

A New Format for Space Law?

by

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Introduction

In 2020, we celebrate not only the 60th anniversary of the International Institute of Space Law, but also more or less the 60th year of space law making.¹ Around 1959/1960 the United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS) and in particular its Legal Subcommittee were established with a view to create international space law.¹ As this lecture will show, since then, space law-making has been characterised by different phases, each having its own distinct features.

Characteristic for the first period of space law making - the treaty-making phase up to 1979 when the Moon Agreement² as the last of the five treaties on outer space was adopted - was the preeminent role played by the military overtone to the use of outer space.³ Moreover, despite the concept of international responsibility of States for national activities as introduced with Art. VI of the Outer Space Treaty,⁴ at that time only governmental space activities were taking place.⁵ Thus, the exploration and use of outer space were undertaken either by governments or by governmental agencies. As of today, however, this has changed.

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¹ Historical account by Steven Doyle, *A Concise History of Space Law*, Nandasiri Jasentulyana Keynote Address on Space Law, International Astronautical Congress 2010, 27 September – 1 October 2010. Prague, Czech Republic.

² Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, 1363 UNTS 3, adopted on 18 December 1979, entered into force on 11 July 1984.

³ Stephan Hobe, *Space Law, Nomos/Hart* (2019), p. 127.

⁴ Michael Gerhard, 'Article VI', in: Hobe/Schmidt-Tedd/Schrogl (eds.). *Cologne Commentary on Space Law*, Vol. I, (Heymanns 2009), pp. 107 et seq.

⁵ Hobe, *supra* note 4, pp. 29-34; p. 127.

More and more States refrain from spending large amounts of governmental money on space projects; or, to put it differently, do this rather on an incentive centered around significant military considerations.⁶ As a result of this process of commercialisation and privatisation in the space sector, more and more private companies with their commercial activities come to the forefront. Of course, the crucial question is at stake whether influenced by this new paradigm, the international *lex lata* for human activities in outer space will change in character.

I will, therefore, in the first part of the lecture characterize the different phases of law making before sketching out the challenges in the second part. Then, in the third part of the lecture I will offer some considerations on whether a new (format of) law is needed in the future.

These reflections will allow to draw a conclusion on where we stand now and what we have to expect for the years of space activities to come.

Thereby it is clear that forecasts are difficult to make, in particular in the long-term perspective. Therefore, the following ideas that reflect common sense are by no means a “blueprint” for the future.

Before we start, let me, however, at this point share with you some thoughts about the Covid-19 pandemic that goes on already for some time. Perhaps this crisis is an answer to human's perpetual strive for more, higher, faster. My impression is that we as humans in the 21st century have already almost completely or are likely to soon lose sight with regard to the natural environment, and to our fellow neighbours in any respect. .

It is an ongoing, burgeoning lack of belonging together on planet Earth, and of the need to care and protect our habitat. One only gets fully aware of this fact if one looks at our blue planet from outer space. It is my sincere conviction that the corona pandemic is a loud call demanding us to slow down, and to become aware of how we, as humankind, should act and behave more responsibly vis-à-vis our fellow brothers and sisters and vis-à-vis the nature. Shouldn't this responsibility for our common future have a consequence also for space law making in the future? Shouldn't compromising be an important consequence from what we have experienced?

⁶ As can be seen from the newly established units within the armed forces of certain States, charged specifically with space-based defense: In 2019, French President Emmanuel Macron announced the creation of a „space high command“ within the French air force. For the full text of his speech from 13 July 2019, see <https://www.elysee.fr/emmanuel-macron/2019/07/13/discours-aux-armees-a-lhotel-de-brienne>. Moreover, on 20 December 2020, the USA established its Space Force as a branch of the US Armed Forces, see <https://www.spaceforce.mil/About-Us/About-Space-Force/>.

Part I Phases of space law making so far

Let me, before starting with a more in-depth description of the current format of space law, make one important preliminary remark.

The frame of international space law-making has so far been surprisingly stable. In my opinion this is the case because, and not despite of, the numerous broadly used and formulated notions characterising space law that allow for a flexible interpretation and adaptation to critical cases when needed: e.g. the lack of a legally-relevant definition of outer space, the circular definition of 'space object', the definition of damage etc..

