Legal Perspectives for the Further Development of the Five United Nations Treaties on Outer Space in Light of Rising Multistakeholderism

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Abstract

Increasing commercialization and privatization of outer space and multifaceted uses and exploration of the space potential and benefits raise new challenges to the existing framework of international space law and its established procedural legal mechanisms. What are the legal perspectives of an adjustment, supersession or possible resistance of the five United Nations treaties on outer space?[1] UNISPACE conferences have aimed to enhance international cooperation in the peaceful uses of outer space, including the promotion of common principles. UNISPACE+50 focuses, *inter alia*, on the issue of the "Legal regime of outer space and global space governance" and the effectiveness of the legal regime in the 21st century. Indeed, the international community is facing today new legal questions with respect to the exploitation of space recourses, multiplication of private space businesses, unilateral grants of national licenses to commercial sector, space traffic management, need for enhanced registration and precision of responsibility and liability regime, to name few. This presentation aims to introduce a general international legal framework of various procedural legal modes of further development of the five UN treaties, both in a *de lege lata* and *de lege ferenda*

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1 The term "UN Space Treaties" or "UN Treaties" refers to the following five UN Treaties on Outer Space: *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies*, 1967 (referred as "Outer Space Treaty" or "OST"), *Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space*, 1968 (referred as "Rescue Agreement"), *Convention on International Liability for Damage Caused by Space Objects*, 1972 (referred as "Liability Convention"), *Convention on Registration of Objects Launched into Outer Space*, 1975 (referred as "Registration Convention"), and *Agreement Governing the Activities of States on the Moon and Other Celestial Bodies*, 1979 (referred as "Moon Treaty").

perspective. Light will be shed on the respective procedures of treaty law, prerequisites of the emergence of an international custom, role of non-legally binding standards, bottom-up impact of national legislations and assessment of an effective norm-making capacity of relevant stakeholders, all transposed in the space arena with regard to the current international space debate and practice of States. A selection of the most up-to-date topics will serve as examples. This comprehensive legal outline aims to highlight various options that the UNISPACE dialogue and its agenda for the future can address.

1. Introduction

Outer space is experiencing boom in commercialization and privatization of space activities as the multifaceted uses and exploration of the space potential and benefits expand. New actors enter the space arena and rapid development of space technologies and abilities grows in diversity and quantity. Telecommunications services, remote sensing and global navigation services are followed by space tourism and exploitation of space resources and general quest for independent access to information and critical technologies.

This propagation of space activities gives rise to a plenitude of legal questions concerning corresponding regulations with respect to the issue of liability, jurisdiction and control over space objects, transfer of ownership, the principle of non-appropriation of outer space including celestial bodies, State responsibility for non-governmental space activities, need for enhanced registration, avoidance of harmful interference, safety regulations, environmental protection, appropriation of natural resources, to name few.

The core legal question touches upon the very foundations of space law: Are the UN Treaties on Outer Space still viable? What are the legal perspectives of further development of the UN Treaties in order to ensure an effective and efficient legal framework regulating space activities and maintaining Outer Space for peaceful purposes and sustainable use?

This is one of the priorities addressed by UNISPACE+50 in 2018 which focuses, *inter alia*, on the issue of the "Legal regime of outer space and global space governance" and the effectiveness of the international space law in the 21st century. The Working Group on the Status and Application of the Five United Nations Treaties on Outer Space of the UN COPUOS Legal Subcommittee, responsible for addressing within a multi-year workplan this UNISPACE+50 thematic priority, has defined the core objectives as follows: "Promote the universality of the five United Nations treaties on outer space. Assess the state of affairs of those treaties and their relationship with other relevant international instruments, such as principles, resolutions and guidelines governing space activities. Analyse the effectiveness of the legal regime of outer space in the twenty-first century, with a view to identifying areas that may require additional regulation."[1]

1 See UN Doc. A/AC.105/1169, 13 November 2017, para. 4, as well as the Proposal submitted by the Chair of the Working Group on the Status and Application of the

The aim of this study is to provide a general overview of possible legal options of further development of UN Space Treaties from the international procedural legal perspective and outline possible way forward.

