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The Privatization of Outer Space and the Consequences for Space Law

submitted by

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Abstract [in Dutch]

Er is een recente opkomst van private ondernemingen in de ruimte waarneembaar, genaamd de 'NewSpace' sector. Bij deze vernieuwende ontwikkelingen, die elkaar in snel tempo opvolgen, komen verscheidene juridische problematieken kijken aangezien deze privatisering gevolgen heeft op het ruimterecht.

De context waarin deze private ondernemingen ruimteactiviteiten ondernemen is geenszins een wettelijk vacuüm: er is het internationale wettelijk kader van ruimterecht en er zijn verscheidene nationale ruimterechten. Het internationaal kader bestaat uit een aantal verdragen waarvan 'the Outer Space Treaty' de hoeksteen vormt. De verdragen stellen een aantal fundamentele principes voorop waaraan staten zich moeten houden. De uitvoering verloopt niet altijd even vlot, aangezien het principe dat de ruimte van iedereen, 'the common heritage of mankind', is en het principe dat men de ruimte niet kan toe-eigenen al aanleiding hebben gegeven tot tal van discussies.

De resem verdragen lijkt dan ook niet uitgebreid en geactualiseerd genoeg om te kunnen voldoen aan de eisen van de NewSpace sector, waardoor bij gevolg, nationaal ruimterecht hieraan poogt tegemoet te komen. Het internationale wettelijk kader blijkt wel voldoende ademruimte te geven aan nationaal ruimterecht om passende interpretaties te ontwikkelen. Maar rechtsonzekerheid en juridische moeilijkheden blijven bestaan. In de specifieke ontginningssector – we spreken hier ook wel van 'space mining' – heerst er grote onzekerheid met betrekking tot de eigendomsrechten. Verscheidene nationale benaderingen trachten soelaas te bieden, zonder evenwel tot een helder besluit te komen. Een onderzoek van de wettelijk status quo voor wat betreft de toerisme- en transportsector toont aan dat ook deze sector gepaard gaat met een veelvoud aan juridische bedenkingen: aansprakelijkheid en verzekeringen, de classificatie van 'suborbital flights' en veiligheid verdienen een duidelijkere uitwerking.

Aangezien deze juridische problemen de vooruitgang en vernieuwing in deze sector fnuiken, is het aan de internationale gemeenschap om te bespreken hoe het verder moet. Er werd reeds een waaier aan verschillende oplossingen voorgesteld. Hierin kan men drie stromingen onderscheiden. Een eerste strekking wil het bestaande internationale kader van ruimterecht behouden omdat dit vrijheid geeft aan de nationale ruimterechten die op die manier toegelaten worden zich te ontwikkelen. Een tweede groep stelt voor het bestaande internationaal kader van ruimterecht te wijzigen, zodat het de hedendaagse ruimtevaart business kan ondersteunen. Een derde stroming wil tot slot een volledig nieuw internationaal wettelijk kader van ruimterecht creëren dat alle nationale ruimterechten kan harmoniseren. Het 'common heritage of mankind' principe moet ook duidelijker worden omlijnd.

Wat de uitkomst van de onderhandelingen dan ook moge worden: men dient billijkheid, internationale samenwerkingen en de vreedevolle ontwikkeling van de ruimtevaart hoog in het vaandel te dragen.

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Glossary of Abbreviations and Acronyms

| | |
|----------------------------|--|
| ABA Journal: | American Bar Association Journal |
| Barry L. Rev.: | Barry Law Review |
| Berkeley J. Int'l L.: | Berkeley Journal of International Law |
| Cal.W.Int'l L.J.: | California Western International Law Journal |
| Can. B. Rev.: | Canadian Bar Review |
| Case W. Res. J. Int'l L.: | Case Western Reserve Journal of International Law |
| Chi. J. Int'l L.: | Chicago Journal of International Law |
| Colum. Bus. L. Rev.: | Columbia Business Law Review |
| Denv. J. Int'l L. & Pol'y: | Denver Journal of International Law and Policy |
| ECSS: | European Cooperation for Space Standardization |
| ESA: | European Space Association |
| FAA: | Federal Aviation Authority |
| Fed. Reg.: | Federal Register |
| FIU L. Rev.: | Florida International University (College of Law) Law Review |
| GSO: | Geostationary Satellite Orbit |
| Harv. L. & Pol'y Rev.: | Harvard Law & Policy Review |
| High Tech. L.J.: | High Technology Law Journal |
| ICAO: | International Civil Aviation Organization |
| IISL: | International Institute of Space Law |
| ILDC: | International Law in Domestic Courts |
| Indian J. Int'l Econ. L.: | Indian Journal of International Economic Law |
| Int'l L. & Mgmt. Rev.: | (Brigham Young University) International Law & Management Review |
| Int'l L. Ass'n Rep. Conf.: | International Association Reports of Conferences |
| ISS: | International Space Station |
| ITU: | International Telecommunication Union |
| J. Air L. & Com.: | Journal of Air Law and Commerce |
| J. Space L.: | Journal of Space Law |

| | |
|----------------------------|---|
| JSPG: | Journal of Science Policy & Governance |
| N.Y.U. J. Int'l L. & Pol.: | New York University Journal of International Law and Politics |
| NASA: | National Aeronautics and Space Administration |
| OECD: | Organization for Economic Cooperation and Development |
| OST: | Outer Space Treaty |
| Publ. L: | Public Law |
| Rev. BDI: | Revue Belge de Droit International |
| Rev. dr. unif.: | Revue de droit uniforme |
| TECHNOL SOC: | Technology in Society |
| Tex. A&M J. Prop. L.: | Texas Agriculture & Mechanical (University) Journal of Property Law |
| TFEU: | Treaty on the Functioning of the European Union |
| UMKC L. Rev.: | University of Missouri-Kansas City (School of Law) Law Review |
| UNCOPOUS: | United Nations Committee on the Peaceful Uses of Outer Space |
| UNOOSA: | United nations Office for Outer Space Affairs |
| UNTS: | United Nations Treaty Series |
| Vand. J. Ent. & Tech. L.: | Vanderbilt Journal of Entertainment & Technology Law |
| Wash. U. L. Rev.: | Washington University Law Review |
| Wis. Int'l L.J.: | Wisconsin International Law Journal |
| ZLW: | Zeitschrift für Luft- und Weltraumrecht |

The Privatization of Outer Space and the Consequences for Space Law

This is a master's dissertation in the field of space law. Just like activities on Earth, activities in outer space are governed by rules. Both national and international laws form space law as we know it today.