It must, however, be seen whether this stable legal framework can stand the test of growing commercialization and its needs. As I will demonstrate in the following, at least some adaptation of the current format of space law is necessary.

If we now look into space law making it is in my opinion, possible to distinguish three distinct phases.⁷ An early phase of treaty law making⁸, a second phase of the substitution of (new) treaty law by non-binding resolutions of the UN General Assembly⁹, and a third most recent phase characterized by resolutions of the UN General Assembly that interpret notions of the existing international space law.¹⁰

Let us begin with the first phase of space law making.

1. The Era of Treaty Law (1963 - 1979)

The United Nations Committee on the Peaceful Uses of Outer Space was established with the aim to create the international regulation of human activities in outer space. The treaties on space law, negotiated in the two sub-committees¹¹ would then be adopted by the UNCOPUOS Main Committee and sent as recommendations to the UN General Assembly. If a

⁷ Stephan, Hobe, *International Space Law in its First Half Century*, in: Proceedings of the 49th Colloquium of the International Institute of Space Law 2006, pp. 373–381.

⁸ This early phase started in the late 1950s with the establishment of the ad hoc Committee on the Peaceful Uses of Outer Space (COPUOS) in 1958, composed of 18 members, which in 1959 became a permanent body under the auspices of the UN General Assembly. See UN General Assembly Resolution 1472 (XIV), International Co-operation in the Peaceful Uses of Outer Space, 12 December 1959.

⁹ This second phase of space law making was characterised with the adoption of UN General Assembly Resolutions on specific human activities in outer space and lasted from 1982 to 1996.

¹⁰ The third phase is still ongoing. See Hobe, *supra* note 4, pp. 63-65.

¹¹ The two sub-bodies within UNCOPUOS are the Technical and the Legal Subcommittees.

recommendation was aimed to become an international agreement, the General Assembly had to adopt it before it was opened for signature by the UN Member States.¹²

Such procedure worked considerably well at the beginning. Between 1963, the adoption of the infamous Resolution 1962 (XVIII)¹³ (foreshadowing the Outer Space Treaty) brought about five international treaties in a relatively short period of time: the 1967 Outer Space Treaty;¹⁴ the Rescue Agreement of 1968;¹⁵ the Liability Convention of 1972;¹⁶ the Registration Convention of 1975¹⁷ and finally the Moon Agreement of 1979.¹⁸ This is even more so, if you compare the totally unknown area of outer space to the much better equipped national maritime law which had in fact produced four international conventions only in 1958. The time before was characterized by customary international law. Antarctica knows only one international agreement, the Antarctic Treaty of 1959 with two amending protocols. Admittedly, the first phase of law making for human activities in outer space was rather successful. This was the case despite the introduction of the principle of decision making based on consensus.¹⁹ This principle, in its effect, provides every state participating in the law formation within UNCOPUOS with a veto right, as a provision can only be adopted if no State raises an objection and no State wishes to further elaborate on the matter. This consensus-based treaty adoption process, however, has no effect on the later acceptance of an existing agreement by further Members of the international community. Discrepancy between the consensus-adoption of the treaties and the number of ratifications was not so big with regard to the Outer Space Treaty, which now has 110 ratifications,²⁰ the Rescue

¹² On the law-making procedure for space law within UNCOPUOS, see Hobe, *supra* note 4, p. 42.

¹³ Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space of 13 December 1963.

¹⁴ Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, 610 UNTS 205, adopted on 27 January 1967, entered into force on 10 October 1967.

¹⁵ Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, 672 UNTS 119, adopted on 22 April 1968, entered into force on 3 December 1968.

¹⁶ Convention on International Liability for Damage Caused by Space Objects, 961 UNTS 187, adopted on 29 March 1972, entered into force on 1 September 1972.

¹⁷ Convention on Registration of Objects Launched into Outer Space, 1023 UNTS 15, adopted on 14 January 1975, entered into force on 15 September 1976.

¹⁸ Moon Agreement, *supra* note 3.

¹⁹ Eilene Galloway, *Consensus Decisionmaking by the United Nations Committee on the Peaceful Uses of Outer Space*, *Journal of Space Law* Vol. 7 No. 1 (1979), pp. 3-13.

