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Houston We Have a Law.
A Model for National Regulation of Space Resources Activities.

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Abstract

The field of space resources activities is rapidly maturing, but we still do not have a legal regime able to cope with such development. The United Nations Committee on the Peaceful Uses of Outer Space finally started to debate whether *commercialization* of space resources is permitted under current international space law only in 2018, and yet declaring that space resources activities are lawful is barely the start. In fact, the real challenge is *how to regulate* them in light of the obligations set forth in international space law, without jeopardizing their economic convenience. The present paper addresses precisely this question by presenting a draft law redacted in articles, coupled with a comprehensive explanatory note. *Inter alia*, the paper introduces a new “space resources activities” license and proposes a detailed authorization regime based on the grant of priority rights limited in size, number and time extension. Based on the above, the paper concludes praising the importance of domestic regulation of space resources activities, when based on the same language and spirit of the OST and coordinated through mutual recognition.

Keywords: Space Resources, New Space, National Space Legislation, International Space Law

Table of Contents

Abstract.....	p. I
Table of Contents.....	p. I
Introduction.....	p. 1
1. The “Space Resources Bill”	p. 1
2. Explanatory Note.....	p. 4
Conclusion. Future perspectives.....	p. 7
References.....	p. 8

Introduction.

The field of space resources activities is rapidly maturing, but we still do not have a legal regime able to cope with such development. While in the last five years the number of new space ventures has increased by 7000%, the state of the law did not make a fraction of that progress. The United Nations Committee on the Peaceful Uses of Outer Space finally started to debate whether *commercialization* of space resources is permitted under current international space law only in 2018.ⁱ So far, no agreement has been reached.

In the meantime, States retain the right to interpret the Outer Space Treatyⁱⁱ and to consequently allow or forbid their nationals to engage in space resources activities. As to October 2019, of the 92 COPUOS' membersⁱⁱⁱ only the United States and Luxembourg have passed domestic laws enabling their nationals to undertake space resources activities.^{iv} In both cases, the two laws merely declare the legality of space resources activities, without providing any specific rule as to which they should be practically performed.

However, declaring that space resources activities are lawful under the OST is barely the start. As per Article VI OST, private activities in outer space require authorization and continuing supervision by the relevant State, which shall assure that they are carried out in conformity with the OST provisions.^v Therefore, the real challenge is *how to regulate* space resources activities in light of the obligations set forth in international space law, without jeopardizing their economic convenience.

Accordingly, this paper addresses the question of how to draft efficient national regulation of space mining that is also compatible with the main principles of international space law. This is done by presenting a Space Resources Bill redacted in articles, coupled with a comprehensive explanatory note. Chapter 1 presents the proposed Bill, while Chapter 2 is dedicated to the explanatory note.

In particular, the Bill establishes a new “space resources activities” license, regulating the exploration and use of celestial bodies for the purpose of extracting space resources. Then, the Bill couples

this license with a detailed authorization regime for the actual governance of space resources activities. Drawing insights from the ITU model, the proposed regime is based on the grant of priority rights limited in size, number and time extension. Notably, such provision is completed by a mutual recognition clause aimed at fostering international cooperation on the matter.

Moving from the provisions of the Bill, Chapter 2 provides an explanatory note laying down context and rationale for the proposed solutions. From the above, the paper concludes that domestic laws based on the same language and spirit of the OST, coordinated through mutual recognition, could ensure compliance with the current system of international space law while fostering the development of space resources activities.

1. The “Space Resources Bill”

Before presenting the text of the Bill, it is important to note that the latter is meant to function as *lex specialis* to existing national legislation on space law, although it may also refer to such provisions. While the “Space Resources Activities Bill” will prevail in case of conflicts, companies will still have to comply with relevant provisions from applicable national space legislation, except when explicitly excluded. Lastly, on a purely editing note, since this Bill is meant as a general model, the reader should keep in mind that expressions such as “National Space Agency” or “the State’s domestic law” have been left unspecified on purpose.

Article 1

This Bill takes measures for the implementation of the right to explore and use outer space and celestial bodies for the purpose of extracting space resources, in accordance with applicable international law.

Article 2

To such end, this Bill recognizes that the right to possess, own, transport, use and sell over the extracted space resources is an essential part of the right declared under Article 1, and will ensure its exercise in accordance with the State’s domestic law and its international obligations.

Article 3

This Bill shall grant the rights of Articles 1 and 2 only to companies incorporated under the laws of the State and under its continuous authorization and supervision as detailed in the provisions of the present Bill.

