The International Outer Space and Maritime Legal Commons:

Different principles and common legal loopholes governing the deep-seabed, outer space, celestial bodies, and the high seas.

Abstract: The Legal Commons are the areas beyond national jurisdiction, e.g. deep-seabed, the high seas, Antarctica, celestial bodies, and outer space. Neither States nor private actors can claim ownership, sovereignty rights, or appropriation over these lands, seas, and objects. This paper asks what are the different principles and rules governing mineral exploration in outer space and maritime legal commons. For that purpose, it adopts a threefold approach. Firstly, it introduces the legislative history of the different principles that govern these Legal Commons: i.e. the *res communes* or Freedom and the Common Heritage of Humankind. Secondly, it assesses how these principles are implemented under the rules for mineral exploration in outer space, celestial bodies, and the deep-seabed. Thirdly, it discusses common challenges shared by these regimes, despite their different stage of development, i.e. the problem of sponsorship or registry of convenience.

Keywords: exploration: global commons, sponsorship, registry, convince.

Résumé: Les biens communs juridiques sont les zones situées au-delà de la juridiction nationale, par exemple les fonds marins, la haute mer, l'Antarctique, les corps célestes et l'espace extra-atmosphérique. Ni les États ni les acteurs privés ne peuvent revendiquer la propriété, les droits de souveraineté ou l'appropriation de ces terres, mers et objets. Le présent document s'interroge sur les différents principes et règles qui régissent l'exploration minière dans l'espace extra-atmosphérique et les biens communs maritimes. Pour ce faire, il adopte une triple approche. Premièrement, il présente l'historique législatif des différents principes qui régissent ces biens communs juridiques, à savoir les res communes ou la liberté et le patrimoine commun de l'humanité. Deuxièmement, il évalue la manière dont ces principes sont mis en œuvre dans le cadre des règles relatives à l'exploration minière dans l'espace extra-atmosphérique, sur les corps célestes et dans les grands fonds marins. Troisièmement, il examine les défis communs à ces régimes, malgré leur stade de développement différent, à savoir le problème du parrainage ou du registre de complaisance.

Mots-clés: exploration : biens communs mondiaux, parrainage, registre, convaincre.

1. Introduction

The Legal Commons (the Commons) are the areas beyond national jurisdiction, e.g. the Antarctic, the high seas, deep-seabed, outer space, and celestial bodies. Some of them are regarded as the new frontiers for exploration, and eventual exploitation, of natural resources that are scarce elsewhere on Earth.[1]

In 2021, *Mars*, a documentary produced by the National Geographic, and *Look Up*, a movie streamed by Netflix, illustrate interest in these new frontiers. In *Mars*` second season, a parallel is drawn between the exploration for water on the planet Mars and the exploration for oil and gas at sea, namely, in the Arctic high seas. In *Look Up's* plot, the high-tech industry regards the apocalyptical scenario of an asteroid heating the Earth, as a prospect for harvesting rare minerals needed to manufacture smartphones. What may initially read like a sci-fi cinematographic plot under the context of the search for natural resources of commercial value and use,[2] is actually an ongoing reality. This reality is mainly triggered by technological developments and commercial interests.

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[1] Joanna Dingwall, *International Law and Corporate Actors in Deep Seabed Mining* (Oxford University Press 2021)1.

[2] Under the Law of the Sea exploration means: 'searching for deposits of polymetallic nodules in the Area with exclusive rights, the analysis of such deposits, the testing of collecting systems and equipment, processing facilities and transportation systems, and the carrying out of studies of the environmental, technical, economic, commercial and other appropriate factors that must be taken into account in exploitation, see: International Seabed Authority (Authority), Exploration Regulation for Polymetallic Nodules in the Area, Regulation 1, paragraph 3(b) and (a);, *Responsibilities and Obligations of States Sponsoring, Persons and Entities in Respect to Activities in the Area*, International Tribunal for the Law of the Sea (ITLOS) Seabed Dispute Chmaber Advisory Opinion, (Seabed Chmaber Advisory Opnion)February 2011, para. 89.

To date, there are 31 contracts sponsored by several States, and carried out by public and private actors, are held with the International Seabed Authority (the Authority)[3] for exploration of mineral resources on the deep-seabed across the Pacific, Indian, and Atlantic Oceans.[4] To date, private actors hold 20% of these exploration licenses for the deep-seabed. However, by including the exploration activities licensed under public entities, but in fact carried out by private investment, this figure rises to 29% i.e. 7 out of all contracts for exploration.[5] Two examples of the latter are: *NORI* (*Nauru Ocean Resources Inc.)*, sponsored by Nauru, but wholly owned by a subsidiary in Canadian, i.e. *Deep-Gree*n, and *TOMI* (*Tonga Offshore Mining Limited*), sponsored by Tonga, but also owned by *Deep-Green.*[6]

In the outer space, the figures show a similar rising trend of private investment-orientated expeditions, which are replacing the former public investment in outer space expeditions.[7] A 2019 study named some of the national privately funded initiatives for outer space mineral exploration underway, these included: the US-based *Planetary Resources Inc*, (an asteroid mining company), the US-Luxemburg based *Deep Space Industries* (technologies for exploring and harvesting outer space minerals) and the Japan-based *Ispace Inc*..[8]

Within this context of increasing private investment-oriented exploration for mineral resources both in outer space and on the deep-seabed, this paper starts by asking what are the different principles and rules governing mineral exploration in outer space and maritime legal commons. Then, it asks whether these legal frameworks leave loopholes open for this private investment and operation. It does so by drawing a focused comparison between the international treaty-law for mineral exploration on the outer space celestial bodies and the deep-seabed in a threefold approach.