²⁰ United Nations Office for Outer Space Affairs, *Status of International Agreements Relating to Activities in Outer Space* as at 1 January 2020, updated and available online at

Agreement, now 98²¹ or the Liability Convention with now also 98 ratifications.²² Already starting with the Registration Convention which has so far been ratified by 69 States²³ there was a remarkable discrepancy between the fact that also this Convention had been adopted by consensus — i.e. without any objection within UNCOPUOS — and a relatively low number of ratifications. The discrepancy became extremely evident in the fact that although the Moon Agreement²⁴, adopted with consensus by all UNCOPUOS Members in 1979²⁵, required only five instruments of ratification to enter into force, this took five years. As of 2020, the Agreement has been ratified only by 18 States²⁶ which shows that this international agreement does not have a widespread support. The Moon Agreement, being the last international treaty on outer space to be adopted, in one way or another was symbolic for the beginning of a crisis in space law making. At the time of the negotiations, there was a lot of disagreement, there was a lot of anger, there was a confrontation between the so-called “First” and “Third” World, there were repercussions of the strive on the young developing countries for a new international economic order which all came down in the famous Common Heritage of Mankind-formula as enshrined in Art. 11 of the Moon Agreement.²⁷ Today, the number of developed countries that have ratified this agreement is marginal and none of the big space forces has become parties to it. But also here we have to state that the Moon Agreement was adopted by consensus and therefore constitutes binding treaty law which, apart from directly binding its State Parties, serves as a subsequent State practice in determining the specific content of the fundamental legal principles adopted with the Outer Space Treaty.²⁸

<https://www.unoosa.org/documents/pdf/spacelaw/treatystatus/TreatiesStatus-2020E.pdf> (status up to date as of 30 Sept. 2020).

²¹ *Ibid.*

²² *Ibid.*

²³ *Ibid.*

²⁴ Moon Agreement, *supra* note 3.

²⁵ At the time of adoption, approximately 50 States were members of UNCOPUOS. See UN Office for Outer Space Affairs, Committee on the Peaceful Uses of Outer Space: Membership Evolution, <https://www.unoosa.org/oosa/en/ourwork/copuos/members/evolution.html>.

²⁶ Status of International Agreements Relating to Activities in Outer Space, *supra* note 18.

²⁷ See, for example, Aldo Amando Cocca, *The Common Heritage of Mankind: Doctrine and Principle of Space Law:*

An Overview, IISL Proceedings of the 29th Colloquium on the Law of Outer Space 1986, pp. 17-24. For a historical account of the inclusion of the CHM principle in the Moon Agreement, see Ram Jakhu, Steven Freeland, Stephan Hobe, Fabio Tronchetti, “Article 11 Moon Agreement”, in: Hobe/Schmidt-Tedd/Schrogl (eds.). *Cologne Commentary on Space Law*, Vol. II (Heymanns 2013), pp. 389 et seq.

²⁸ On the Moon Agreement as subsequent State practice to the Outer Space Treaty, see the Preamble of the Moon Agreement stating that it is “to define and develop” the predeceasing four treaties.

2. The Era of United Nations Resolutions (1982 - 1996)

The era of space law treaty making ended in 1979 and was followed by an era of adopting non-binding UN General Assembly Resolutions. In law, there is of course a significant difference between treaties and resolutions as the latter, due to the missing competence of the UN General Assembly to adopt instruments of international law²⁹, lack any legally binding force. And within the development of space law, this seems to have been intended. After the shock of the low participation to the Moon Agreement, the UNCOPUOS Member States entered a new phase of adopting non-binding instruments dealing with specific types of space activities.³⁰ Resolutions on direct broadcasting by satellites,³¹ dealing with the transboundary transport and broadcasting of television signals, on remote sensing³², i.e. the acquisition of information about areas on Earth from outer space; on nuclear power sources³³, dealing with the protection from accidents caused by satellites with nuclear power on board; and on space benefits³⁴, an attempt to reinterpret the Outer Space Treaty. All these instruments were adopted by consensus with one exception: the ideologically inspired resolution on direct broadcasting by satellites³⁵ was adopted by majority. The other instruments adopted during this phase were in fact adopted by consensus as agreement on the contents could be reached relatively easily because of their legally non-binding nature.