Space law is a relatively new field of law. The inception can be traced back to October 1957, the launch of the world's first artificial satellite. The Soviet Union propelled the 'Sputnik 1'-satellite into the uncharted territory of outer space. At the time, law did not extend into outer space, but this launch changed that: from that point on, space law would evolve greatly.

In the early days of space exploration, national governmental superpowers were the only human presence in outer space. This classic framework, however, is the subject of many recent changes on various fronts as private enterprises are becoming increasingly important in the space industry.

In this dissertation, the legal aspects of this relatively new phenomenon that is the privatization of outer space, will be researched. More specifically, the consequences this privatization has for the existing framework of space law will form the main subject of investigation.

First off, as an introduction to the modern space industry, the new evolution of privatization in the space industry will be clarified.

Then the existing framework of space law, both national and international, will be examined to give a clear look at the legal context in which this privatization takes place.

This will lead to an attempt to answer the question if the existing framework of space law can support this new evolution by involving relevant cases.

To conclude, some of the most feasible proposed solutions from the doctrine and industry will be provided.

Throughout this dissertation, in dealing with the private space industry, the focus will be on the exploitation and transportation sectors, as they will have to overcome some interesting though challenging legal problems.

Chapter I. An Introduction to the Modern Space Industry

1. A lot has changed since the early days of space law. "I think we're really at the dawn of a new era for space exploration and one where there's a much bigger role for commercial companies", SpaceX founder Elon Musk said in 2012 following the launch of the first commercial spacecraft to visit the International Space Station.¹

2. **De facto monopoly of government.**² The government used to have a de facto monopoly regarding space activities as they were purely state undertakings at the time. This is abundantly clear when taking into account the most influential space presences of yesteryear – and arguably today still: The National Aeronautics and Space Administration (NASA) is evidently an executive federal government agency, the Soviet Union's space program is government initiated and even the European Space Agency (ESA) is a governmental organization, albeit an intergovernmental one. Every big space player was intrinsically tied to the government.

3. **Private enterprises.**³ Private space enterprises have existed for a long time and the United States have always shown a strong support for them. However, in the early days they were by far not as influential and prominent as they are today. After the fall of the Soviet Union, private enterprises did become more incentivized to participate in the space race. This eventually led to a shift in the paradigm and nowadays private enterprises have a bigger role in the space industry. Usually their purpose is almost strictly commercial.

These private enterprises are developing into fully fledged space faring businesses, opening up or at least planning to open up new markets in outer space. They are becoming increasingly prominent in the space industry:⁴ SpaceX, Virgin Galactic, Blue Origin, Planetary Resources, MarsOne and Deep Space Industries are only a few of the most notable players.⁵

¹ C. MOSKOWITZ, "Private Rocket Launch Vindicates Commercial Spaceflight Model", *space.com* 2012, <https://www.space.com/15809-spacex-private-capsule-launch-commercial-spaceflight.html>, last accessed on 4 May 2018.

² P.J. BLOUT, "Renovating Space: The Future of International Space Law", *Denv. J. Int'l L. & Pol'y* 2011, (515) 518.

³ C. PASTORIUS, "Law and Land Policy in the Global Space Industry's Lift-off", *Barry L. Rev.* 2013, (201) 211.

⁴ P.J. BLOUT, "Renovating Space: The Future of International Space Law", *Denv. J. Int'l L. & Pol'y* 2011, (515) 521.

⁵ NASA, *Emerging Space, The Evolving Landscape of 21st Century American Spaceflight*, 2014, 19 https://www.nasa.gov/sites/default/files/files/Emerging_Space_Report.pdf, last accessed on 3 May 2018; J. KRAUSE, "The Outer Space Treaty turns 50. Can it survive a new space race?", *ABA Journal* 2017, http://www.abajournal.com/magazine/article/outer_space_treaty, last accessed on 3 May 2018.

4. NewSpace Industry.⁶ This emerging movement of private enterprises being active in space is often dubbed as the ‘NewSpace Industry’, contrasting it to the traditional space industry.

There is no universally accepted definition for this umbrella term. It is a definition in a permanent state of flux. It can be described as follows:

“NewSpace is a worldwide phenomenon of entrepreneurs developing products, and service enterprises focusing on space and are using private funding in their initial developments. [...] principally, the ethos of the movement has been to challenge the traditional ways of space exploration that are widely considered as too expensive, time-consuming, and lacking in room for inventive risk-taking. Companies [...] are primarily funded by private capital to build products and services that challenge the cost to either access to space itself or access to services based out of assets in space.”⁷

Or as Wikipedia describes it: *“[NewSpace] is a movement and philosophy encompassing a highly visible, globally emerging, private spaceflight industry. Specifically, the terms are used to refer to a global sector of relatively new, distinctly commercially minded, aerospace companies and ventures working to independently (of governments and their prime or major contractors, i.e., Old Space) develop faster, better, and cheaper access to space, space and spaceflight technologies, and overall space missions—again, all largely driven by commercial, as distinct from political or other, motivations (although many view the commercial aspects of NewSpace as simply the best means to broader, more socioeconomically-oriented, NewSpace ends; notably, the settlement of Mars and space colonization. These terms also naturally extend to the worldwide community of designers, refiners, promoters, and advocates of building-block concepts, architectures, systems, technologies, missions, programs, protocols, and policies that enable and support NewSpace activities across all relevant dimensions.”*

⁶ N. PRASAD, “Traditional Space and NewSpace Industry in India: Current Outlook and Perspectives for the Future” in R.P. RAJAGOPALAN and N. PRASAD (Eds.), *Space India 2.0 Commerce, Policy, Security and Governance Perspectives*, Bengaluru, Mohit Enterprises for Observer Research Foundation, 2017, (11) 14.

⁷ *Ibid.*

5. A closer look at their objectives teaches us that most of these NewSpace private enterprises have varying expertise. We can see current trends of them embracing a variety of subjects, including tourism, exploitation, the food industry, remote sensing⁸, etcetera.⁹

The NewSpace industry is characterized by creative ‘out-of-the-box’ thinking, leading to ideas and concepts that are interesting in principle but potentially unrealistic in practice. In this dissertation, the focus will therefore lie on the most achievable goals put forth by the industry.