2. UN Space Treaties and International Relations

The starting point is the assessment of the UN Space Treaties within the current legal context of space activities. Are the provision of the Treaties outdated, ineffective, contradictory or *désuetude*, in light of the new phenomena in the space zone? If this is the case, then the need for the revision of the Treaties might arise. Or are the Treaties, laying down the essential principles of space law, still valid and respected, but they don't address particular new developments in the space arena which, in consequence, gives rise to legal lacunas and incertitudes and calls for new rules and legal regimes? In other words, it is the elaboration, precision, dynamic interpretation or complementation of the fundamental normativity provided by the UN Space Treaties in light of the new space challenges which is at stake. In this scenario a revision is not an exclusive option, other norm-making processes enter into play.

This distinction is essential in terms of the legal effectiveness, efficiency and Realpolitik perspective of the prioritized approach since, after all, it will be the States' willingness that will determine the way forward. International politics, and international law-making in particular, is animated by constant interaction and tension between sovereign States' national interests, motivated primarily by efficiency, pragmatism, cost-benefits approach, and economy, on one side, and universal needs and global responsibility, on the other side.

Engaging in a comprehensive and cumbersome total revision of the UN Space Treaties via a complex and formalized treaty-making process for the sake of a new global treaty, no matter how perfect, systematic and logical the normative product would be, in a situation where the current UN Space Treaties are being still viable and respected, is rather idealistic in the realm of international politics. On the other hand, adopting a passive approach, normative laissez-aller, giving way to decentralized national legislation processes, reflecting States' individual business, industrial or foreign affairs interests, would lead to a chaos and disruption of common order and global regime – the more essential in an internationalized zone such as the Outer Space. The balance between national, or private, and international interests has to be achieved, which is, after all, the philosophy underpinning International Law as such.

Five United Nations Treaties on Outer Space on the outline of the key points for the guidance document, UN Doc. A/AC.105/C.2/2018/CRP.14, 9 April 2018; Report of the Chair of the Working Group on the Status and Application of the Five United Nations Treaties on Outer Space, UN Doc. A/AC.105/1177, Annex I, 30 April 2018.

Considering that the current international reality rather confirms that the issue at stake is the insufficiency of the UN Treaties to reflect fully upon today's activities in Outer Space, not their normative contradiction or *désuetude*, the primary focus will be on how to maintain international space law updated without the revision of the UN Space Treaties (II). Then we will examine the options and benefits of a formal revision of the Treaties (III).

3. Development of the UN Space Treaties

UN Space Treaties serving as a foundation of Space Law, laying the essential common principles for the exploration and use of Outer Space, ensure the lowest common denominator for the space theater. The Treaties cannot logically encompass the diversity of detailed rules and specific technical requirements or to provide answers to unpredictable new technological or environmental challenges and future exploration potential of Outer Space. Therefore, as in other legal systems, such rules can be elaborated and further complemented on subsidiary levels, in other harmonized special legal spheres or via other regulatory techniques: particular or specialized treaties, soft law, national legislation and via interpretation.

3.1. Particular Treaties

In terms of legal certitude and clarity, the adoption of particular treaties with specialized substantive legal object is the most preferred option. It provides legally binding norms of a concrete section of International Space Law, based on express consent and fully-fledged participative element. The conventional regime ensures a harmonized approach to targeted branch of activities in Outer Space, indispensable for mutual respect for rights and obligations of all spacefaring actors, enforcement of legal order and sustainable use of Outer Space.

An example could be the International Telecommunication Union regulatory system: the ITU Constitution lays down the legal basis which is complemented by the ITU Convention providing for the institutional framework of the Organization. Concrete regulations of technical nature pertaining to the operation of telecommunication services are elaborated in the Administrative Regulations, composed of the International Telecommunication Regulations and the Radio Regulations providing rules for the use of radio spectrum.

Similarly, UN Convention on the Law of the Sea (UNCLOS) is complemented by other specific treaties like Convention on the Conservation and Management of Fishery Resources in the South East Atlantic Ocean (2001), Convention for the suppression of unlawful acts against the safety of maritime navigation (Rome, 1988) or Convention on the Control of Transboundary Movements of Hazardous Wastes and Disposal (Basel, 1989) that either complement of precise the provisions of the fundamental treaty.