3. Resolutions interpreting space law (2004 — 2020)

As of 2004 the UN Committee on the Peaceful Uses of Outer Space adopted instruments, which, instead of amending treaty law under the Vienna Convention on the Law of Treaties

²⁹ Art. 13 UN Charter.

³⁰ Hobe, *supra* note 4, p. 63 et seq.

³¹ Principles Governing the Use by States of Artificial Earth Satellites for International Direct Television Broadcast (adopted by General Assembly Resolution 37/92 of 10 December 1982).

³² Principles Relating to Remote Sensing of the Earth from Outer Space (adopted by General Assembly Resolution 41/65 of 3 December 1986).

³³ Principles Relevant to the Use of Nuclear Power Sources in Outer Space (adopted by General Assembly Resolution 47/68 of 14 December 1992).

³⁴ 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 (adopted by General Assembly Resolution 51/122 of 13 December 1996).

³⁵ *Supra* note 32.

(VCLT)³⁶, serve to reinterpret certain provisions and notions of the existing international treaty law.³⁷ Thus, specific problems of space law, as e.g. of the 'launching State', were subject to specific "guiding principles" with regard to particular problems that had arisen after the adoption of the Liability Convention³⁸ and the Registration Convention.³⁹ Moreover, in 2013 the General Assembly adopted a Resolution encouraging Member States to adopt national space legislation.⁴⁰

What does this development mean? To say it in a rather neutral form, major space faring countries seem to be of the opinion that it is more favourable to adopt non-legally binding instruments than to enact treaties imposing specific legal obligations on States.⁴¹ Consensus seems to be easy when it has no immediate consequence in law. And this exactly is intended. International lawyers will shake heads with regret to the ever shrinking normativity of international space law.⁴² One thing seems to be clear: if there is no binding law, this is to the clear advantage of those countries who have the power to easily live without the law. The lack of binding obligations is favourable rather for economically and technologically stronger countries, and disadvantageous for other States with modest economic potential because the law, at the first place, aims at protecting the weak, and at legal certainty. And with this in mind it may be permitted to express again a deep regret about the fading away from the normative power of the law regulating space activities which we are currently experiencing.

Part II: Challenges

Let me now turn to the more recent developments and opportunities in the space sector, but also to the challenges resulting therefrom for space law.

³⁶ Vienna Convention on the Law of Treaties, 1155 UNTS 331, adopted on 23 May 1969, entered into force on 27 January 1980.

³⁷ Hobe, *supra* note 4, pp. 63 et seq.

³⁸ UN GA Res. 59/115, Application of the Concept of the "launching State", 10 December 2004.

³⁹ UN GA Res. 62/101, Recommendations on Enhancing the Practice of States and International Intergovernmental Organizations in Registering Space Objects, 17 December 2007.

⁴⁰ UN GA Res. 68/74, Recommendations on National Legislation Relevant to the Peaceful Exploration and Use of Outer Space, 11 December 2013.

⁴¹ For a critical account, see Stephan Hobe, *Space Law*, *supra* note 4, pp. 63-65.

⁴² *Ibid.*, pp. 209 - 212.

1. Commercial Space Activities

The last three decades of the 20th, and particularly the 21st century have been characterized by new commercial activities. The Ansari X Prize⁴³ marked the beginning of a number of NewSpace activities that have, over the course of less than two decades, changed the basic feature of space activities from originally completely governmental to now increasingly private. Governments have started to more critically reflect their investments in outer space activities. This was well exemplified with the decision of the Obama administration in the United States to discontinue the Space Shuttle program.⁴⁴ Ever since, the United States became reliant on other launcher options. With the private company SpaceX, a replacement of the space shuttle fleet was found. As was the case with the Space Shuttle, the SpaceX vehicles, and the launch vehicles of companies of the expanding club of commercial launchers, evolve to operate on the basis of renewable launches.⁴⁵ Moreover, following the Ansari X Prize, the concept of non-orbital flights for transportation of humans to an altitude allowing to experience zero gravity offered by private firms like Virgin Galactic flourished.