Recently there have been some developments in the exploitation of outer space, the so-called space mining business. Private enterprises as well as governments are interested in the possibilities this can bring. Apart from the inherent risks, they also see interesting applications and economic opportunities.¹⁰

The private enterprises in the NewSpace Industry will try to improve upon the work of their ‘predecessors’, as they often criticize the way of the past. A major point of critique is the fact that the traditional governmental space industry got into its rhythm and became rigid and formulaic. The old way is often too cautious and halting with a lot of unnecessary supervising. The NewSpace Industry in turn wants to be what this older traditional space industry is not, purposely distancing themselves from a bureaucratic, slow and entirely top-down governmental way of doing things.¹¹

Cost-efficiency is a big factor in the rise of these private enterprises. For example, SpaceX builds re-usable rockets to drastically lower the cost of space activities.¹²

6. **Co-operation between old and new.**¹³ Even though old and new seem to clash, it turns out that for the evolution of the industry as a whole, both the private enterprises and the governments will have to work together. Recent developments have made clear that the traditional governmental space industry and

⁸ Remote sensing describes the activity of using satellites to observe various characteristics of Earth’s surfaces to obtain information valuable for e.g. mapping, mineral exploration, resource management, etc.; “Space exploration: remote sensing”, *Encyclopædia Britannica*, <https://www.britannica.com/science/space-exploration/Satellite-telecommunications#ref839156>.

⁹ NASA, *Emerging Space, The Evolving Landscape of 21st Century American Spaceflight*, 2014, 19, https://www.nasa.gov/sites/default/files/files/Emerging_Space_Report.pdf.

¹⁰ R. DAVIES, “Asteroid mining could be space’s new frontier: the problem is doing it legally”, *The Guardian* 2016, <http://www.theguardian.com/business/2016/feb/06/asteroid-mining-space-minerals-legal-issues>, last accessed on 3 May 2018.

¹¹ J. ACHENBACH, “Which Way to Space? Flights of fancy may launch the industry’s future”, *The Washington Post* 2013, http://www.washingtonpost.com/sf/national/2013/11/23/which-way-to-space/?utm_term=.1d9f8ebd223b, last accessed on 3 May 2018.

¹² C. PASTORIUS, “Law and Land Policy in the Global Space Industry's Lift-off”, *Barry L. Rev.* 2013, (201) 242.

¹³ *Ibid.* 212.

NewSpace Industry turn out to have a symbiotic relationship. New Space companies will need government contracts to fund their increasingly expensive projects. The governments will in return need NewSpace companies to turn their innovative visions into realities.

Government contracting used to be the norm in the space industry and seemingly will remain the norm in the privatized space industry as for example SpaceX has a contract with NASA, as does Blue Origin.¹⁴

7. Possibilities and legal troubles. The privatization of an industry harbors a lot of possibilities for modernization. A clear historical example is the privatization of the military internet-network, that subsequently changed the world as we knew it. Further in this dissertation however, it will be revealed that the privatization of the space industry can also be the harbinger of legal troubles.

¹⁴ NASA, *List of Active Space Act Agreements*,
https://www.nasa.gov/sites/default/files/atoms/files/active_domestic_private_sector_saas_as_of_12-31-2016.pdf.

Chapter II. The Existing Framework of Space Law

8. Nowadays space law exists on both an international and a national level. This legal framework is the context in which the private enterprises will undertake their space related activities. The current legal framework was gradually established starting more than half a century ago.¹⁵

Before the launch of the ‘Sputnik 1’-satellite by the Soviet Union in 1957 the legal framework for space related activities was rather a cause for speculation than a tool for practical use. As of that moment however, the development of space law gained momentum.¹⁶

At the time, when the framework for space law was being formed, the international context was wildly different from the current one. National governmental bodies were the main actors in the space industry as the United States’ NASA rivaled the Soviet Union’s space program. They both had a strong military focus, so the primary consideration whilst negotiating was peace and security.¹⁷ And only from the 1980s on, the focus began to shift towards commercial applications.¹⁸

9. If economic, military or political issues relating to space would arise, legal footing would be provided by international law. For years this reliance on international law seemed to fulfill the needs of the spacefaring community. More recently there has been an emergence of national space law. This is the logical consequence of the birth of the NewSpace Industry where the actors are not states but its nationals, as private enterprises. Regulating space activities on a national level seemed the most practical solution in this new context. National space law is better suited for the kind of commercial space activities these private enterprises undertake. An international legal framework adjusted to the needs of private enterprises would be more difficult to achieve, as there are more parties and concerns involved in decision-making on an international level than on a national one.¹⁹

¹⁵ T.S. TWIBELL, “Space Law: Legal Restraints on Commercialization and Development of Outer Space”, *UMKC L. Rev.* 1996-1997, (589) 591.

¹⁶ *Ibid.*

¹⁷ P.J. BLOUT, “Renovating Space: The Future of International Space Law”, *Denv. J. Int’l L. & Pol’y* 2011, (515) 516.

¹⁸ S. HOBE, “The Impact of New Developments on International Space Law (New Actors, Commercialisation, Privatisation, Increase in the Number of “Space-faring Nations””, *Rev. dr. unif.* 2010, (869) 869-870.

¹⁹ T.S. TWIBELL, “Space Law: Legal Restraints on Commercialization and Development of Outer Space”, *UMKC L. Rev.* 1996-1997, (589) 592.

10. However, it should be made clear that the states are still responsible for ensuring these private enterprises are following the principles of international space law.²⁰

11. The merits of this evolution towards national legal frameworks are up for discussion. Doctrine heavily debates the *modus operandi* regarding legislation in the future.²¹

§1. International Space Law, an Old Regime

12. The existing framework of space law came into existence primarily on an international level. At the dawn of the space age government bodies were the primary actors in space law. As such, the original legal framework was internationally established. This initial frame was shaped mainly by the power struggle between the United States and the Soviet Union. And these two states did not want bilateral agreements as they turned to the United Nations to draft treaties of public international law.²²

13. This international space law is a ‘*lex specialis*’, governing the specific area of space law. This makes international law the ‘*lex generalis*’.