Firstly, it introduces the two principles governing these Commons: the *Res Communis* or Freedom and the Common Heritage of Humankind, as well as the political and legislative history contexts behind them. Secondly, it assesses the rules applied to the exploration for mineral resources and how these principles are implemented through these rules. Thirdly, it draws out its conclusion by comparing where both legal regimes stand and remarking that, to some extent, they share a common loophole.

Notably, this paper`s scope is restricted to mineral non-living resources on the outer space celestial bodies and the deep-seabed, with brief analogies to the high-seas (Sections 2.1 and 3.1). Hence, draft mineral exploitation (commercial harvesting or extraction), and biological resources beyond national jurisdiction regulations,[9] are topics that fall outside this its scope.

2. Legal Principles

2.1 *Res Communis* or Freedom Governing the High Seas, Outer Space and Celestial Bodies

Under the general principle of the *res communis*, the high seas, the outer space, and celestial bodies shall be subjected neither to the sovereignty of any State, nor general to acquiesce apart and States are bound to refrain from any act that might adversely affect their use by another State or their nationals.[10] Within the 1982 United Nations Convention on the Law of the Sea (LOSC), the *res communis* principle is translated into the Freedom of the High Seas (Freedom). To date, this Freedom

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[3] The international autonomous body created under the LOSC to regulate, manage and administrate the seabed, subsoil and ocean floor there of beyond national jurisdiction: Article 1(2), 1982 United Nations Convention on the Law of the Sea, ratified in December 1982, United, entered into force in November 1994, UN Treaty vol 18333.31363 (LOSC).

[4] International Seabed Authrority, Exploration Contracts <www.isa.org.jm/exploration-contracts> accessed 28 March 2022.

[5] Dingwall (n 1) 6, 67, 127.

[6] Ibid 31-133.

[7] Bin Cheng, 'International Responsibility and Liability of States for National Activities in Outer Space specially by Non-Governmental Entities' in *Studies in International Space Law*, (OUP 1997) 621; World Economic Forum, 'Global Risks Report: Crowding and Competition in Space' (The World Forum 11th January 2022)<www.weforum.org/reports/global-risks-report-2022/in-full/chapter-5-crowding-and-competition-in-space> accessed 28 March 2022.

[8] Tanja Masson-Zwaan and Mahulena Hofmann, *Introduction to Space Law* (4th edn, Volkers Kluver 2019). 97-8.

[9] The ISA is combining efforts to finalize drafting the Exploitation Regulations for Mineral Resources in the Area by 2024 and negotiations under the LOCS Implementation Agreement on the Utilization and Conservation of Biodiversity Beyond National Jurisdiction are also under way and might be met until 2024.

[10] Ian Brownlie, *Principles of Public International Law*, (7th edn, OUP 2008) 169.

applies to all living and non-living resources in the air space, surface and water column beyond the limits of national jurisdiction (the high seas).[11] According to Western interpretation and historical accounts, the Freedom hails back to private activities that dominated exploration and exploitation of the seas in the XVII and XVI centuries, conducted by companies such as the West Indies Companies, thereby, shaping international law, namely Hough Grotius' doctrine of the *Mare Liberum*.[12] Since then, Freedom was gradually incorporated as customary international law and crystalized under the LOSC.

A decade later, after the exploration of outer space was launched, the 1967 Treaty Principles on Governing Activities of States in Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (also known as Outer Space Treaty, or simply OST) was adopted.[13] According to which, the outer space and celestial bodies should be accessible and the subject of exploration to all States, without discrimination and irrespective of their economic and scientific development, as if these Commons are 'the province of all mankind.[14]

Furthermore, none of these Commons are subject to national appropriation by claim of sovereignty or any means of use or occupation or any other mean thereof.[15] The language of the OST derived from the 1963 UN Legal Principles Governing the Activities Governing the Exploration and Use of the Outer Space.[16] Both texts are considered crystallized customary outer space law on the basis of freedom of use and prohibition of appropriation.[17]

Moreover, the language of the OST led former scholarship to conclude that the regime and principle governing of the outer space and celestial bodies are very similar to those of the high seas, implying that both regimes provide for: free use only for peaceful purpose; and prohibition on sovereignty claims from individuals or States.[18] Accordingly, many analogies can be drawn between these Commons. For instance, the exploration and use of the outer space is free to all States without any sort of discrimination, on the basis of equality.[19] This freedom of access to the outer space reads very similar to the freedom of the high seas, in which all States, irrespective of their geographical location (coastal or landlocked), are among other uses, free to navigate, fish, lay down submarine cables and conduct research.[20]