It has become clear that particularly the new launcher infrastructure requires national space legislation in which the details of authorizations (licenses) are laid down; equally, when they become feasible, also non-orbital flights will need to be accompanied by such national space legislation.⁴⁶ On the other hand, the old question of the extraction of natural resources from celestial bodies found back its way on the agenda of international space legislation. Although the Moon Agreement has addressed this question, it did so in a rather rudimentary form

⁴³ NASA, Ansari X-Prize : A Brief History and Background, <https://history.nasa.gov/x-prize.htm>. The most famous example for a composite suborbital vehicle is the concept that won the X Prize in 2004, SpaceShipOne/White Knight, and its successor SpaceShipTwo/White Knight Two (in test flight since 2013, but not yet operating).

⁴⁴ The White House, Office of the Press Secretary, Remarks by the President on Space Exploration in the 21st Century, 15 April 2010.

⁴⁵ See, for example, the suborbital reusable vehicle developed by Blue Origin, New Shepard, <https://www.blueorigin.com/new-shepard/>.

⁴⁶ This is already the case with US national legislation, see 51 US Code, Chapter 509, Commercial Space Launch Activities.

without solving the real problems of the permissibility of national appropriation of natural resources on celestial bodies.⁴⁷

One thing is, however, clear: as stems from the systematics of international space law enshrined in Art. II of the Outer Space Treaty, any future legislation has necessarily to be adopted international, and single States must first be entitled through international law to enact national legislation governing the exploitation of such common resources. Outer space and the celestial bodies, including their resources, are areas beyond national jurisdiction and international common goods. Therefore, absent an international regulation providing States with a specific title to national regulation over these areas, the more recent national activities such as the US Law allowing American nationals to obtain, possess, sell and own space resources adopted in 2015⁴⁸ and the Luxemburg Law adopted in 2017⁴⁹ lack the necessary jurisdiction with regard to the disposing over and the taking of resources from outer space and celestial bodies. Accordingly, any authorization for such activities provided by national authorities under such national laws, may be valid nationally, but is invalid with regard to other States and to the international regime governing outer space.

2. Military Space Activities

Rather unchanged remains the situation with regard to military activities. As is well known, Art. IV of the Outer Space Treaty contains only a partial prohibition of military space activities.⁵⁰ For example, although it is not allowed to put weapons of mass destruction into orbits around the Earth, ICBMs with nuclear warheads can use outer space, considering the fact that during their flight trajectory, they only cross an orbit, but are not “put into” orbit, as satellites are. Moreover, Art. IV of the Outer Space Treaty prohibits the instalment (Art. IV para. 1) and testing (Art. IV para. 2) on celestial bodies. This concession with regard to a non-encompassing prohibition of military activities in outer space was the compromise of 1967, without which none of the major superpowers – the then Soviet Union and United States of

⁴⁷ Art. 11 Moon Agreement foresees that, when space resource activities become „feasible“, an international legal order shall be established to ensure the orderly and safe development, the rational management and the equitable sharing of natural resources on celestial bodies. See Hobe, *supra* note 4, pp. 98 et seq.

⁴⁸ U.S. Commercial Space Launch Competitiveness Act, 25 November 2015.

⁴⁹ Loi du 20 Juillet 2017 sur l'exploration et l'utilisation des ressources de l'espace, 1st August 2017.

⁵⁰ Kai-Uwe Schrogl and Julia Neumann, 'Article IV OST', in: Hobe/Schmidt-Tedd/Schrogl (eds.), *Cologne Commentary on Space Law*, Vol. I (Heymanns 2009), pp. 75 – 80.

America — would have adopted the Outer Space Treaty. And this duopoly between the civilian and the military uses of outer space has not changed since then. Of course, activities such as US President Reagan's "Star Wars" program were against the idea of mutual destruction which is inherent to any military policy. Today it is not completely clear what is behind the ideas of President Trump with regard to the new creation of a Space Force.⁵¹ This remains certainly on the agenda and will determine the format for space law in the future.

III. High Altitude Pseudo Satellites/Non-orbital Spaceflight and the Question of Delimitation

Interestingly enough, new technology may seriously challenge the discussion on the delimitation between airspace and outer space.⁵² As is well known, according to the so-called 'spatialist approach' one would determine that, as around 80 to 90 kilometers above sea level no airplane can fly and a satellite has had its so far lowest perigee of, air space should end and outer space should start. This is more or less the altitude around the so-called van Kármán Line.⁵³

Others, supporting the so-called 'functionalist approach' do not refer to a fixed physical boundary, but to the purpose of a specific activity. If a vehicle aims at carrying out a space activity, space law should be applicable; if its mission is predominantly aimed at airspace, then air law would be applicable. And this difference is quite considerable, because space law is characterized by the non-existence of sovereign rights and aviation law through the sovereignty of the subjacent state over its airspace – and depending on the type of the activity, either one or the other field of law would be applicable.⁵⁴

⁵¹ The US Space Force is a branch of the US Armed Forces that was established on 20 December 2019 with the enactment of the National Defense Authorization Act for Fiscal Year 2020.