14. The international legal framework was concocted using multi-lateral treaties, international agreements and the United Nation’s lawmaking process. This birthed a vast set of rules applying to all states parties.²³

15. **Treaties.**²⁴ The primary foundation of space law lies in several international treaties generated within the first two decades after the launch of Sputnik. This was a very successful era for international space legislation. Generally speaking, these treaties are:

²⁰ D. LINDEN, “The Impact of National Space Legislation on Private Space Undertakings: Regulatory Competition vs. Harmonization”, *JSPG* 2016, (1) 1
http://www.sciencepolicyjournal.org/uploads/5/4/3/4/5434385/linden_nationalspacelegislation.pdf, last accessed on 3 May 2018.

²¹ *Infra* No. 123 *et seq.*

²² S. HOBE, “The Impact of New Developments on International Space Law (New Actors, Commercialisation, Privatisation, Increase in the Number of “Space-faring Nations””, *Rev. dr. unif.* 2010, (869) 874.

²³ T.S. TWIBELL, “Space Law: Legal Restraints on Commercialization and Development of Outer Space”, *UMKC L. Rev.* 1996-1997, (589) 592; D. LINDEN, “The Impact of National Space Legislation on Private Space Undertakings: Regulatory Competition vs. Harmonization”, *JSPG* 2016, (1) 2.

²⁴ IISL DIRECTORATE OF STUDIES, *Does International Space Law Either Permit or Prohibit the Taking of Resources in Outer Space and on Celestial Bodies, and how is this Relevant for National Actors? What is the Context, and What are the Contours and Limits of this Permission or Prohibition?*, unpublished background paper, 2016, 1, http://iislweb.org/docs/IISL_Space_Mining_Study.pdf, last accessed on 4 May 2018.

- Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies or The Outer Space Treaty of 1967²⁵,
- Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space or the Rescue Agreement of 1968²⁶,
- Convention on International Liability for Damage Caused by Space Objects or the Liability Convention of 1972²⁷,
- Convention on Registration of Objects Launched into Outer Space or the Registration Convention of 1976²⁸ and
- Agreement Governing the Activities of States on the Moon and Other Celestial Bodies or the Moon Treaty of 1984²⁹.

Every single one of the treaties lays emphasis on the same idea: the activities carried out in outer space and the accompanying benefits should be devoted to evolving all countries and all people. Therefore, international cooperation takes a central role in the treaties.

16. After this era, the focus began to shift towards less binding legal commitments, as there were no more multilateral international agreements on the use of space or space resources being made.³⁰

17. Originator of treaties.³¹ These treaties have originated in the United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS). This is a subsidiary organization to the United Nations General Assembly (UNGA) created in 1959 with one goal in mind: governing “the exploration and use of space for the benefit of all humanity”, the pillars being development, peace and security.

²⁵ Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies of 10 Oct. 1967 (**The Outer Space Treaty**), *UNTS* Vol. 610, 205.

²⁶ Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space of 3 Dec. 1968 (**Rescue Agreement**), *General Assembly resolution 2345 (XXII)*, 5.

²⁷ Convention on International Liability for Damage Caused by Space Objects of 1 Sept. 1972 (**Liability Convention**), *General Assembly resolution 2777 (XXVI)*, 25.

²⁸ Convention on Registration of Objects Launched into Outer Space of 15 Sept. 1976 (**Registration Convention**), *UNTS* Vol. 1023, 16.

²⁹ Agreement Governing the Activities of States on the Moon and Other Celestial Bodies of 11 Jul. 1984 (**The Moon Treaty**), *UNTS* Vol. 1363, 3.

³⁰ S. HOBE, “The Impact of New Developments on International Space Law (New Actors, Commercialisation, Privatisation, Increase in the Number of “Space-faring Nations””, *Rev. dr. unif.* 2010, (869) 875.

³¹ <http://www.unoosa.org/oosa/en/ourwork/copuos/index.html>, last accessed on 3 May 2018; J. FRAKES, “The Common Heritage of Mankind Principle and the Deep Seabed, Outer Space, and Antarctica: Will Developed and Developing Nations Reach a Compromise?”, *Wis. Int'l L.J.* 2003, (409) 421.

The Committee's consists of members that are representative for states that have varying needs. In addition, only unanimous decisions reach the General Assembly. This makes for a rigid system.³²

This organization would review international cooperation possibilities regarding the peaceful uses of outer space. When the United Nations could undertake a space related activity, the Committee would make a study. The studies were mainly concerned with legal problems arising from the exploration of outer space. The encouragement of space research programs is also part of its tasks.

Furthermore, the Committee rethinks the merits of international cooperation in space exploration on a yearly basis. They also discuss how space technology can be applied to meet global development goals.

In 1961, a subsidiary was established, the Legal Subcommittee. This subcommittee provides an exceptional global platform to review and discuss the rapid evolutions in the industry that result in an ever-changing space agenda.

18. Object of treaties. These treaties are binding for the states that are parties to the treaties. But as this is a dissertation about privatization, the following question should be raised: what about private space enterprises? A closer look at the treaties shows that the addressed parties are generally not private enterprises. So, will these enterprises not have to adhere to the treaties? They for a fact do not have obligations or rights on the basis of these legal text. But states and international organizations do.³³ Space activities were, at the time of drafting, envisioned as uniquely state controlled activities so there were no attempts in these texts to control the private enterprises.³⁴

19. Problem. Later in this dissertation it will become clear that even with all its good intentions, there is still an intrinsic problem with this international framework of space law.³⁵ It is a rigid frame that can hardly keep up with the recent evolutions in the space industry and the needs of the dynamic private enterprises.³⁶

Furthermore, this international legal framework is not very susceptible to change and modification. It can take a very long time for the great many nations around the globe – with differing views if they have

³² R. JAKHU, "Legal Issues Relating to the Global Public Interest in Outer Space", *J. Space L.* 2006, (31) 108.

³³ D. LINDEN, "The Impact of National Space Legislation on Private Space Undertakings: Regulatory Competition vs. Harmonization", *JSPG* 2016, (1) 1-2.

³⁴ P.J. BLOUT, "Renovating Space: The Future of International Space Law", *Denv. J. Int'l L. & Pol'y* 2011, (515) 518.