No one claims UNCLOS should be an all-encompassing, exclusive treaty on maritime law.
In Space Law, calls to adopt a new specific treaty have been raised by States at international fora like the UN COPUOS with respect to for example space debris mitigation or the idea of the European Union to convert the proposed International Code of Conduct for Outer Space Activities (ICoC) into a binding treaty one day[2]. *Prevention of an Arms Race in Outer Space (PAROS)* treaty is under discussion in the Conference on Disarmament.
This option of further development of UN Treaties offers a clear, straightforward approach and provides a harmonized regulation of new or specific spheres of space activities. It requires however the common will of States and proactive participation in a formalized legislative process. This option is viable in a sphere of marked collective interest and/or urgent need to set limitations.

3.2. Soft Law

The preference for soft law-making has succeeded the initial treaty-making era of 1960's and 1970's that defined the lowest common denominator in Space Law. The weakened need for further strict legal limitations and strong legal bond naturally led to reinforcement of State sovereignty and liberty of action at the expense of global interests and to a prioritization of the definition of common rules in a soft, non-legally binding manner.
Soft law refers to "instruments and arrangements used in international relations to express commitments which are more than just policy statements but less than law in its strict sense. These instruments and norms all share a certain proximity to law and have a certain legal relevance, but at the same time they are not legally binding per se as a matter of law".[3] States often resort to soft law norm-making in order to attain some *modus vivendi* and regulate their conduct in a flexible way or, sometimes, to formulate their expectations at a lower level with respect to the unpredictability of future developments of technical knowledge and new economic, scientific or ecological factors. Soft law contributes significantly to the development of both international and national law: "It often represents a step in the evolving process of international law" as, first, consensus is achieved in a non-binding manner and consequently transformed into a legally binding treaty[4], or it serves as a catalyzer or deconstructor of an international custom.

2 See *infra* note 16.
3 Thürer, D., "Soft Law", in *Max Planck Encyclopedia of Public International Law* [MPEPIL], Oxford University Press, online version March 2009, para. 1.
4 An example is the Declaration of Outer Space adopted by the UN General Assembly in 1963 (UNGA Res 1962 [XVIII] [13 December 1963]) followed by the *Treaty on Principles Governing the Activities in the Exploration and Use of Outer Space*. Similarly, the *Universal Declaration of Human Rights* has served as a foundation for the *ICCPR* of 1966 as well as many other human rights treaties and national

Moreover, "[s]oft law acts can be used as a source of inspiration or as building-blocks when creating new municipal law".[5]

Since the 1980's various non-legally binding declarations, guidelines and principles have been elaborated by the UN COPUOUS and adopted as UN General Assembly resolutions: Principles Governing the Use by States of Artificial Earth Satellites for International Direct Television Broadcasting[6], Principles Relating to Remote Sensing of the Earth from Outer Space[7], Principles Relevant to the Use of Nuclear Power Sources in Outer Space[8] regulate special types of space activities, Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of All States, Taking into Particular Account the Needs of Developing Countries[9] clarifies the controversy of the "common benefit" clause contained in OST, while Declaration of Legal Principles Governing the Activities of States in the Exploration and Uses of Outer Space[10] provides further clarification of space law concepts. In addition, UN COPUOS Space Debris Mitigations Guidelines were adopted in 2007.[11] These UN documents serve as an important guideline to domestic legislations as well as norm-making by other international organizations.

Similarly, soft international standards are formulated by other international organizations like the International Standardization Organization (ISO), which aims to harmonize product and process rules, including standards for aviation and space-related activities, the European Cooperation for Space Standardization and the European Committee for Standardization.

International principles addressing transparency and confidence-building measures and aspects of space traffic management have been formulated by several international initiatives like the GGE Group that succeeded to achieve a general agreement of UN General Assembly on series of measures for outer space activities, including exchange of information relating to national space policy such as major military expenditure on outer space, notifications on outer space activities aimed at risk reduction, coordination and consultative mechanisms and visits to space launch sites and facilities.[12] Rules on long-term sustainability of Outer Space activities are under discussion in the UN COPUOS.[13] Important initiative to adopt a holistic approach to regulation of

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constitutions and human rights charters.