⁵² For an excellent account on the different approaches to delimitation, see Francis Lyall/ Paul B. Larsen, *Space Law: A Treatise*, 2nd ed., (Routledge, 2018), pp. 143–151. See also UNCOPUOS, *Historical Summary on the consideration of the question on the definition and delimitation of outer space*, UN Doc. A/AC.105/769 (2002).

⁵³ The so-called "van Kármán line" at around 100 km defines the altitude where that the atmosphere is so thin that an airplane cannot be sustained by aerodynamic forces and has been accepted by the International Aeronautical Federation (IAF) as a boundary between airspace and outer space. For a critical description see, Jonathan C. McDowell, *The Edge of Space: Revisiting the Kármán Line*, *Acta Astronautica* (2018).

⁵⁴ Hobe, *supra* note 4, p. 13.

However, following the emergence of new types of activities that may include elements of both air flight and spaceflight, such as the use of High-Altitude Pseudo Satellites (HAPS)⁵⁵ and of non-orbital vehicles may pose the question in a different way. Is it really granted that there is a delimitation between a very high air space and outer space or is there a third area in between which is neither airspace, nor outer space? Or may it be justified that air space reaches only as far as airplanes can really fly (at approximately 27 kilometers above sea level)? And will, with the development of technology, the lowest perigee for a satellite remain at approximately 84 km? The space in-between, the so-called meso-space, could/should arguably be governed either by air or by space law, thereby taking and applying the functional approach. This could arguably facilitate many problems.⁵⁶

Part III: New Law?

So far, we have seen that space legislation is at crossroads. The old *corpus* of space law, be it in the form of treaty law or of UNGA resolutions, is challenged by the new range of commercial space activities, by the relevance of military aspects and also by the delimitation problem that may give rise to further discussion.

1. New Discussion on Delimitation

As we have already seen, HAPS and non-orbital spaceflight may raise the question of delimitation in a new way.⁵⁷ Perhaps the older idea of allowing sovereignty only to go so far as necessary and possible for the defense (through airplanes) is not so wrong. This could arguably lead to an alternative applicability of air and of space law in meso-space, depending on what the aim of a flight is going to be. Maybe the concept of contiguous zone from maritime law could be applied here that makes all water beyond 12 aeronautical miles off the coast of the coastal state to be international waters but allows the coastal state some economic uses in the contiguous zone.⁵⁸ Parallel to the concept of contiguous zones in the law of the sea, with regard to the delimitation of outer space, for example, all activities beyond 25

⁵⁵ Hobe, *supra* note 4, p. 14;

⁵⁶ *Ibid.*

⁵⁷ Stephan Hobe, *The Limits of Space (Law): Which Law for 'Meso-space'?*, paper by the Chair of the Directorate of Studies, International Institute of Space Law (2018).

⁵⁸ Art. 3 UNCLOS.

kilometres above sea level could be considered to be space activities, and some economic uses (maybe even military uses) would be allowed as high as airplanes can fly.

2. National space law

Obviously, the growing commercial activities necessitate more national space law that formulates the questions for the granting of authorizations for such activities.⁵⁹ Unfortunately, there is a lack of international standards for national space law. To come up with such new standards, as has been attempted by the International Law Association and is facilitated also within UNCOPUOS, could be an important work in the future. However, the rough structure of national space law as applying raw models for such national space legislation does exist as well. They may be helpful because the growing importance of national space law may help the creation of international space law through the emergence of customary international law – provided that relevantly spread State practice and identifiable *opinio iuris* are given.