³⁵ *Infra* No. 72 *et seq.*

³⁶ T.S. TWIBELL, "Space Law: Legal Restraints on Commercialization and Development of Outer Space", *UMKC L. Rev.* 1996-1997, (589) 640-641.

developed or are developing their space industry – to discuss and agree on a single thing. And more so, it can take a while before most nations sign the agreement, as not every nation will be involved at first. This already illustrates one of the reasons why an international frame may not be the way to go in this evolved world.³⁷

A. The Outer Space Treaty of 1967

20. In this part of the dissertation, the existing international legal framework (the treaties) will be analyzed. An overview follows of the most important articles of the treaties, with a focus on the private space enterprises and their activities.

For starters there is the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies of 1967 or the Outer Space Treaty, a landmark in the process of establishing space law.³⁸

a. The Main Principles

21. Context.³⁹ The context in which the Outer Space Treaty was made, was immensely different from today's world.⁴⁰ The space race had started and the Soviet Union had just launched their Sputnik satellite. Space activities were carried out by the powerful nations with no apparent goal other than proving their superiority. They did not chase profit nor the appropriation of outer space and its resources. The main concern at the time of drafting was making sure the United States and the Soviet Union, the superpowers did not expand their nuclear arms race into space.

³⁷ *Ibid.*

³⁸ *Ibid.* 594; D. LINDEN, “The Impact of National Space Legislation on Private Space Undertakings: Regulatory Competition vs. Harmonization”, *JSPG* 2016, (1) 2-3; IISL DIRECTORATE OF STUDIES, *Does International Space Law Either Permit or Prohibit the Taking of Resources in Outer Space and on Celestial Bodies, and how is this Relevant for National Actors? What is the Context, and What are the Contours and Limits of this Permission or Prohibition?*, unpublished background paper, 2016, 3-4, http://iislweb.org/docs/IISL_Space_Mining_Study.pdf, last accessed on 4 May 2018.

³⁹ J. THOMAS, “Privatization of Space Ventures: Proposing a Proven Regulatory Theory for Future Extraterrestrial Appropriation”, *Int'l L. & Mgmt. Rev.* 2005, (191) 198; H. QIZHI, “The Outer Space Treaty in Perspective”, *J. Space L.* 1997, (93) 95-96.

⁴⁰ *Supra* No. 1 *et seq.*

This was a time before SpaceX and their privately built rockets, before talks of space tourism by Virgin Galactic and before ideas of space hotels for space tourists. The reality where private enterprises had completely joined in on this space adventure was nearly non-existent.

In this context ninety plus nations ratified and twenty-seven nations signed the Outer Space Treaty.

22. At the time of writing 107 nations are part of the treaty and 23 nations have signed it.⁴¹ The Outer Space Treaty is reflected on as a giant success. It is considered to be part of international space law.

23. Significance and contents.⁴² The Outer Space Treaty is undeniably one of the most important legal text in space law, a true cornerstone. The Outer Space Treaty was the first legislative text to provide regulation for outer space activities. The text also outlined the first legal guiding principles for the exploration of outer space based on a set of principles that were internationally agreed upon. The provisions were intendedly kept broad in order to keep them usable in the future.⁴³

24. Even long before the inception of the Outer Space Treaty, some of its basic principles were already established as customary international space law.⁴⁴ So even though some states do not formally accept the treaty, they can still be bound by the basic principles imbedded in it.

25. Freedom of exploration and use. The first significant provision goes as follows:

“Article I

The exploration and use of outer space, including the Moon and other celestial bodies, shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development, and shall be the province of all mankind.

Outer space, including the Moon and other celestial bodies, shall be free for exploration and use by all States without discrimination of any kind, on a basis of equality and in

⁴¹ COMMITTEE ON THE PEACEFUL USES OF OUTER SPACE LEGAL SUBCOMMITTEE, *Status and application of the five United Nations treaties on outer space*, 9 April 2018, A/AC.105/C.2/2018/CRP.3, http://www.unoosa.org/documents/pdf/spacelaw/treatystatus/AC105_C2_2018_CRP03E.pdf, last accessed on 11 May 2018.

⁴² H. QIZHI, “The Outer Space Treaty in Perspective”, *J. Space L.* 1997, (93) 93-94.

⁴³ T.S. TWIBELL, “Space Law: Legal Restraints on Commercialization and Development of Outer Space”, *UMKC L. Rev.* 1996-1997, (589) 593; J. FRAKES, “The Common Heritage of Mankind Principle and the Deep Seabed, Outer Space, and Antarctica: Will Developed and Developing Nations Reach a Compromise?”, *Wis. Int'l L.J.* 2003, (409) 421.

⁴⁴ H. QIZHI, “The Outer Space Treaty in Perspective”, *J. Space L.* 1997, (93) 96.

accordance with international law, and there shall be free access to all areas of celestial bodies.

There shall be freedom of scientific investigation in outer space, including the Moon and other celestial bodies, and States shall facilitate and encourage international cooperation in such investigation.”

This is a core principle that embodies the inclusive mindset favored in space.⁴⁵

‘Exploration’ refers to scientific expeditions leading to discoveries and ‘use’ implies exploitation. The ‘exploration and use’ is limited by the text to states. Private enterprises are not included.⁴⁶

Notably for the private space enterprises, the phrasing “*for the benefit and in the interest of all countries*” seems to imply that even commercial benefits made through the exploration and use of Outer Space should be shared by all countries.⁴⁷

‘The province of all mankind’-concept is a precursor to the ‘common heritage of mankind’-principle which will be further elaborated in the Moon Treaty.^{48; 49} Even though the same principle in the Law of the Sea Convention⁵⁰ was met with backlash and its implementation in the Moon Treaty was heavily critiqued, here in the Outer Space Treaty, it was widely accepted. This acceptance may be caused by the lack of concrete space exploration at the time which lead to states not seeing the full potential of outer space and the acceptance of this visionary principle. If states at the time were confronted with the principle’s practical application, they may not have been as accepting.⁵¹

26. Prohibition of national appropriation (non-appropriation principle).⁵² One of the main reasons for the creation of the Outer Space Treaty was to counteract any claims of sovereignty over outer space or

⁴⁵ R. OOSTERLINCK, *Exploration and Exploitation of Outer Space: Seen from a Legal Perspective, Chapter 9 – Sources of Space Law*, unpublished, 2015, 6.