5 *Op.cit.* note 4, para. 32.

6 UN GA Resolution 37/92 of 10 December 1982.

7 UN GA Resolution 41/65 of 3 December 1986.

8 UN GA Resolution 47/68 of 14 December 1992.

9 UN GA Resolution 51/122 of 13 December 1996.

10 UN GA Resolution 1962 (XVIII) of 13 December 1963.

11 UN GA Resolution A/62/20, Annex.

12 *Report of the Group of Governmental Experts on Transparency and Confidence-Building Measures in Outer Space Activities*, UN Doc. A/68/189*, 29 July 2013.

13 See the work of the UN COPUOS Working Group on the Long-Term Sustainability

space activities, addressing both civil and disarmament aspects, International Code of Conduct for Outer Space Activities (ICoC) was introduced by the European Union, with last draft version dated 31 March 2014.[14] As long as such soft law initiatives don't contradict the existing international legal rules, they contribute to the progressive development or codification of the existing international space law. One of the ICoC's stumbling blocks was, *inter alia*, its ambition to modify the core principle of space law and general international law, via introduction of the right "to [bring] about, directly or indirectly, damage, or destruction, of space objects" though the expansion of exceptions to the general prohibition to use force laid down in Art. 2(4) of the UN Charter.[15] While such a normative move is not excluded, it would need to take form of a revision of a peremptory norm of general international law in line with Art. 53 of Vienna Convention on Law of Treaties requiring the "norm [be] accepted and recognized by the international community of States as a whole".[16]

Important sets of recommendations, reflecting common ideas and principal stands and serving as guideline to States' practice, soft law rules open the door to State discretion and national legislation in line with the State's own interests. As long as the potential disparities and deviations from the recommended common policy don't undermine or deny "peaceful uses" of Outer Space, the quality of "province of all mankind", don't cause "harmful interference" and challenge other basic principles of Space Law and applicable general international law, the decentralized legislation serves a fruitful adjustment to particularities "in the field". As the Cologne Commentary on Space Law notes, "[l]egal standards and in particular soft law can only fulfil their functions as long as they are uniformly interpreted and supported by basic consensus"[17].

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of Outer Space Activities – for the current state, see the UNOOSA website http://www.unoosa.org/ oosa/en/ourwork/copuos/working-groups.html.

14 Draft *International Code of Conduct for Outer Space Activities* (ICoC), last official version dated 31 March 2014, available at https://eeas.europa.eu.

15 Draft article 4(2) stipulates: "The Subscribing States resolve, in conducting outer space activities, to:
- refrain from any action which brings about, directly or indirectly, damage, or destruction, of space objects unless such action is justified:
- by imperative safety considerations, in particular if human life or health is at risk; or
- in order to reduce the creation of space debris; or
- by the Charter of the United Nations, including the inherent right of individual or collective self-defence and where such exceptional action is necessary, that it be undertaken in a manner so as to minimize, to the greatest extent practicable, the creation of space debris", *ibid*.

16 *Vienna Convention on the Law of Treaties*, 23 May 1969, Vienna.

17 Hobe, S., Schmidt-Tedd, B., Kai-Uwe Schrögl, K.-U., *Cologne Commentary on Space Law*, Vol. 3, Carl Heymanns Verlag, Köln, 2015, p. XXIX.

3.3. National Legislation

National and international law form an indissoluble tandem, while the former serves in principle an essential tool of implementation of the latter, regardless the choice of the monistic or dualistic perspective of transposition of international legal norms into national legal orders. National space-related regulatory framework serves therefore as an essential instrument of the development of UN Space Treaties, in particular with respect to the international responsibility of State for national activities in outer space, whether such activities are carried on by governmental agencies or by non-governmental entities, in line with Article VI of OST and the increased level of commercial and private activities in outer space.