3. Reformulation of International Space Law

One can clearly see that so far, outer space and *in concreto* the Solar System have been used by either military or civil space missions in a rather uncoordinated form. In the future there will be a growing number of commercial activities and new challenges can certainly be expected. For this reason, a new order for using outer space is necessary.⁶⁰

Art. I, para. 1 of the Outer Space Treaty proclaims the exploration and use of outer space to be a 'province of all mankind'.⁶¹ In other words, a certain restriction may exclude an exclusive exploration and use of outer space by States, and allow the international community to participate. At the same time, any exploration and use of outer space may serve military purposes to the extent provided by Art. IV of the Outer Space Treaty. And most importantly, the law should be able to require that outer space may be used only in a way that is

⁵⁹ Still leading in the making of national space legislation is the 2012 Resolution on National Space Legislation of the International Law Association. See Hobe, Stephan, Draft Model Law for National Space Legislation and Explanatory Notes, in: ILA, Report of the Seventy-Fifth Conference, 2012 Sofia (Bulgaria), ILA, 2012, pp. 307 et seq.

⁶⁰ Hobe, *supra* note 4, pp. 212 et seq.

⁶¹ See for an interpretation of the provision, Stephan Hobe, "Article I OST", in: Hobe/Schmidt-Tedd/Schrogl (eds.), *Cologne Commentary on Space Law*, Vol. I (Heymanns 2009), pp. 38-39.

environmentally acceptable. It is most difficult to come to concrete conclusions in the environmental regard since Art. IX of the Outer Space Treaty does not impose any real restrictions on human activities to ensure the preservation of the outer space environment. However, there are at least the non-binding IADC⁶² and UNCOPUOS Space Debris Mitigation Guidelines⁶³, which try to encourage states to do the uttermost for the mitigation of space debris already – however, they exist in a non-binding form. On the other hand, after the rather successful adoption of Space Debris Mitigation Guidelines, the discussion is on its way on the formulation of rules for Space Debris Remediation. This is absolutely necessary in order to preserve the accessibility and usability of orbits in the LEO and GSO regions and to facilitate the growing use of outer space for commercial purposes.

This means in other words, that the old paradigm that a State can do whatever it wants if there is no prohibition by international law - the so-called Lotus principle named after the famous decision of the Permanent Court of International Justice of 1927,⁶⁴ should be newly evaluated. Can we really afford outer space to be overcrowded by satellite swarms, i.e. having up to 12.000 or even more small satellites in Low Earth Orbit in view of other possible uses and can we establish an order of traffic management so that in the future satellites do not considerably endanger other space objects?⁶⁵

What should be learned from this is that the uses of outer space as an international common space might be guided by the guarantee of a freedom of use exercised in a proportionate way. I can use my freedom only in such a way as not to hamper the freedom of use of others. And this is just the kind of modesty that I find necessary to apply as a countermeasure against the Covid-19 pandemic and its repercussions.

4. Contractual liability

What moreover is necessary is, if one looks into space transportation, the decision of the question whether commercial space transportation of persons and freight by cargo should

⁶² IADC Space Debris Mitigation Guidelines, IADC-02-01, Rev. 1, September 2007.

⁶³ UN GA Res. 62/17, Space Debris Mitigation Guidelines of the Committee on the Peaceful Uses of Outer Space, 22 December 2007.

⁶⁴ The Case of the S.S. Lotus (French Republic v. Turkish Republic); Judgment of 7 September 1927, Permanent Court of International Justice, PCIJ Series A, No. 10, pp. 18–19.

⁶⁵ For a critical account see Stephan Hobe, Interview

lead to a contractual liability of the carrier. This old concept of international aviation law does not exist so far in space law.⁶⁶ It would, however, be necessary if one would decide that this is the necessary result of the commercial use for transportation purposes. The current policy of an 'informed consent'⁶⁷ alone would leave all the risk with the passenger, i.e. the customer. Obviously, the development of the question depends very much on answering the question whether adequate insurance will be provided in the future in this sector.

4. Private International Law

Obviously, any commercially orientated activity would immediately bring international private law into discussion. Questions of liability, standards for spaceports, standards for freight, etc. should be brought under the umbrella of private international law, the example in air law being the Warsaw Convention of 1929,⁶⁸ respectively the 1999 Montreal Convention.⁶⁹

What we therefore will need in the future is an international convention on spaceflight as a means of transportation. But how should such international convention look like?