⁴⁶ *Ibid.*

⁴⁷ *Ibid.* 5.

⁴⁸ *Infra* No. 55 *et seq.*

⁴⁹ R. OOSTERLINCK, *Exploration and Exploitation of Outer Space: Seen from a Legal Perspective, Chapter 9 – Sources of Space Law*, unpublished, 2015, 6.

⁵⁰ Convention on the Law of the Sea of 10 Dec. 1982 (**LOS Convention**), *UNTS* Vol. 1835, 3.

⁵¹ J. FRAKES, “The Common Heritage of Mankind Principle and the Deep Seabed, Outer Space, and Antarctica: Will Developed and Developing Nations Reach a Compromise?”, *Wis. Int’l L.J.* 2003, (409) 423.

⁵² IISL DIRECTORATE OF STUDIES, *Does International Space Law Either Permit or Prohibit the Taking of Resources in Outer Space and on Celestial Bodies, and how is this Relevant for National Actors? What is the Context, and What are*

parts of it. Consequently, national appropriation is prohibited in outer space. This prohibition includes celestial bodies and is incorporated in Article II of the Outer Space Treaty.

“Article II

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.”

There is a certain tension between the previous and this article, as they respectively state that there is a freedom of use of outer space and that outer space cannot be claimed.⁵³

This prohibition will have to be a big consideration in the context of the exploitation business by private enterprises. The old principles used by Europe in the age of colonization can no longer be used here. The ensuing property rights problem will be discussed in-depth later in this dissertation.⁵⁴

Nevertheless, it should be noted that based on Article VIII states will be able to control and retain jurisdiction over personnel and objects they sent into outer space, even objects landed or constructed on a celestial body.⁵⁵

27. Parallel with maritime and Antarctic law.⁵⁶ A parallel for these provisions can be seen in maritime law.

Particularly the High Seas Convention of 1958⁵⁷ contains an interesting parallel.

“Article 2

The high seas being open to all nations, no State may validly purport to subject any part of them to its sovereignty. Freedom of the high seas is exercised under the conditions laid down by these articles and by the other rules of international law. [Freedoms] shall

the Contours and Limits of this Permission or Prohibition?, unpublished background paper, 2016, 25-26, http://iislweb.org/docs/IISL_Space_Mining_Study.pdf, last accessed on 4 May 2018.

⁵³ *Ibid.* 30.

⁵⁴ *Infra* No. 75 *et seq.*

⁵⁵ T.S. TWIBELL, “Space Law: Legal Restraints on Commercialization and Development of Outer Space”, *UMKC L. Rev.* 1996-1997, (589) 594.

⁵⁶ *Ibid.*

⁵⁷ Convention on the High Seas of 30 Sept. 1962, *UNTS* Vol. 450, 11.

be exercised by all States with reasonable regard to the interests of other States in their exercise of the freedom of the high seas.”

This means that states have no jurisdiction over the surroundings of their vessel, but they do have jurisdiction over the vessel itself and the personnel inside, as is the case in space law.

Furthermore, outer space is oftentimes compared to Antarctica, as both areas belong to nobody.

The parallel with the High Seas and Antarctica will be further explored later in this dissertation in the context of finding a solution to the property right problem.⁵⁸

28. Accordance with international law.⁵⁹ Another main principle is the use of general international law in outer space.

“Article III

States Parties to the Treaty shall carry on activities in the exploration and use of outer space, including the Moon and other celestial bodies, in accordance with international law, including the Charter of the United Nations, in the interest of maintaining international peace and security and promoting international cooperation and understanding.”

29. Application.⁶⁰ The application of this treaty is very broad, encapsulating space activities of individual states, joint activities and international intergovernmental organizations.

“Article XIII

The provisions of this Treaty shall apply to the activities of States Parties to the Treaty in the exploration and use of outer space, including the Moon and other celestial bodies, whether such activities are carried on by a single State Party to the Treaty or jointly with other States, including cases where they are carried on within the framework of international intergovernmental organizations. Any practical questions arising in connection with activities carried on by international intergovernmental organizations in the exploration and use of outer space, including the Moon and other celestial bodies,

⁵⁸ *Infra* No. 168 *et seq.*

⁵⁹ R. OOSTERLINCK, *Exploration and Exploitation of Outer Space: Seen from a Legal Perspective, Chapter 9 – Sources of Space Law*, unpublished, 2015, 8.

⁶⁰ *Ibid.* 25.

shall be resolved by the States Parties to the Treaty either with the appropriate international organization or with one or more States members of that international organization, which are Parties to this Treaty.”

The question remains whether the space activities of individual states include the space activities of its nationals and their private enterprises?

30. For the most part, academics agree that the Outer Space Treaty and thereby its prohibition of national appropriation apply to public as well as private entities such as private commercial enterprises. This can be assumed because the Outer Space Treaty ensures “free access to all areas of celestial bodies”. This free access would be violated from the moment public or private actors start appropriating outer space because others would not have free access anymore.⁶¹

Moreover, Article II can quite easily be read as including private persons and corporations as it contains a very broad addition. It says that appropriation is not possible “by any other means”. The main objective of this catch-all stipulation is considered to be the exclusion of other entities used by governments to exploit outer space. These juridical and natural persons can operate as a “means” for the government.⁶²

It will be made clear further on in this dissertation that some countries, including the United States seem to have a different opinion on this topic.⁶³

b. Liability

31. Space activities are deemed to be dangerous as they could possibly damage earth.⁶⁴ Consequently, the liability regime in space law is quite substantial. There are two texts covering the liability regime. The Liability Convention was drawn up a few years after the Outer Space Treaty.⁶⁵ However, here, the Outer Space Treaty articles will be handled.

⁶¹ J. THOMAS, “Privatization of Space Ventures: Proposing a Proven Regulatory Theory for Future Extraterrestrial Appropriation”, *Int'l L. & Mgmt. Rev.* 2005, (191) 200.

⁶² *Ibid.*

⁶³ *Infra* No. 87.

⁶⁴ M. SCHAEFER, “The Need for Federal Preemption and International Negotiations regarding Liability Caps and Waivers of Liability in the U.S. Commercial Space Industry”, *Berkeley J. Int'l L.* 2015, (223) 225.