UN COPUOS, and UNISPACE+50 process in particular, encourage States to develop national legislation. The Working Group on National Legislation Relevant to the Peaceful Exploration and Use of Outer Space of the UN COPUOS Legal Subcommittee developed by 2013 a "Set of recommendations on national legislation relevant to the peaceful exploration and use of outer space" adopted as a separate resolution by the UN General Assembly at its sixty-eighth session. It advised States to elaborate national laws regulating for example "the launch of objects into and their return from outer space, the operation of a launch or re-entry site and the operation and control of space objects in orbit", "the design and manufacture of spacecraft", the regime of "authorization by a competent national authority" of space activities, the "continuing supervision and monitoring of authorized space activities", a "national registry of objects launched into outer space", "recourse from operators or owners of space objects if their liability for damage under the United Nations treaties on outer space has become engaged", "appropriate coverage for damage claims" and "insurance requirements and indemnification procedures" or "transfer of ownership or control of a space object in orbit", in compliance with their international obligations, in particular under the United Nations treaties on outer space.[18]

UNOOSA maintains a Schematic Overview of National Regulatory Frameworks for Space Activities to which States submit texts of their national space laws and regulations.[19]

Increasing number of States face themselves a growing pressure within their jurisdiction to formulate regulations in view of the propagating activities of non-governmental entities in the domain of space business, industry or research. Adoption of precise rules and elaboration in detail of international space norms is needed and beneficial both to ensure legal certitude, clarity, effectiveness and efficiency and to avoid *non liquet* (gaps in law). In

18 *Ibid*.

19 See UN doc. A/AC.105/C.2/2014/CRP.5 of 17 March 2014, with regular updates provided at http://www.unoosa.org/oosa/ en/ourwork/spacelaw/nationalspacelaw/ schematic-overview.html, consulted 16 September 2018.

consequence, it strengthens international legal order and regime of international cooperation in general.
The problem arises if the national legislation contradicts the UN Space Treaties or if the individual national laws filling up the gaps, elaborating or complementing the Space Treaties are not mutually harmonized and provoke legal discrepancies or disruptions in space activities. Here, the decentralized national legislative approach would lead to conflicts of law and destructive effects undermining efficiency of space operations and international cooperation.

3.4. Interpretation

Some provisions of the UN Space Treaties might face new challenges as to their substantive meaning in light of new activities or discoveries in Outer Space. If the letter and objective of the legal provisions allows, in line with Article 31 of Vienna Convention on the Law of Treaties, or a new interpretative practice of States crystallizes, new sense can be breathed in to the legal concept. A treaty could thus be updated and remain viable and effective via modern interpretation. Concept prone to such re-interpretation could potentially be for example "space object", "weapon", "non-appropriation", or "peaceful purposes".
The core legal prerequisite however is that multilateral treaty is not an object for a single State's unilateral interpretation. "Any subsequent practice in the application of the treaty" shall be taken into account, as stipulated in Article 31 (3b) of Vienna Convention, if "the agreement of the parties [to the Treaty] regarding its interpretation" is established.[20] Similarly, "[a]ny subsequent agreement *between the parties* regarding the interpretation of the treaty or the application of its provisions"[21] is to be taken into account. In the implementation of a treaty, each party shall interpret the treaty "in good faith in accordance with the ordinary meaning to be given to the terms of the treaty in their context and in the light of its object and purpose"[22]. If the interpretative stands of various parties to a treaty diverge, a dispute over the interpretation of a treaty emerges. Some treaties presuppose such option and lay down preventatively procedural legal rules for the settlement of disputes. Bilateral treaties usually refer to a common committee of the parties to the treaty while multilateral treaties establish an obligatory jurisdiction of an international adjudicatory body (for ex. UNCLOS in Art. 186 and subseq. refers to the International Tribunal for the Law of the Sea, while Convention on the prevention and punishment of the crime of genocide[23] confers jurisdiction on the International Court of Justice).

20 *Vienna Convention on the Law of Treaties*, *op.cit*. note 17.
21 *Ibid*., Art. 31 (3a) (emphasis added).
22 *Ibid*., Art. 31 (1).
23 *Convention on the Prevention and Punishment of the Crime of Genocide*, Paris, 9 December 1948.

The common interpretative stand of parties to the treaty can be evidenced either via simple interpretative practice of States or more formally via the adoption of a non-binding political document such as UN General Assembly resolution, political declaration of set of guidelines expressing the *opinio iuris* of interpretation by States.