Article 4

This Bill shall ensure that the right mentioned in Article 2 will be exercised on a non-interference basis. To this end, it establishes at Articles 6-12 a first-come-first-served regime for the recognition and subsequent protection of specifically delimited rights of exploration and use.

Article 5

This bill establishes a special license covering the exploration and use of celestial bodies for the purpose of extracting space resources.

5.1 The “space resources activities” license is applicable to all the space operations related to the exploration and extraction of space resources.

5.2 The “space resources activities” license has a pluriennial validity of 10 years, subject to the persistence of the licensing requirements. One year before expiration, the licensee can apply for renewal, following the same procedure provided for the release.

5.3 The “space resources activities” license shall be released by the National Space Agency upon demonstration of the ability to comply with the requirements imposed by applicable national legislation on space activities.

5.4 In addition, the licensee shall demonstrate compliance also with:

- a) Liability obligations for incidents and accidents in outer space, including the obligation to indemnify the Government, up to the maximum amount of mandatory insurance coverage. Such amount shall be determined yearly by the Government per administrative decree.
- b) Environmental protection provisions, including respect of the UN Space Debris Mitigation Guidelines and COSPAR planetary protection policies.
- c) Safety of space operations, including assessment of potential risks of collisions with existing space objects and celestial bodies. In particular, no licensee shall redirect the trajectory of any celestial bodies unless

specifically authorized by the National Space Agency and exclusively under the terms of that authorization.

5.5 The space operations licensed under the “space resources” license shall be performed directly by the licensee through its own resources and personnel.

5.6 The “space resources activities” license may not be transferred without the prior consent of the National Space Agency.

Article 6

This Bill establishes a special authorization regime governing the exploration or use of a certain area of a celestial body for the purpose of extracting space resources, which shall be organized pursuant to the provisions of Articles 7-12.

Article 7

Every licensee shall apply to the National Space Agency for obtaining the authorization to explore or use a certain area of a celestial body for a determined time. Such area cannot exceed a certain size, fixed every year by the Government per administrative decree. Authorizations to explore and use shall have a maximum time extension of 25 years.

7.1 The application shall include a detailed plan accounting for the feasibility of the planned activities and demonstrating compliance with the requirements imposed by this Bill.

7.2 Authorizations to explore are released upon the condition of sharing any scientific information obtained, if the National Space Agency so require, against appropriate indemnification. The release of such information can be deferred until the related authorization to use has been granted.

7.3 Authorizations to explore or use are released subject to the approval of the presented plan, the possession of a valid license and absent any other previous legitimate claim over the same area.

7.4 The National Space Agency shall issue the authorization upon payment of an initial fee, whose amount has to be determined by the Government per administrative decree every year. The validity of authorizations to use is subject to the annual payment of a utilization fee, to be predetermined by the National Space Agency in the authorization itself, based on general criteria set up forth every year by the Government per administrative decree.

7.5 The National Space Agency shall issue or refuse the requested authorization with a motivated decision to be issued within 6 months after the submission of a complete application.

Article 8

The same company may hold unlimited authorizations for exploring and using different celestial bodies at the same time. However, the same company shall only have one authorization to explore and use per each celestial body.

Article 9

Authorizations to explore and use are released on a first-come-first-served base. An authorization to explore a certain area also entails priority over the right to subsequently use it, provided that an application for obtaining the right to use is initiated before the expiration of the authorization to explore.

9.1 For contemporary applications, the National Space Agency shall issue the authorization to the company who does not have any existing rights of exploration and use. In case such criteria should not be decisive, then the authorization shall be issued to the company providing the best assurance on the respect of the licensing requirements set forth in Articles 5.3 and 5.4.

9.2 Duly authorized rights to explore and use shall be protected against any third-party interferences which are not justified under national law. Such justifications may include, but are not limited to:

- a) Rights to inspection and visit based upon Article X and XII OST
- b) The protection of the State's national interest
- c) Compliance with State's international obligations

Article 10

Authorizations to explore and use may always be suspended or revoked by the National Space Agency in the event that the relevant license is suspended or revoked, or that the limits and the conditions set forth in the authorizations have been violated.

10.1 Rights to explore and use must continue to be prosecuted. Failure to do so will result in the possible revocation of the authorization and abandonment of the rights obtained.