5. Space Traffic Management

Let me answer first with one important premise. International space law can only progress, and this we have seen in Part I of our considerations, if there is a will of the international community to adopt respective law or at least to develop widely accepted guidelines. And if such law, or guidelines, would be required, there is obviously the case at least for a future Convention on Space Traffic Management. This future Space Traffic Management Convention should regulate transport into outer space, the transport in outer space and the transport from outer space for the benefit of all. Therefore, a more stringent registration of space objects is absolutely necessary in order to keep track of all space objects sent into outer

⁶⁶ See e.g. Art. 17, 20, 21 of the Warsaw Convention of 1929 and the Montreal Convention of 1999.

⁶⁷ See for a description Stephan Hobe, Melchior Antunano, Rupert Gerzer, *Medical Safety and Liability Issues for Short-Duration Commercial Orbital Space Flights*, Position Paper, International Academy of Astronautics, Paris 2009.

⁶⁸ Convention for the Unification of Certain Rules Relating to International Carriage by Air, 137 LNTS 11, adopted on 12 October 1929, entered into force on 12 February 1933.

⁶⁹ Montreal Convention for the Unification of Certain Rules for International Carriage by Air, 2242 UNTS 309, adopted on 28 May 1999, entered into force on 4 November 2004

space. This is absolutely necessary in order to avoid accidents with the problematic result of space debris. It should thus be the most important new format for space law between 2020 and 2023 to come up with such a Convention. If there is no agreement on coming up with stringent international law, at least guidelines to that effect could help.⁷⁰

But even if there is no consensus of the international community on the future law making one should not give up. Emphasis must then be put on national space legislation which may allow to come up at least with common standards of a "coalition of the willing" that could evolve into at least regional customary international law.

I am, however, not too pessimistic as it is in our common interest to use outer space for commercial purposes. That a sustainable, rational commercial use will not be possible without adequate regulation is beyond doubt.

Conclusion

What is the result of the above thoughts? Is there a new format for space law required?

1. First, we need in the future a new motivation for international law — the use and exploration of outer space need enforceable law, i.e. conventions that clearly state what is legally allowed and what is prohibited.
2. We need rules for the economic uses of outer space — space transportation being one important activity which can only be conducted if it is safe enough to preserve outer space as usable as it is now.
3. This also means that we need to give a farewell to the traditional *laissez-faire* approach derived from the Lotus Principle and prepare for a legal order based on mutual responsibility.
4. Space debris generation should be avoided, but we should be much more ambitious: through regulation, economic incentives must be given to space actors for the removal of debris from polluted orbital regions.

⁷⁰ Some efforts that offer a substantial basis in this regard include the 2006 IAA STM Study, Contant-Jorgenson, Corinne/L.la, Petr/Schrogl, Kai-Uwe (eds.), Space Traffic Management: Cosmic Study, International Academy of Astronautics, 2006 (updated in 2018) as well as the 2007 Report of the International Space University on Space Traffic Management, available in full text at https://www2.isunet.edu/index.php?option=com_content&task=view&id=374&Itemid=251.

5. The existing and the upcoming space transportation activities need clear liability rules orientated at commercial air transportation.

6. We should allow for more legal flexibility with regard to activities taking place in airspace and outer space, particularly with regard to the so-called meso-space.⁷¹

7. Time is more than ready for legal rules concerning the exploitation of resources from celestial bodies. Concerning these rules, one should consider all possibilities, starting from a total prohibition, a moratorium, to establishing a permission subject certain restrictions that do allow the respective activities, but are strictly necessary to preserve the outer space environment.

All this means that international space law will considerably grow in importance. It should change from a law that enables only the fittest to a law that enables the fit but also helps the weaker to grow and to stabilize the environment used for space activities. On the other hand, let us face the fact that the treaties on human uses of outer space are not so bad. They have led us through the past 60 years rather successfully. Through the consensus upon which they all are based, they have formed a realistic basis for all future human space activities and have paved the way towards rational uses of outer space also in the future.

In any future regulation of space activities, we must learn to balance interests and not to be one sided. The commercial interests of economic and technological progress will continue to drive us forward, but they must be balanced with the community interest to preserve our planet and the Solar System in a way that guarantees the survival of mankind in the future.

⁷¹ Supra notes 58 and 59.