Relevant to this legal perspective of further development of the UN Space Treaties is for example the question of the exploitation of national recourses in Outer Space incited by the adoption of the *Spurring Private Aerospace Competitiveness and Entrepreneurship Act* in 2015[24] by the United States, followed by the Luxembourg *Law on the exploration and use of space resources* adopted in 2017[25]. The update to the US commercial space legislation explicitly allows "United States citizens to engage in commercial exploration for and commercial recovery of space resources" (§51302) and stipulates that "[a] United States citizen engaged in commercial recovery of an asteroid resource or a space resource under this chapter shall be entitled to any asteroid resource or space resource obtained, including to possess, own, transport, use, and sell the asteroid resource or space resource" (§51303).[26] The first article of the Luxembourg Law states that "space resources are capable of being appropriated in accordance with international law".[27] "Luxembourg is thus the first European country to provide legal certainty as to the ownership of minerals, water and other space resources identified in particular on asteroids."[28] Article II of OST is directly in question with respect to these national acts as it stipulates: "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". While the US Act asserts that "the United States does not [(by this Act)] assert sovereignty, or sovereign or exclusive rights or jurisdiction over, or the ownership of, any celestial body" [29], the Explanatory note to the Luxembourg Act assures that "it is perfectly in line with Article II of the Treaty"[30]. It argues that "[a]lthough the legal status of the territories of celestial bodies themselves is defined by said provision – namely that they are not subject to national appropriation – it does not further address the status

24 *Spurring Private Aerospace Competitiveness and Entrepreneurship Act*, 2015, H.R.2262 - 114th Congress (2015-2016): U.S. Commercial Space Launch Competitiveness Act.

25 *Loi du 20 juillet 2017 sur l'exploration et l'utilisation des ressources de l'espace* (English translation *Law on the Exploration and Use of Space Resources*, 2017, available at http://legilux.public.lu.

26 *Op.cit.* note 25.

27 *Op.cit.* note 26.

28 Le Gouvernement du Grand-Duché de Luxembourg, *Projet de loi sur l'exploration et l'utilisation des ressources de l'espace*, p. 2, available at *wwwluxembourg.public.lu* (informal English translation).

29 *Op.cit.* note 25.

30 *Op.cit.* note 29, p. 9.

of the resources nor even touches upon it. Yet, Article 1 of the draft law only addresses 'resources'."[31] It refers further to Article I paragraph 2 of the OST which establishes the principle of freedom of exploration and use of outer space and to the analogy with the legal regime of the high sea. As seen, both US and Luxembourg aim to align with the text of the UN Space Treaties without denying its legal validity. Later, further interpretations and legal argumentations for and against have been developed and advanced, denying any unified stand of the parties to the UN Space Treaties at the moment.[32] Active discussions continue at international platforms such as the UN COPUOS Legal Subcommittee and the Hague International Space Resources Governance Working Group.

Regardless the progressively evolved legal argumentation affiliated with such national legislative acts, the gist is to maintain integrity of international space law, at least with respect to the key norms underpinning the co-existence and interaction of States in this international zone. Space law norms are not immutable and eternal! Unilateral re-interpretation of basic international space law norm without the validation, or acquiescence, of international community does not however justify a modification of the UN Treaties and runs counter the basic principles of international law. Re-interpretation as a means of update or further development of the UN Space Treaties without their literal/formal revision is a beneficial, pragmatic and the simplest tool of international law. The main flaw is nevertheless the potential discrepancy and decentralized contradictory approaches.

4. Revision of the UN Space Treaties

Revision of the UN Treaties can be invoked not only in case of the need to update ineffective provisions or in *désuetude* but also in the framework of global efforts to provide for a new legal regime regulating new activities, status of new actors and new phenomena in the space arena. Formal revision of the text of the UN Space Treaties resides in amendments that any State Party may propose while "[a]mendments shall enter into force for each State Party to the Agreement accepting the amendments upon their acceptance by a majority of the States Parties to the Agreement and thereafter for each remaining State Party to the Agreement on the date of acceptance by it."[33]

31 *Ibid*.

32 See *Report of the Legal Subcommittee on its fifty-seventh session, held in Vienna from 9 to 20 April 2018*, UN Doc. A/AC.105/1177, Chapter XIII „General exchange of views on potential legal models for activities in the exploration, exploitation and utilization of space resources".