There are also similarities regarding control and responsibility. As under the LOSC, Flag-States have exclusive jurisdiction over the ships, and crew thereof that fly their flag on the high seas.[21] Additionally, all ships must be registered under one State-Registry and comply with the national regulations of that Flag-State- together with standards set under international law by the competent international organization.[22] Similarly, to some extent, Spacefaring-States have responsibility and liability for ships, objects and personnel thereof launched by them into the outer space.[23] Furthermore, the OST mirrors the high seas freedom regimes[24] by providing that this freedom to explore the outer space and celestial bodies is not absolute and shall pay due regard to and not interfere with other uses by other State-Parties.[25]

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[11] Article 86, LOSC.
[12] Dingwall (n 1) 70.
[13] Brownlie (n 10) 256.
[14] Articles 1, UN General Assembly Resolution 1962 (XVII), Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies ratified in 1963, entered into force in 1963, (OST).
[15] Articles 2, OST.
[16] Tanja Masson-Zwaan, (n 8), 2-3.
[17] Bin Cheng, 'United Nations Resolutions on Outer Space: 'Instant' Customary International Law?' in *Studies in International Space Law*, (OUP 1997) 125-146; Mahunela Hofman, 'Moon and Celestial Bodies' in Wolfrum, Rüdiger (ed) *Max Planck Encyclopaedia of Public International Law* (OUP 2010) paras. 7 and 23.
[18] Brownlie (n 10) 257; Former study has also concluded it similarly see: Masson-Zwaan (n 8) 100.
[19] Masson-Zwaan (n 8)16-17.
[20] Article 87 (1), LOSC
[21] Article 94, LOSC.
[22] Articles 92-94, LOSC.
[23] Articles VII and VIII, OST; Brownlie (n 10) 257.
[24] namely Article 87 (2), of the LOSC.
[25] Article IX of the OST; see also Article 2, 1958 United Nations Gneneva Convention on the High Seas, UN T*reaty Series* , vol. 450, p. 11.ratfied in 29 April 1958, entered into force in September 1962. .

Although, the language of the OST mentions "the province of mankind", as a means to accommodate the 77 Group of developing State` interests, at the time of drafting, there is no hint, implementation or further guidance in the OST text as to what this wording means, this leads to obscurity and debates.[26] Thus, this paper is of the standpoint that the principle of freedom governs access and exploration on the basis of peaceful propose, equity and mutual due regard for other States-Parties activities in the outer space and celestial bodies. Nonetheless, it is generally agreed the *res communis* category is not a source for precise rules.[27] This will be further discussed in section 3.1.

2.2 Common Heritage of Humankind (CHH) governing the Area but not *de facto* to the Moon

When it comes to mineral resource deposits *in situ*, [28] on the deep-seabed, ocean floor, and subsoil thereof, beyond the limits of national jurisdiction (hereafter the Area[29]), the regime of freedom is completely over shadowed by the Common Heritage of Humankind (CHH) principle.[30] It is generally agreed that any exploration activity that targets these minerals in *situ in* the Area, is governed by this principle.[31] Most notably, this principle is an immutable clause under the LOSC, i.e. it is not subject to amendments.[32] As a commentator put it, it is the 'backbone' principle of the LOCS's regime that governs the Area and its mineral resources.[33]

The CHH`s legislative history, under the Law of the Sea, dates back to the 1970s, when Maltese ambassador, Arvid Pardo, proposed (in the realm of the UNCLOS III),[34] that the seabed, sea-floor and subsoil thereof, beyond national jurisdiction, should be declared 'common heritage of mankind'.[35] Some scholars suggest that, when Pardo developed his CHH legacy (between 1967-1973), he had in mind the idea of the 'province of mankind' under the OST text.[36] After Pardo`s proposal, developing-States and developed States positioned themselves differently according to their interests and exploration capabilities.[37] Accordingly, the developing-State (Group 77) backed the CHH.[38] They regarded it as a tool to gain solid access, benefit-sharing, knowledge, and technology transfer for exploration and eventual exploitation of the minerals of the Area.

On the other hand, developed States, with greater exploration capacities, backed extending the Freedom to the exploration, and eventual exploitation of the Area's mineral resources.[39] This favored their wealth and technological development on a first-come, first-served basis in relation to mineral exploration in the Area.[40] It was no surprise that after the adoption of the LOSC, the United States (US)