Article 11

Authorizations to explore and use can be renewed subject to the following conditions:

- a) application presented between two and one year before the expiration of the current authorization;
- b) payment of a renewal fee, to be fixed every year by the Government per administrative decree;
- c) compliance with applicable law, including the maintenance of a valid license;
- d) the absence of public reasons against the renewal.

Article 12

The National Space Agency shall establish and maintain a register of all the released authorizations. Such register will contain the information related to the size, the time extension and the conditions of the authorization. Such register shall be publicly available online, and shall be organized on a *prior in time, prior in jus* base.

Article 13

Once sold to a third party, the possession, ownership, transport, use and sell of the space resources shall be governed by the ordinary regime for precious movables.

Article 14

This Bill includes, for the purpose of its application, an Annex with punctual definitions of the key terms adopted.

Article 15

This Bill welcomes the establishment of an international regime for the coordination of space resource activities in compliance with international law, insofar as it is compatible with the one designed in the present Bill. In the meantime, this Bill will recognize existing rights for the conduction of space resource activities granted by foreign States, subject to the following conditions:

- a) the equivalence of the relevant system to the one designed in the present Bill;
- b) the compatibility with prior rights already registered by national licensees under this Bill;
- c) the recognition, in reciprocity, of the rights granted to national licensees in virtue of the present Bill.

Annex – Definitions

For the purpose of the present Bill:

- a) “space resource” means an extractable abiotic resource in situ of outer space;
- b) “space operations” means all activities conducted in outer space for the purpose of searching for space resources, the recovery of those resources and the extraction of raw mineral or volatile materials therefrom, including the construction and operation of associated extraction, processing and transportations systems.
- c) “space object” means an object launched into outer space from Earth, including component parts thereof as well as its launch vehicle and parts thereof;

2. Explanatory Note

After having presented the text of the Space Resources Bill, this explanatory note serves the purpose of facilitating its understanding, explaining the context and the rationale behind the various provisions.

Article 1 lays down the goal of the Bill. It declares that “the Bill takes measures for the implementation of the right to explore and use outer space and celestial bodies for the purpose of extracting space resources, in accordance with applicable international law”.

The first novelty of this provision comes from its language, which is partially modelled on the same wording of Article I (2) OST. The second element of novelty is that the Bill does not *create*, but simply *declares* “the right to explore and use outer space and celestial bodies for the purpose of extracting space resources”. The two elements combined reveal that the Bill is relying on the interpretation of Article I (2) OST according to which the right to “use” outer space also covers the extraction of space resources.^{vi}

This operation is in line with Articles 31 and 32 VCLT,^{vii} as the ordinary meaning of “use” also includes extracting rights. It also seems to be in line with the fundamental rules of Public International Law, as each State retains the right to interpret international law unless an alternative, official and binding interpretation already exists.^{viii}

It is also important to note that the clause “in accordance with applicable international law” is to be

referred to the *implementation* of the right, not to its *existence* or validity. The scope of this clause is to ensure that the *exercise* of the right to use celestial bodies for the purpose of extracting space resources will be regulated *in accordance with applicable international law*, *i.e.* in compliance for instance with Articles IV-IX OST.^{ix}

Building upon these findings, **Article 2** specifies that “to such end, the Bill recognizes that the right to possess, own, transport, use and sell over the extracted space resources is an essential part of the right declared under Article 1, and will ensure its exercise in accordance with the State’s domestic law and its international obligations.”

The reasoning of Article 2 remains in line with the rationale behind Article 1. Then again, the law does not *establish* but *recognizes* a right that is presumed to be already there, as *an essential part* of the broader right declared under Article 1 of the Bill.

This operation is in line with Articles 31 and 32 VCLT,^x as the right to extract space resources would have no meaning without the correlative title to the ownership over what has been extracted. At the same time, the Article makes sure that the regulation of also such right will be consistent with both domestic and international norms.

Furthermore, as the law does not establish but simply recognizes such rights, the objection made by some authors^{xi} over the implicit assertion of territory is defeated as their very source remains the right to use outer space under Article I OST,^{xii} and not the territorial jurisdiction of the State.

Article 3 contains nationality and supervision clauses, as it provides that “the Bill shall grant the exercise of the rights mentioned in Articles 1 and 2 only to companies incorporated under the laws of the State under its continuous authorization and supervision as detailed in the provisions of the present Bill”.