33 See *supra* 1, Art. XV OST and relevant identic provisions in other UN Space Treaties.

4.1. Revision by an International Treaty

The substitution of the UN Treaties by a new conventional regime is already a topical idea behind the concept "space traffic management" (STM).

STM refers to "the set of technical and regulatory provisions for promoting safe access into outer space, operations in outer space and return from outer space to Earth free from physical or radio-frequency interference."[34]

Such a global regulation to ensure safety, stability and sustainability of space activities in the future is certainly beneficiary to guarantee the legal certitude and systemization of law and to overcome a "silo approach"[35]. As the proponents of the STM suggest, a more comprehensive legal regime based on the concept of space traffic management is "an ambitious alternative" to the "incremental accumulation of specific binding and non-binding standards".[36]

In addition, certain key legal elements are not defined in existing international space law: a noteworthy traffic management aspect would be for example the detailed administrative requirements on the registration of space objects, unambiguous definition of the term "space object", the clarity on the regulation of liability, or the delimitation of Outer Space. These aspects are not defined in the UN Space Treaties while a harmonized legally binding approach is needed for the efficiency and sustainability of uses of Outer Space, task which decentralized national legislative procedures do not guarantee.

The proponents of STM propose "two avenues for this transition: a gradual bottom-up approach, linking existing systems, or a comprehensive top-down approach creating a common new frame for the regulation of human activities in outer space".[37] While elements of the first approach can be observed today in the heterogeneous legal landscape, ranging from SSA, space debris mitigation and remediation, to private human spaceflight and traffic rules, and include national laws as well as agenda of UN COPUOS, ITU, UNIDROIT, ICAO, Conference on Disarmament, "they may constitute the building-blocks of an STM system emerging from single fields of regulation".[38] The second approach presents "an opportunity to achieve an end-to-end framework with coherence amongst the various elements and levels"[39].

The challenge for a successful STM policy in general would be both technical, legal and political.

34 Schrögl, K.-U., et als. (eds.), *Space Traffic Management - Towards a Roadmap for Implementation*, International Academy of Astronautics (IAA), Paris, 2018, p. 22.
35 *Ibid*., p. 93.
36 *Ibid*., p. 6.
37 *Ibid*., p. 128.
38 *Ibid*.
39 *Ibid*.

- Identification of the STM technical requirements and their translation into legal norms.
- Identification of the STM legal norms already defined in the existing international treaties.
- Definition of new STM legal norms.
- Restructuralization of the institutional framework administering the STM mechanism.

The main challenge from the legal systemic perspective would be the integration of all relevant legal elements into one united legal regime without causing legal discrepancies and duplicity. In addition, institutional re-arrangements and complementary costs would be at stake. If UN Space Treaties are to be incorporated into a new STM Treaty and the STM is only, although maybe the major, sectorial branch of international space law, the issue remains with respect to the remaining principles contained in the UN Treaties, such as the non-appropriation principle or military uses of Outer Space, not inherently direct "STM issue". The question of the maintenance of normative hierarchy in current international space law should also be taken into account. Is it practical to deconstruct the integrity of the normative foundation of international space law anchored in the UN Treaties with a worldwide recognition and fragment it via cherry-picking of the STM elements? Or perhaps a particular treaty on STM complementing and elaborating the UN Treaties be more viable option from the perspective of Realpolitik?
This last point leads to the political challenge of such supranational initiative, however good and overall beneficial it might be – acceptance by States. It is the criterion of necessity, economy and cost-benefit approach that will serve the determining factor. Are however States, the primary guardians of sovereign interests, the perfect and universal judge?