⁶⁵ *Infra* No. 40.

32. General international law stipulates that states are not only liable for their own actions, but also for actions of their officials that can be attributed indirectly to the state.⁶⁶

The Outer Space Treaty of 1967 fleshes out the concept of liability in a significantly different way.

“Article VI

States Parties to the Treaty shall bear international responsibility for national activities in outer space, including the Moon and other celestial bodies, whether such activities are carried on by governmental agencies or by non-governmental entities, and for assuring that national activities are carried out in conformity with the provisions set forth in the present Treaty. The activities of non-governmental entities in outer space, including the Moon and other celestial bodies, shall require authorization and continuing supervision by the appropriate State Party to the Treaty. When activities are carried on in outer space, including the Moon and other celestial bodies, by an international organization, responsibility for compliance with this Treaty shall be borne both by the international organization and by the States Parties to the Treaty participating in such organization.” (underlining by author of this dissertation)

The underlined elements deserve some further explanation.

33. **‘Non-governmental entities’.**⁶⁷ The treaty puts forth that states are responsible for ‘national activities’. ‘Non-governmental’ bodies are expressly included in the scope of application. This makes for an exceptional clause in international law as states hereby adopt more responsibility for non-governmental bodies than attributed by customary international law.⁶⁸ There is a fair amount of academic discussion as to what this phrasing implies.

‘Non-governmental entities’ does not necessarily include private enterprises, but it does leave the door open for these enterprises to be included in the concept. This belief however has several detractors who argue that space activities should serve public interests and not private ones, hereby pinpointing one of the

⁶⁶ D. LINDEN, “The Impact of National Space Legislation on Private Space Undertakings: Regulatory Competition vs. Harmonization”, *JSPG* 2016, (1) 2-3.

⁶⁷ R. OOSTERLINCK, *Exploration and Exploitation of Outer Space: Seen from a Legal Perspective, Chapter 9 – Sources of Space Law*, unpublished, 2015, 13.

⁶⁸ P.J. BLOUT, “Renovating Space: The Future of International Space Law”, *Denv. J. Int’l L. & Pol’y* 2011, (515) 530.

fundamental statements made in the Outer Space Treaty. In any case, Article VI seems to imply that the private sector should let their space activities be supervised and authorized by the states parties.

Other scholars believe that private entities are indeed adequately addressed in Article VI. States are by this Article incentivized to pass fitting national space law. In passing this national space law, free enterprise can be given a chance by working with a bare minimum of provisions.

An interpretation of the text can be found in the preparatory works. The Outer Space Treaty originated in the context of opposition between the United States and the Soviet Union in the sixties. As a result, the wording of Article VI is a compromise between these two state's visions. The United States have always been supportive of private enterprises participating in space activities. The Soviet Union, in contrast, believed in a 'state only'-space.

This context has however drastically changed, as private enterprises are universally accepted in the space industry.

34. 'Authorization and continuing supervision by the appropriate State Party'.⁶⁹ Furthermore, in Article VI, authorization and continuing supervision of these national activities is required by the 'appropriate state'. As states are responsible for these non-governmental actors, allowing private enterprises in outer space becomes a high-risk activity.⁷⁰ However, the interpretation of this authorization and supervision concept is not entirely clear.

Authorization and supervision implies a certain degree of control: states will want to exercise control over these activities, mainly because they may lead to international liability of the state. Potential liability can be dealt with accordingly.

Usually this authorization happens through a licensing regime for non-governmental actors.

Does this mean that private enterprises should wait on a proper national framework before venturing into outer space? Doctrine offers contrasting opinions on this topic.

35. Private enterprises will want to make a profit by recovering their investments in outer space, but this profit will not benefit all mankind. The goals of private enterprises in this way contradicts a fundament of the Outer Space Treaty, and these private enterprises will be supervised and authorized by their

⁶⁹ R. OOSTERLINCK, *Exploration and Exploitation of Outer Space: Seen from a Legal Perspective, Chapter 9 – Sources of Space Law*, unpublished, 2015, 14.

⁷⁰ P.J. BLOUT, "Renovating Space: The Future of International Space Law", *Denv. J. Int'l L. & Pol'y* 2011, (515) 530-531.

governments in this respect. These kinds of realities expose the core of this dissertation, as later chapters will explore the possibilities of handling the existing legal framework.

36. Broad basis for liability.⁷¹ If private enterprises launch from the ‘territory of facility’ of a ‘State Party’, these ‘State Parties’ are internationally liable regardless of who procured the launch. As states should be able to control activities on their territory or facilities, this is no unreasonable provision.

“Article VII

Each State Party to the Treaty that launches or procures the launching of an object into outer space, including the Moon and other celestial bodies, and each State Party from whose territory or facility an object is launched, is internationally liable for damage to another State Party to the Treaty or to its natural or juridical persons by such object or its component parts on the Earth, in air space or in outer space, including the Moon and other celestial bodies.”

The provision has a very broad basis for liability. In comparison to general international law, this is rather extraordinary and innovative.⁷²

B. The Rescue Agreement of 1968

37. The Agreement on the Rescue of Astronauts, the Return of Astronauts and Objects Launched into Outer Space of 1968 or the Rescue Agreement is based on some provisions of the Outer Space Treaty.⁷³

The Rescue Agreement further elaborates on the concept of astronauts as ‘envoys of mankind’, ensuring them “all possible assistance”, but without going into details.⁷⁴

38. With the existing plans to enlarge mankind’s presence in outer space, this agreement seems to deserve some form of specifying expansion.

⁷¹ R. OOSTERLINCK, *Exploration and Exploitation of Outer Space: Seen from a Legal Perspective, Chapter 9 – Sources of Space Law*, unpublished, 2015, 15.

⁷² D. LINDEN, “The Impact of National Space Legislation on Private Space Undertakings: Regulatory Competition vs. Harmonization”, *JSPG* 2016, (1) 3.

⁷³ T.S. TWIBELL, “Space Law: Legal Restraints on Commercialization and Development of Outer Space”, *UMKC L. Rev.* 1996-1997, (589) 595.

⁷⁴ *Ibid.*

39. Will private enterprises and their spacefaring employees be ‘envoys of mankind’?

C. The Liability Convention of 1972

40. The liability regime laid out in the Outer Space Treaty is further elaborated upon in the Convention on International Liability for Damage Caused by Space Objects of 1972.⁷⁵

41. **Definitions.** The Liability Convention starts by defining the concepts it uses.