This Article reconnects the Bill with Article VI OST,^{xiii} as the legitimacy for private use of outer space

comes from the correlative regulation (*i.e.* authorization and supervision) by the State.^{xiv}

Article 4 is the answer to the concerns of industry regarding the *quiet enjoyment* of the above mentioned rights, formulated in a way that is also consistent with international space law. Accordingly, pursuant to this provision “the Bill shall ensure that the rights mentioned in Articles 1 and 2 will be exercised on a non-interference basis. To this end, it establishes at Articles 6-12 a first-come-first-served regime for the recognition and subsequent protection of specifically delimited rights of exploration and use”.

This Article has the difficult task to effectively implement Article IX OST without violating Articles I and II OST. Such goal is reached adopting a terminology used for the first time by the Federal Aviation Authority of the United States, which in 2013 responded to some industry concerns asserting that it will ensure that “commercial activities can be conducted on a non-interference basis”.^{xv} Notably, non-interference is recognized as one of the core principles guiding the valid exercise of the freedom to explore and use outer space.^{xvi} Accordingly, measures ensuring its respect are lawful under international space law, since the freedom to use outer space is subject to respect for the freedom of other users.^{xvii}

It is important to note that the proposed first-come-first-served regime has been chosen as it is consistently applied under the International Telecommunication Union regime for frequencies and orbits without any alleged violation of international space law.^{xviii}

Article 5 lays down a special type of license enabling the exploration and use of celestial bodies for the purpose of extracting space resources. To this end, the Article designs a comprehensive license covering all the activities related to the extraction of space resources for a maximum of 10 years. To balance such broadness, the license will be strictly subjective and its transfer will be subject to the prior approval of the National Space Agency.

Further, the license will be released subject to demonstration of the ability to comply with all

applicable requirements. First, the Bill refers to the requirements already imposed under applicable national space legislation, which usually concern liability for injury/damage on the ground, safety of space operations, respect for national security, financial stability of operators and finally also personal and technical standards. Then, the Bill also imposes further liability for injury/damage in outer space, extensive environmental protection and additional safety conditions as special requirements needed for space resources activities.^{xix}

The system designed in Article 5 is quite standard, as comprehensive licenses with pluriennial validity are common within various national space legislations.^{xx}

Article 6 formally establishes the regime mentioned in Article 4, which is regulated under the following 6 Articles (up to Article 12).

Under **Article 7**, every licensee has to present a formal application to the National Space Agency for obtaining the authorization to explore or use a certain area of a celestial body for a determined time.^{xxi}

Notably, the Article imposes that such area cannot exceed a certain size, fixed yearly by the Government per administrative decree, in order to ensure equitable access, guarantee environmental protection and also respect the non-appropriation principle. Accordingly, the risk of appropriation by means of occupation is avoided in a flexible way that can be easily updated pursuant to further technological development.^{xxii} Additionally, the Article provides also for a maximum time extension of 25 years.

Further, to ensure compliance with the law, and to avoid spurious claims, every application shall include a detailed plan accounting for the feasibility of the planned activities and demonstrating compliance with the requirements imposed by the Bill.

As a way to ensure that the regime is also compatible with the obligation to share benefits under Article I OST, Article 7 provides that authorizations to explore are conditioned upon the sharing of the scientific information obtained, if the National Space Agency so

requires based on public grounds.^{xxiii} Notably, to protect the interest of the companies, the Bill provides for appropriate indemnification and the possibility to defer the release until the related authorization to use has been granted.

Authorizations are released subject to approval of the presented plan, possession of a valid license, and absent any other previous claim over the same area. A further condition is represented by the payment of an initial fee, while validity is maintained through a utilization fee to be paid every year.

To ensure a prompt conclusion of the procedure, the Bill orders the National Space Agency to issue or refuse the requested authorization with a motivated decision to be enacted within 6 months after the submission of a complete application.

Article 8 ensures equitable and open access to space resources activities, providing that while the same company may hold unlimited authorizations for different celestial bodies, it can only have one authorization per single celestial body.

Pursuant to **Article 9**, the first-come-first-serve principle is established. Significantly, an authorization to explore a certain area also entails priority over the right to subsequently use it. Both authorization types have a maximum duration of 25 years, which can be renewed subject to the respect of certain conditions, including the absence of public reasons against the renewal.

In case of contemporary requests, priority will be given to the company which does not have any existing rights of exploration and use, in order to ensure more equitability. Should that criteria not be decisive, the Bill then favors the company that can give the best assurance about the respect of the licensing requirements set forth in Article 5.3 and 5.4.