4.2. Revision by an International Custom

Modification of the UN Space Treaties by an international custom is another envisageable option to further develop space law. International custom as source of international law is composed of two constitutive elements: constant, coherent and general practice of States as a repetitive confirmation of the sequence of precedents (*usus longaevus*) coupled with the legal conviction of the States that such a conduct is a legal norm (international legal right or obligation – *opinio iuris*). Under such circumstances a new international legal norm may emerge within the practice of States without being incorporated in a treaty to fill up a lacuna or modify an existing treaty.
A current example could be the above cited US and Luxembourg initiatives to regulate space mining. If the legal argumentation based on the re-

interpretation of Art. 2 of OST does not acquire a general acceptance, a customary revision is still an open option. If the first precedents, however contradictory to existing UN Space Treaties, set by the US and Luxembourg are followed by other States, including those whose interests are specially affected, we might witness a normative process of an emerging international custom validating such a conduct. The prerequisite would be that such practice is "both extensive and virtually uniform" (*North Sea Continental Shelf* Case, ICJ, 1969), supported by acquiescence of others, without significant opposition and, what's more, an international legal challenge in terms of responsibility for an internationally wrongful act. In consequence, such a customary norm will modify the UN Space Treaties, probably with further effects on other relevant legal provisions.
Again, it is the States' legal awareness and corresponding action or omission that will either validate the emergence of an international custom or prevent it.

5. Conclusion

In view of the rising multistakeholderism deluging the Outer Space, the increasingly more densely populated space environment and diversification of space activities, the adaptation of international space law is inevitable. It is in the interest of all international community to maintain a common normative denominator reflecting the rules of international cooperation and maintenance of Outer Space for sustainable use as a province of mankind.
International space law is facing fragmentation today. Fragmentation derives from the expansion and diversification of international law both in substance and procedure. As Oxford Encyclopedia lays out, in substance, international law is fragmented, first, along functionally defined issue-areas (such as radio frequencies, space disarmament, liability regime) and geographical or regional lines (EU and ESA regulations, bilateral treaties) and with respect to parallel or conflicting norms or obligations in the same issue-area (suborbital flights in light of air/space law). Procedural fragmentation of international law pertains to the variety of procedural or secondary rules of international law as well as the context of multiple international courts and tribunals. Relevant to international space law is the vertical fragmentation arising of "the growing importance of international norms created by non-State actors", such as standardizing bodies and corporations, proliferation of diverging national legislation and interpretation, and "the development of so-called relative normativity", i.e. relativization of normative degree among rules of international law, in particular by the concepts of soft law.[40] UN

40 Pauwelyn, J., "Fragmentation of International Law", *Max Planck Encyclopedia of Public International Law* [MPEPIL], Oxford University Press, 2006, online publication, http://opil.ouplaw.com/ , paras. 2-6.

International Law Commission, addressing the issue "Fragmentation of international law: difficulties arising from the diversification and expansion of international law" notes that "fragmentation [is] not a new phenomena" and that "international law [is] inherently a law of fragmented world."[41] The Commission highlights the "risks and challenges posed by fragmentation to the unity and coherence of international law"[42] while acknowledging at the same time that "fragmentation could be seen as sign of vitality of international law" and "the proliferation of rules, regimes and institutions might strengthen international law"[43].

Regardless the positive or negative approach towards the fragmentation of international law, this phenomenon gives rise to several practical problems in law. The UN International Law Commission addresses the following issues in its multi-year study: "(a) The function and scope of the *lex specialis* rule and the question of 'self-contained regimes'; (b) The interpretation of treaties in the light of 'any relevant rules of international law applicable in the relations between the parties' [...] in the context of general developments in international law and concerns of the inter- national community; (c) The application of successive treaties relating to the same subject matter [...]; (d) The modification of multilateral treaties between certain of the parties only [...]; (e) Hierarchy in international law: *jus cogens*, obligations *erga omnes*, Article 103 of the Charter of the United Nations as conflict rules."[44] The same would be relevant in the domain of international space law.

Irrespective of whether the proliferation of space actors and space activities will further reinforce the fragmentation of space law and which alternative of further development of UN Space Treaties will be adopted, it is the willingness of States that will pave the way. Their degree of maturation as the *guardians* of global responsibility for maintaining Outer Space for sustainable use and as province of mankind will set the balance with national interests. In all scenarios, the above outlined procedural legal challenges will pop up in practice.

41 ILC Report on the work of the fifty-fourth session (2002), UN Doc. A/57/10, Chapter IX, para. 512.
42 *Ibid*., para. 498.
43 *Ibid*.
44 *Ibid*., para. 512.