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[26] Also named 'fragmentation and impression': Masson-Zwaan (n 8) 17; Hofman (n 17) paras. 23.
[27] James Crawford, *Brownlie's Principles of Public International Law* (9th edn, OUP 2019) 331.
[28] namely cobalt-rich crusts, manganese nodules, and sulfide manganese.
[29] Article 1 (1), LOCS.
[30] Article, 133 and 136, LOSC.
[31] ITLOS Seabed Chmaber Advisory Opnion, 2011 (n. 2), para. 82; Tullio Scovazzi, 'Article 133' in Proelss, Alexander et al. (eds) *United Nations Convention on the Law of the Sea: A Commentary* (Hart 2017).
936; Dingwall, (n 1) 2.
[32] Article 311 (6), LOSC; Rudger Wolfrum, 'Common Heritage of Mankind' in Wolfrum, Rüdiger (ed) *Max Planck Encyclopaedia of Public International Law* (OUP 2010) para. 4.
[33] Dingwall (n 1) 68.
[34] i.e., the round of diplomatic negotiations between 1973 and 1982 that led to the adoption of the 1982 LOSC.
[35] UN General Assembly, Malta Report for the Inclusion of a Supplementary Item in the Agenda of the Twenty Second Session, 18 August 1967, GAOR 22nd Session, annexes, Agenda Item 92, 1; UN General Assembly Resolution 2479 (XXVI), *Declaration of Principle Governing the Seabed, Ocean Floor and Subsoil there of beyond the limits of national jurisdiction,* 17 December 1970, Principle 1; Arvid Pardo, *The Common Heritage: Selected Papers of Ocean and World Order* (Malta University Press 1975) 381; Wolfrum, (n 32) para. 1; Dingwall, (n 1) 71-73.
[36] Hacken With Adersen, 'A Short History of the Ocean Floor', in elesetsky, Anastasia, and Keyuan Zou. *Marine Scientific Research, New Marine Technologies and the Law of the Sea* (Brill, 2021), 79-81.
[37] Brownlie (n 10) 245; Dingwall (n 1) 71.
[38] See e.g. later dated from 24 April 1979 from the Chairman of the Group 77; UNLCOS III; Off Records, xi, 80; Rceod 2749 (XXV), 17 Decmber 1970, Brownlie Documents, p. 92, (848 votes in favour, none against and 14 abstension); Moratorium Resolution UNGA 2574 (XXIV), 15 December, 1968 cf. Brownlie (n 10) 245; Dingwall (n 1) 701.
[39] Digest US Practice, (1973), 273-276 cf. Brownlie (n 10) 245; Dingwall (n 1) 75, 83.
[40] Dingwall (n 1) 71-2.

did not ratify and in fact was opposed to it -namely to the regime governing the Area.[41] Other industrialized States also remained reluctant to ratify it and waited more than a decade, until the adoption of the 1994 Implementation Agreement on Exploration and Exploitation of Mineral Resources in the Area, to ratify the LOSC.[42] The latter agreement enlightened the operationalization of the regime for minerals in the Area.[43]

According to the LOSC, the CHH principle provides that:

i. No State shall claim or exercise sovereignty or sovereign rights over any part of the Area or its (*in situ* mineral) resources, nor shall natural or judicial persons appropriate any part thereof.[44]
ii. All activities (of protecting, exploring and exploiting for mineral resources) shall be managed by the Authority for the benefit of humankind.[45]
iii. The States sponsoring activities in the Area must make sure that their nationals or persons under their jurisdiction comply with the rules and also those of the International Organization carrying such activities.[46]

Commentators have noted that there are many interpretations of the CHH principle, which mainly entail the following: i) non-appropriation and the exclusion of unilateral appropriation; ii) peaceful purpose, iii) benefit-sharing; iv) environmental protection; and v) a common management regime and internationally agreed rules to be set by an intergovernmental organization.[47] As to the latter entailment, the Authority is the embodiment of the CHH by its mandate not only to regulate, manage, control and grant license for mineral orientated activities in the Area, but also to perform these functions on behalf of humankind as a whole.[48]

The Agreement on Governing Activities of States on the Moon and Other Celestial Bodies (the Moon Agreement), was adopted by the UN General Assembly in 1979. According to it, the Moon and its resources are the common heritage of mankind[49] and its exploration and use is the province of mankind.[50] This agreement was drafted while the negotiations of the UNCLOS III were coming to an end. Thus, it is no coincidence that the principle reads, to some extent similarly to the LOSC and is more matured than the principle of the OST. Overall commonalities include: its use only for peaceful purpose[51] and the prohibition of appropriation.[52] Other than that, the Moon`s CHH principle literally entails that there should be:

i- Access to all states regardless of their scientific and economic capabilities;[53]
ii- Due regard for inter-generation equity;[54]

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[41] Wolfrum (n 32) para. 1.
[42] The LOSC is a 'package deal', i.e. when ratifying it the States agree to its full content and text: Dingwall, (n 1) 82-84.
[43] Dingwall (n 1) 84-84.
[44] Article 137 (1), LOSC.
[45] Articles 137 (2), 150(I), 153 (1), 156 and 157, LOSC.
[46] Article 139, LOSC.
[47] Rüdiger Wolfrum, The Principle of Common Heritage of Mankind, (1983) 43 ZaoRV 312, 316; cf, Ornella Ferrjolo, 'The Common Heritage of Mankind in International Law: A Great Past but no Future?' [2018-9] (5) Marit. saf. secur. law j. 115; Dingwall, (n 1) 9, 72, 86, 87.
[48] Articles 137 (2) and 153, LOSC; Dingwall (n 1) 2.
[49] Artcile 11 (1), UN GA Resolution 34/68 1979, Agrremnt Governing Activities in the Moon and Other Celestial Bodies,
United Nations, *Treaty Series* , vol. 1363, p. ratified in December 1979 entered into force in 1984 (Moon Agremment).
[50] Artcile 5 (1) Moon Agreemnt.
[51] Article 3 Moon Agrrement.
[52] Artcile 11(2) and (3), Moon Agrrement.
[53] Articles 4 (1) Moon Agreement.
[54] Articles 4 (1) Moon Agreement.

iii- Maximum cooperation on bilateral or multilateral levels and through international organization.[55]

iv- An *In situ* inspection system, which applies, on a reciprocity basis, to all manned or unmanned stations, facilities, installations, equipment, vehicles, etc., which contracting parties may establish and/or utilize on the Moon.[56]

To date, the Moon Agreement has only 24 ratifications,[57] with the recent accession of Oman and Bahrain.[58] Most of the Spacefaring-States, e.g. China, Japan, Russia and the US, did not ratify the Moon Agreement. It is also worth noting that in 2008 the Parties to the Moon Agreement acknowledged that the CHH in the text does not constitute an obstacle to space mining initiatives.[59] Hence, the OST, with over 130 ratifications,[60] *de facto* sets the international rules for the exploration of mineral resources in the outer space and celestial bodies. Against this background, this paper assesses the OST instead of drawing further consideration on the Moon Agreement. With the OST and the LOSC in mind, it now assesses how treaty rules on exploration for mineral resources implement these different principles.