Pursuant to Articles 4 and 6, Article 9 provides that duly authorized rights to explore and use shall be protected against any third-party interferences which are not justified under national law. Without pretending to be exhaustive, the Article enumerates

some justifications such as the protection of the national interest or the State's compliance with its international obligations.^{xxiv}

Under **Article 10**, authorization can always be suspended or revoked in the event that the related license is undermined, or that the limits and the conditions set forth in the authorization have been violated.

An interesting part of the regime designed in Article 10 is the prosecution duty, which has been drawn from the US General Mining Law of 1872.^{xxv} Accordingly, rights to explore and use must continue to be prosecuted, as failure to do so will result in the possible revocation of the authorization and consequent abandonment of the rights obtained. In this way, the Bill ensures that claims are real and not spurious.

Under **Article 11**, authorizations can be renewed subject to both procedural, financial, legal and political conditions.

Article 12 mandates the National Space Agency to establish and maintain a public register of all the released authorization, for the sake of transparency and to keep adequate track of the current and future use of celestial bodies.^{xxvi}

Article 13 regards the legal status of space resources once sold to a third party. In such case, the possession, ownership, transport, use and sell of space resources will be governed by the ordinary regime for precious movables. The rationale for this provision is to ensure the free circulation of space resources, which otherwise pursuant to Article 3 could only happen within licensees.

Articles 14 establishes an Annex containing punctual definitions of the key terms adopted, such as "celestial bodies", "space resource", "space operation", "space object".^{xxvii}

Article 15 states that the Bill welcomes the establishment of an international regime for the coordination of space resource activities in

compliance with international law, insofar as it is compatible with the one already designed into the Bill.^{xxviii} In the meantime, the Article develops a provisional recognition of existing rights relating to space resources activities granted by foreign States,^{xxix} subject to the existence of certain conditions:

- a) the equivalence of the relevant system to the one designed in the present Bill;
- b) the compatibility with prior rights already registered by national licensees under this Bill;
- c) the recognition, in reciprocity, of the rights granted to national licensees in virtue of the present Bill.

Conclusion. Future perspectives

The proposed Bill is, needless to say, just a proposal. It is meant to provide a starting point for a concrete debate on how to *practically* regulate space resources activities. Right now, two States have passed basic laws enabling their nationals to undertake space resources activities, while UNCOPUOS has just started to debate the matter. Nonetheless, to comply with Article VI OST States will have to do more than simply stating that their nationals can own or extract space resources.

Taking a step forward from the *status quo*, this paper has addressed both practical and theoretical challenges posed by space resources activities. This has been done by presenting a draft bill redacted in articles coupled with a comprehensive explanatory note, in the attempt to find a balance between the needs of the industry and the obligations of international space law.

As seen in Chapter 1, the draft bill provides a pragmatic model based on the establishment of both a dedicated license and a special authorization regime for the exploration and use of space resources. On the one hand, having a comprehensive license will lessen the bureaucratic burden on companies, thus incentivizing commercial operators. On the other one, having a dedicated authorization regime will allow for appropriate control over the execution of such delicate activities, so to ensure full compliance with the principles of the OST.

In this respect, as seen in the explanatory note presented in Chapter 2, the lawfulness of such model under international space law directly stems from Article I OST as the primary source enabling the use of space resources.

In order to foster international cooperation on the matter, most of the draft Bill's provisions are in line with the "Building Blocks" (BB) developed by The Hague International Space Resources Governance Working Group. The Hague WG has done a tremendous work in drafting a sound legal basis for the international governance of space resources activities. The result of such work, the BB, will be officially adopted in November 2019 and this author firmly believes that they should be carefully considered by all States interested in regulating space resources activities.

As said, the proposed "Space Resources Bill" could represent a turning point in such process, as it translates the solutions developed in the BB into the language of national legislation. Like the BB, the draft Bill strives to reconcile the needs of the industry with the requirements of international space law in an innovative and comprehensive way.

Through the use of treaty language, combined with a more prudent approach over the recognition and management of mining rights, the draft Bill proves that space resources activities can be effectively regulated also by States at the national level. Accordingly, should States decide to follow such approach, it could then pave the way for the flourishing development of a space resources industry in harmony with international space law, for the benefit of all countries and humankind.

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^{xxviii} This provision has the purpose to facilitate the future implementation of the system proposed by the Hague WG, in an attempt to foster international cooperation on the regulation of space resources activities.

^{xxix} This clause is in line with building block 4.2 (a-d) and has the meaning to show good will to other Countries wishing to nationally regulate space resources activities, in an attempt to preserve the peaceful uses of outer space.