detail on this element, so it is mainly a matter of retaining the conclusion that, in fine, Luxembourg and US laws cannot be regarded as purely domestic but are representative national-transnational laws.

### 3.2.3 Space property as economic policy

Finally, the last name for space property may relate to governance. Indeed, if we have qualified spatial property as a hybrid in the introduction, it is for this reason. Indeed, if fully mobilised in domestic law and private international law, property of space resources can be embodied in a second level of spatial governance. Private international law, insofar as it is a tool for decentralised coordination of national laws with the objective not so much of settling conflicts of laws and jurisdictions as of avoiding them, is also, in its own way and with its own methods, a tool for decentralised governance, as Alex Mills affirms *“the operation of private international law constitutes an international system of global regulatory ordering”*<sup>111</sup> essentially derived from the field’s methodology.

For in the context of a capital-intensive space economy with an international reach, space property transforms resources into transferable assets, passing from one legal order to another as transactions occur. It is this transferability, this capacity of a property title to space resources to travel, which is at the heart of the second level of governance referred to: for it is not said that all legal systems accept to recognise and accept the property titles in question. This is basically the heart of the concern of the Luxembourg Council of State when it asked the following question:

*“If Luxembourg puts in place a regime recognising a person's property of outer space resources, how can it ensure that other States will recognise the related title? This is all the truer since*

<sup>108</sup> E Gaillard, ‘Transnational Law: A Legal System or a Method of Decision Making?’ (2001) 17 *Arbitration International* 59. Cited by Ralf Michaels, *ibid*.

<sup>109</sup> Peer Zumbansen, ‘Manifestations and Arguments: The Everyday Operation of Transnational Legal Pluralism’ in Paul Schiff Berman (ed), Peer Zumbansen, *The Oxford Handbook of Global Legal Pluralism* (Oxford University Press 2020) <<https://academic.oup.com/edited-volume/34238/chapter/290304206>> accessed 13 April 2023.

<sup>110</sup> Michaels (n 107).

<sup>111</sup> Alex Mills, ‘Towards a Public International Perspective on Private International Law: Variable Geometry and Peer Governance’ (2012) <<https://papers.ssrn.com/abstract=2025616>> accessed 13 April 2023.



*operators duly authorised in accordance with the provisions of the future law will necessarily have to use space launchers taking off from the territory of other States or landing on territories over which Luxembourg does not exercise any sovereignty. Similarly, the exploitation of these resources, once brought back to earth, and their marketing will not necessarily take place in Luxembourg. Is there not therefore a risk that the operators will have the resources they have extracted from celestial bodies confiscated by foreign authorities?"*

This perspective on space property allows it to be seen not so strongly as a threat to the main principles of the Space Treaty, but *rather as a complementary tool to the governance and coordination mechanisms of occupations as described in part (3.1) of this section.*

#### 4 Conclusion

By the end of the decade, several competing lunar bases will be installed or in the process of being installed, most probably located around the Moon's South Pole and its water resources. By the end of two decades, companies will probably be extracting resources from the moon with a commercial and lucrative objective. For now, the harshest critics of space resources property may deny its existence or legality, but the fact is that it is there, and we are witnessing the emergence of a new element in the legal landscape of space law. It is therefore up to the lawyers to seize it and make it work for a cooperative and peaceful governance of space. For where public international law finds in its centralised character some heaviness in its evolution, private international law, a decentralised coordination tool, will be able to deploy all its flexibility by transforming space resources into transferable assets.

At the end of these developments, however, it is wise to conclude that nothing should be concluded until effective exploitation of space resources has really begun. Indeed, until then, what really contains the concept of space property remains hypothetical... And since its inception, space exploration has been both a high point of cooperation and a mobilisation of legal ingenuity. We are not immune to the emergence of an alternative framework to the one currently taking shape.