3. Rules Governing Mineral Exploration and Implementation of the Relevant Principles

3.1. In the Outer Space and Celestial Bodies

This section asks how are the principles of non-appropriation and freedom implanted under the rules of OST. To answer, this question it assesses what the duties of State-Parties are under the OST. It also points to where the loopholes that can lead to fragmented national regulation of outer space exploration, and/or the mismanaged private spacefaring investments lie.

The OST allows both public and private actors to have access to explore the outer space and its resources, thus the private sector can explore, side by side with State-Parties.[61] Nonetheless, under international law, only States, and international organizations are responsible for their activities in the outer space.[62] Consequently, State-Parties to the OST are not only responsible for the activities of their public entities, but also for private entities incorporated under their territory and carrying out exploration expeditions in the outer space.[63]

By way of explanation, if one would like to make a private investors accountable for their breach of Outer Space Law, one State has to regulate that responsibility, liability and accountability within its national law. Some scholars arguably read the rationale behind this rule of Article VI of the OST as a means of fostering these national regulations regarding outer space exploration.[64]. Moreover, Registry-States have control and liability for damage over objects (spaceships) and personal (crew) that they launch into space.[65]

Clearly, there is no express due diligence duty to regulate such activities under national law mentioned throughout the OST. Accordingly, comments have been made on the jurisdictional 'laconic provision' of the OST.[66] In other words, jurisdiction may be hinted at by using the words 'control' and "'authorization' for activities of nationals under their control, objects launched and operations authorized by them, but does not go anyway beyond that by expressly ruling on jurisdiction.[67] Putting it simply, under the OST, there is no express due diligence to domestically regulate.

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[55]Articles 4 (2) Moon Agreement.
[56] Articles 9 and 15 Moon Ahrement.
[57]Moon Agrrement.
[58] United Nations Offoce for Outer space Affairs, Status of International Agreements relating to Activities in Outer Space< https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/status/index.html> accessed 28 March 2022.
[59] Masson-Zwaan (n 8) 100.
[60] United Nations Treaty Series , Agreemnt Governing Activities in the Outer Space and Other Clestial Bodies, UN Treaty Series n. 8843, ratified in 1967 (OST) <https://treaties.un.org/pages/showdetails.aspx?objid=0800000280128cbd> accessed 28 March 2022.
[61] Article VI, OST; Masson-Zwaan (n 8) 20.
[62] Article VI, OST; Cheng (n 7) 622; Hofman (n 17) paras. 6.

[63] Article VI, OST; Masson-Zwaan (n 8) 20.
[64] Article VI, OST; Masson-Zwaan (n 8) 20.
[65] Articles VII and VII, OST; Masson-Zwaan (n 8) 20.
[66] Robert Jennings and Arthur Watts, 'The Objects of International Law, Chapter 7 Outer Space' in Robert Jennings and Arthur Watts (eds) *Oppenheim's International Law*: *Vol. 1 Peace* (9th edn 1992) 1992. 830.
[67] Ibid 830.

Questions could also arise as to the extent of this responsibility and what it would mean in the case of joint outer space exploration. Against these questions, in the case of action or omission of nationals controlled by that Spacefaring-State-Party and in case of joint expeditions all States involved should be jointly responsible.[68]

As to debated issues of jurisdiction over nationals of a Registry-State visiting the spaceship of another Registry-State, the jurisdiction of the Registry-State of the spaceship to which the crew originally belongs will prevail over the jurisdiction of the other Registry-State where the crew actually was visiting when it breached the law.[69]

Most notably, the OST does not set minimum international standards for the national regulation of this activity. In a nutshell, the OST's open-ended language, on responsibility, and liability as well as its jurisdictional gap, leaves room for a States-Parties' discretionary interpretation and application of the rules set therein, which may result in two problematic scenarios. Firstly, it could lead to inconsistent or fragmented national regulations for outer space spacefaring, and mineral exploration -without minimum standards. Secondly, it could lead to spacefaring business being incorporated under the national rules that they regard most favorable to their operations and to explore mineral resources in a mismanaged fashion. Against these scenarios, it is questionable whether the OST leaves room for a Registry of Convince in Outer Space Law as an analogy to the issue of the Flag of Convenience[70] under the Law of the Sea.

Additionally, the OST provides for a State-Parties' to consult in the case of harmful impacts to, or interference with, the environment or other Stated-Parties` activities.[71] This duty is again one of general nature and extends only to consultation, i.e. asking an opinion on a certain problem, without implying a follow-up duty to take such opinion into further decision-making consideration.[72]

Ultimately, the OST generally attempts to foster cooperation by two means. Firstly, by encouraging States bilaterally to agree to place observers from other State-Parties onboard their expedition spaceship. [73] Secondly, through unilaterally notifying the UN Secretary General, the general public and international scientific community of the nature, conduct, location and outcomes and information related to the exploration,[74] which the UN Secretary General shall then disseminate.[75] It is also arguable whether private actors engaged in space exploration would be willing to make public the data that could result in their economic profit and even the coordinates of their resources to their competitors.

3.2. In the Area

It is questionable how does the Authority implement its mandate to administrate, regulate and grant license for the mineral exploration in the Area on behalf on humankind. This subsection answers this question by summarizing the powers of the Authority, duties of Sponsoring-States and Contractors under the LOSC.

The Authority is an autonomous intergovernmental organization (IGO), with a legal personality and was created under LOSC. It has been operating since 1994. Notably, every State-Party to the LOSC is *ipso facto* a Party to the Authority.[76] Nonetheless, the Non State-Parties, e.g. the US, can take part, as observers, in discussions at the Authority's Assembly.[77]

The Authority is competent to set the standards for activities in the Area and for compliance with these standards.[78] It also has the power to adopt rules independently from States subsequent to

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[68] Cheng (n 7) 633-634.
[69] ibid 625.
[70] In sum, cheap taxes and light regulation for maximum economic profit and less law enforcement burden of the ship-owner: for more information, see Doris König, 'Flag of Convenience' in Wolfrum, Rüdiger (ed) *Max Planck Encyclopaedia of Public International Law* (OUP 2008).
[71] Article IX , OST.
[72] Masson-Zwaan (n 8) 21.
[73] Article X, OST.
[74] Article XI, OST.
[75] Article XI, OST.
[76] Article 156 (2), LOSC.
[77] James Harrison, *Making of the Law of the Sea: A Study in the Development of International Law*, (CUP, 2013) 117.
[78] Ibid 118.

consent, which differentiates the Authority from any other IGO.[79] The Authority rules apply, not only to State-Parties but, most importantly, to investors and to private or third parties (Contractors) carrying out exploration in the Area through means of signing a contract for exploration with the Authority.[80] This set of rules is clearly legally binding.[81] Along, with their rights, duties and accountability, Contractors have standing rights to participate in deep-sea disputes before the International Tribunal for the Law of the Seabed Dispute Chamber.[82] All these features distinguish this regime from traditional international law systems, where only States and International Organizations are subject to legal personality and have standing rights.

To understand this further, two questions must be asked. Firstly, what is the process for getting a contract? Secondly, how do the standards and rules become binding upon private actors?

Any investor, who aims at carrying out exploration in the Area, shall first submit a written plan of work to the Authority, who will assess this plan.[83] In the case that this assessment deliberates in favor of the investor-applicant's intents, then, it will enter into a formal contract with the Authority based on the written plan of work for the exploration of specific minerals, at an specific area and in a specific time frame.[84] The minimum standards of the contract are that the Contractor will carry out its activities following the LOSC, and the rules for exploration of the Authority will be followed.[85]

Hence, these rules become binding to any Contractor for exploration, meaning that no State-Party can persistently oppose the rules of the Authority.[86] Notably, the Authority may, at any time, control compliance with the contract and carry out inspections in the exploration licensed-area or installation thereof to monitor compliance.[87] Moreover, under the reporting requirements of the Contracts, the Contractor shall report to the Authority on an annual basis.[88] These reports are of a classified nature, but, nonetheless, another monitoring compliance mean.

Additionally, applicants and eventual Contractors shall be nationals or effectually controlled by a Sponsoring-State-Party.[89] As the case law puts it: 'First, [Contractors] must either be nationals of a State-Party to the [LOSC] or effectively controlled by it or its nationals.'[90] 'Second, they must be sponsored by such States.'[91] The Sponsoring-States have the responsibility to ensure, within their legal systems, that a Contractor shall carry out exploration in the Area in conformity with the terms of its contract and its duties under the LOSC.[92] Furthermore, this 'responsibility to ensure' establishes a mechanism through which the rules of the LOSC concerning exploration in the Area, although being treaty law and, thus, binding apply only to the subjects of international law (States and IGO) that have accepted them, and becomes effective for Sponsored-Contractors, who find their legal basis in domestic or national law.[93] To put it simply, this duty is to ensure that the Contractor is held liable under the Sponsoring-State's national private contractual law.

Nonetheless, in case of damage, a Sponsoring State shall not be liable for damage caused by any failure of a Contractor sponsored by it, if that State-Party has adopted laws and have taken administrative measures which are within the framework of its legal system and are reasonably

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[79] ibid 123.

[80] Article 160 (2(ii(f))) and 162 (2(ii(o))); Annex III, Article 14, LOSC; Harrison (n 79) 122-123; Dingwall, *International Law and Corporate Actors in Deep Seabed Mining* 146-147.

[81] Article 137(2), LOSC.

[82] Artcile187 (c) and (e), Annex VI, Article 37, LOSC; Dingwall (n 1) 148.

[83] Articles 153(3) and Articles 3 and 16 Annex III, LOSC; Dingwall (n 1) 2-3, 127.

[84] Article 153 (3): Annex III Article 3 and 11, LOSC.

[85] Articles, 153(3) and Annex III Article 3(5), LOSC; Authority, Regulation for Exploring for Polymetallic Nodules in The Area, Annex 4, Section 13.1.

[86] Harrison (n 79) 123,

[87] Article 153 (4) and (5): Annex III Article 3 and 11, LOSC.

[88] Michael Lodge, 'The International Seabed Authority' in Wolfrum, Rüdiger (ed) *Max Planck Encyclopaedia of Public International Law* (OUP 2020) para. 40.

[89] Article 139, Annex III, Article 3 LOSC.

[90] Article 153, (2), LOSC ; ITLOS Seabed Disputes Chamber Advisory Opinion of 2011, (n 2) para. 74.

[91] *Ibid.*

[92] Article 3 (4), Annex III, LOSC.

[93] ITLOS, , Seabed Dispute Chambe Advisory Opinion, 2011,(n 2) para 108.

appropriate for securing compliance by persons under its jurisdiction.[94] Hence, Sponsoring-States-Parties have the due diligence obligation to ensure that national rules control private or national actors engaged in exploration activities in the Area.[95] Furthermore, the Sponsoring-States have the duty to assist the Authority in its task of controlling exploration in the Area for the purpose of ensuring compliance with LOSC.[96] In summary, the aim of the sponsorship requirement is to ensure that duties that are binding on States-Parties are fulfilled by entities that are subjects of domestic legal systems.[97]

Moreover, the benefit-sharing and the parallel system are other means of implementing the CHH principle. According to the reserved areas under the parallel system, each licensed area has to be large enough to be shared between the Contractor and developing States or the Enterprise.[98] The Enterprise is an operational body of the Authority that is not yet under operation and will not be until regulations for exploitation are set in stone.[99]

Nonetheless, under this parcel system's reserved areas, many developing States (China, Cook Island, Kiribati, Nauru, Singapore and Tonga) have taken advantage of it to conduct their exploration activities in shared areas with exploration Contractors.[100] However, these reserved areas, under the parallel system, hide the major loophole of this regime as already noted by case law and scholarship. In summary, it has been acknowledged that private actors are the ones carrying out exploration in reserved areas: 85% of activities thereof are held by businesses which in turn are primarily owned by corporations based or incorporated in developing States (Section 1).[101] Due to this trend, scholars have asked, 'What are the implication of this [trend] to the achievement of the [CHH]?'[102]

Case law has warned that applying different responsibilities to developing and developed States could lead to the problem of States of Convenience with unharmonious environmental, safety and CHH standards.[103] Case law has also noted that the regime poses no barrier to Western companies operating through, and sponsored by, developing States, with regulatory but no economic control over these companies.[104] Similarly, scholarship has noted that gaps in the deep-seabed mining regime, i.e. an effective nationality test within the parallel system context, could lead to the risk that private actors continue to route their investments through subsidiaries in developing States until the quota of reserved areas is entirely depleted.[105] Hence, these concerns show that, despite the developments of the CHH under the Law of the Sea, it is not completely immune to the issues of State of Convenience.

Another mean of implementing benefit-sharing under the CHH principle is under the duty to transfer technology.[106] According to which, the Contractors shall inform the Authority: i) in the written plan of work with a general description of the equipment and methods to be adopted for exploration, and other relevant non-proprietary information about the characteristics of such technology and information as to where such technology is available: and when any ii) further substantial technological change or innovation is introduced in the review process of exploration.[107] The Authority shall also acquire technology and scientific knowledge from exploration in the Area and promote and encourage the transfer to developing States of such technology and scientific knowledge so that all States-Parties benefit therefrom.[108]

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[94] Article 3 (4), Annex III, LOSC.
[95] ITLOS, , Seabed Dispute Chambe Advisory Opinion, 2011 (n 2), para 110-120.
[96] Article 153 (4), LOSC: ITLOS, Seabed Dispute Chambe Advisory Opinion, 2011 (n 2), para. 124.
[97] Lodge (n 90) para. 42.
[98] Article 170 (1), Annex IV, LOSC; Dingwall (n1) 3.
[99] Lodge (n 90) para. 3.
[100] *Ibid* para. 24.
[101] Dingwall (n 1)134.
[102] ibid 134.
[103] ITLOS, , Seabed Dispute Chambe Advisory Opinion, 2011 (n 2), para. 159: Dingwall (n1) 137.
[104] ITLOS, , Seabed Dispute Chambe Advisory Opinion, 2011,(n 2) para. 159: Dingwall (n1) 137.
[105] John Gibson, 'The Deep Seabed Mining and the Marine Environment Protection: Advisory Opinion of the International Tribunal for the Law of the Sea Responsibilities and Obligations of States Sponsoring Activities in the Area' [2011] 21(193), J. Water Law. 193, 197; Dingwall (n 1) 142.
[106] 'technology' means the specialized equipment and technical know-how, including manuals, designs, operating instructions, training and technical advice and assistance`: see Article 5 (8), Annex III, LOSC,
[107] Article 5 (1) and (2), Annex III, LOSC.
[108] Article 144, LOSC.

Ultimately, the Authority can implement its CHH mandate through the right to call for an "environmental emergency order". In the case that a Contractor foresees a harmful impact of its activity on the environment, it shall notify the Authority, other Constrictors, and ships navigating in the vicinity of its licensed area.[109] Against that notification the Authority's Council can issue emergency orders, which may include orders for the suspension or adjustment of operations, to prevent serious harm to the marine environment arising out of exploration in the Area.[110] In the case of an emergency order of that nature being issued, the Sponsoring-State shall take all necessary measures to ensure that the Contractor provides a guarantee of financial and technical capability to comply promptly with the order or to assure that the Authority's Council that they can take such emergency measures.[111] Otherwise, this could result in liability of the Sponsoring-State under international law.[112]

4. Conclusion

Two principles govern the Commons. The first is the *res commonis* or freedom which applies to the outer space, celestial bodies and the high seas. The second is the CHH, which governs activities, including exploration, *in strictu senso* related to mineral resources *in situ* in the Area. Historically, the OST mirrors the High Seas Freedom; the CHH may have had its seeds in the language of the OST, and the Moon Agreement, to some extent, mirrors the CHH principle as governing the Area. However, the CHH principle has matured through debate, implementation agreements, and under the further development of the Law of the Sea. Additionally, the term 'province of mankind', in the OST text, was rapidly adopted without considering its means of implementation or developing it under Outer Space Law. As scholarship put it, the CHH principle has been limited outside the deep-seabed context.[113]

In summary, both principles depart from the idea of free and equitable access without appropriation, but what differentiates the CHH from the *res communis*, is mainly that the first sets a regime for common administration[114] - under international rules legally binding upon public and private investment. The *res communis* leaves the Commons for free access and allows the discretionary power of the Flag- or Spacefaring-State to control the activities and to enforce the law, which paves the way to *de facto* inequalities given the advanced technologies and higher revenues to explore and access remote spaces this.[115] The CHH rules in favour of solidarity and cooperation, distributive justice, benefit-sharing, and integration of all States irrespective of their degree of scientific and technological development.[116]

On the one hand, the CHH principle under the Law of the Sea is distilled into four central elements: i) common management; ii) no unilateral exploration or exploitation; iii) benefit sharing; and iv) marine environment protection.[117] This translates into 'technology transfer', 'parallel system' and 'benefit-sharing' in the LOSC. Furthermore, the Authority can implement the CHH through means of: conducting reviews of plans of works and contracts; inspecting and monitoring exploration activities; most notably, it has the power to issue an environmental emergency order and prevent or control the harmful impacts or mismanaged conduct of the exploration activity in the Area. Notably, rules and case law, under the Law of the Sea, regarding exploration for mineral resources, makes it clear that the rules and international minimum standards set thereof apply to private and public actors engaged in this exploration activity. Accordingly, scholarship has concluded that this regime, under the LOSC that governs the Area 'sets the most ambitious and comprehensive regime ever devised to govern any global common'.[118]

It has been noted that the main objectives of the CHH aim to ensure that developing States can access and benefit from mineral resource exploration and eventual exploitation, on equal footing with

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[109] Harrison (n 79) 139-140.
[110] Article 162 (2(w)), LOSC.
[111] ITLOS, Seabed Dispute Chamber, Advisory Opinion, 2011, (n 2) para. 138.
[112] Article 139 and 235, LOSC.
[113] Dingwall (n1) 74.
[114] Wolfrum (n 32) para. 1.
[115] Rüdiger Wolfrum, The Principle of Common Heritage of Mankind, (1983) 43 ZaoRV 312, 316; cf, Ferrjolo, 'The Co mmon Heritage of Mankind in International Law' (n 47) 116; Dingwall (n 1) 90-91.
[116] *Ibid*.
[117] Dingwall (n 1) 94.
[118] *Ibid* 2.

developed States.[119] Nonetheless, under this benefit-sharing, and more precisely under the reserved areas of the parallel system, lies the loophole of the regime. This loophole is evident in the trend of Western corporations to carry out contracts for exploration under subsidiaries incorporated in the territory of developing States and linked to the issues of Sponsorship of Convenience.

On the other hand, Outer Space Law under the OST shows major gaps as regards to: minimum standards, due diligence duties of States to regulate, accountability of private actors, control, compliance and cooperation. Most notably, when the OST was drafted, private investment-orientated space exploration was remote. However, this is not the exception anymore rather it is the rule. Hence, this gap in addressing private actors in the outer space needs serious consideration.[120] Consequently, international Outer Space Law stands today where the Law of the Sea stood a hundred years ago: in a legal vacuum outside law enforcement's reach. It is susceptible to the interests of the industries and is largely dominated by private companies, investors, or businesses (e.g. merchant, submarine and cables) and therefore following contractual law.[121]

These legal gaps and private investment trends could entail concerning three scenarios. Firstly, the increase the inequality gap between Traditional Spacefaring and Non-Spacefaring States. Secondly, the fragmented or inconsistent national laws on spacefaring. Ultimately, these legal gaps could create room for private actors to explore resources thereof in a miss-managed fashion without legal consequence.

[119] Ferrjolo, 'The Common Heritage of Mankind in International Law' (n 47)
[120] Cheng (n 7) 622, 634.
[121] As from the Law of the Sea perspective see: Hacken With Adersen, 'A Short History of the Ocean Floor', in Telesetsky, Anastasia, and Keyuan Zou. *Marine Scientific Research, New Marine Technologies and the Law of the Sea* (Brill, 2021), 75-76.