“Article I

For the purposes of this Convention:

The term "damage" means loss of life, personal injury or other impairment of health; or loss of or damage to property of States or of persons, natural or juridical, or property of international intergovernmental organizations;

The term "launching" includes attempted launching;

The term "launching State" means:

(i) A State which launches or procures the launching of a space object;

(ii) A State from whose territory or facility a space object is launched;

(d) The term "space object" includes component parts of a space object as well as its launch vehicle and parts thereof.” (underlining by author of this dissertation)

Using these definitions, private enterprises will need the ‘territory of facility’ of a ‘launching state’ to ‘launch’ their ‘space objects’.

⁷⁵ *Ibid.* 595-596; D. LINDEN, “The Impact of National Space Legislation on Private Space Undertakings: Regulatory Competition vs. Harmonization”, *JSPG* 2016, (1) 3; IISL DIRECTORATE OF STUDIES, *Does International Space Law Either Permit or Prohibit the Taking of Resources in Outer Space and on Celestial Bodies, and how is this Relevant for National Actors? What is the Context, and What are the Contours and Limits of this Permission or Prohibition?*, unpublished background paper, 2016, 4-5, http://iislweb.org/docs/IISL_Space_Mining_Study.pdf, last accessed on 4 May 2018.

42. Liability of the launching state.⁷⁶ The convention expands on the concept of international liability concerning space related activities established by the Outer Space Treaty by settling the fact that the liability for damage caused by space objects lies entirely with the launching states.

“Article II

A launching State shall be absolutely liable to pay compensation for damage caused by its space object on the surface of the earth or to aircraft in flight.”

“Article III

In the event of damage being caused elsewhere than on the surface of the earth to a space object of one launching State or to persons or property on board such a space object by a space object of another launching State, the latter shall be liable only if the damage is due to its fault or the fault of persons for whom it is responsible” (underlining by author of this dissertation)

There is a clear distinction between absolute and fault-based liability. The practical application of these articles requires the involvement of general international law.

In practice, however, launching states have drawn up a specific legal framework, a national law. The launching states will want to share liability with the operator. The operator can be a private enterprise. By sharing the liability, private launch activities are incentivized.

43. Joint liability between two or more states is also dealt with. It will be possible to sue each state for the entirety of the damage.⁷⁷

“Article V

Whenever two or more States jointly launch a space object, they shall be jointly and severally liable for any damage caused.”

44. The launching states will not be able to escape liability over time. As long as there is a possibility of the space object causing damage, the launching state will possibly be liable. Exoneration is only permitted when specific conditions are met. To qualify for exoneration, the damage must be caused as a

⁷⁶ R. OOSTERLINCK, *Exploration and Exploitation of Outer Space: Seen from a Legal Perspective, Chapter 9 – Sources of Space Law*, unpublished, 2015, 40.

⁷⁷ *Ibid.* 41-42.

consequence of gross negligence or by an act or omission done with intent to cause damage by a claimant state or a person it represents.⁷⁸ This person can be a natural or juridical one, so it can also be a private enterprise.

“Article VI

Subject to the provisions of paragraph 2 of this Article, exoneration from absolute liability shall be granted to the extent that a launching State establishes that the damage has resulted either wholly or partially from gross negligence or from an act or omission done with intent to cause damage on the part of a claimant State or of natural or juridical persons it represents.

No exoneration whatever shall be granted in cases where the damage has resulted from activities conducted by a launching State which are not in conformity with international law including, in particular, the Charter of the United Nations and the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies.”

45. Compensation.⁷⁹ A claim for compensating the suffered damage by state or its national can be presented through diplomatic channels, to another state party or possibly the U.N. Secretary General.

The compensation regime will bring a full compensation.

“Article XII

The compensation which the launching State shall be liable to pay for damage under this Convention shall be determined in accordance with international law and the principles of justice and equity, in order to provide such reparation in respect of the damage as will restore the person, natural or juridical, State or international organization on whose behalf the claim is presented to the condition which would have existed if the damage had not occurred.”

46. The approach taken by the Liability Convention of 1972 is very protective of the victim.⁸⁰

⁷⁸ *Ibid.* 42.

⁷⁹ *Ibid.* 43.

⁸⁰ D. LINDEN, “The Impact of National Space Legislation on Private Space Undertakings: Regulatory Competition vs. Harmonization”, *JSPG* 2016, (1) 3.

47. The liability regime will have a significant effect on the businesses blooming in outer space. Doctrine has established that the Liability Convention effectively covers the space activities of private enterprises.⁸¹ Both transportation and space mining enterprises will have to carefully adhere to the concerned legislation.

D. Registration Convention of 1975

48. It will be key in the liability regime to identify the damage-causing spacecrafts. This is where to the Convention on Registration of Objects Launched into Outer Space of 1975 comes in.⁸²

Registration is very important whilst coordinating launches. Registration clearly points out the launching state, an important element in the context of damage and liability.⁸³

49. **Origin.**⁸⁴ The Registration Convention of 1975 has its origin in the liability and registry regime explained by the Outer Space Treaty of 1967. This regime made clear that appropriate registration of space objects was in place.

“Article VIII (of the Outer Space Treaty)

A State Party to the Treaty on whose registry an object launched into outer space is carried shall retain jurisdiction and control over such object, and over any personnel thereof, while in outer space or on a celestial body. Ownership of objects launched into outer space, including objects landed or constructed on a celestial body, and of their component parts, is not affected by their presence in outer space or on a celestial body or by their return to the Earth. Such objects or component parts found beyond the limits of the State Party to the Treaty on whose registry they are carried shall be returned to

⁸¹ S. M. WILLIAMS, “International Law and the Exploitation of Outer Space: a New Market for Private Enterprise?”, *International Relations* 1983, (2476) 2492.

⁸² R. OOSTERLINCK, *Exploration and Exploitation of Outer Space: Seen from a Legal Perspective, Chapter 9 – Sources of Space Law*, unpublished, 2015, 49.

⁸³ *Ibid.*

⁸⁴ T.S. TWIBELL, “Space Law: Legal Restraints on Commercialization and Development of Outer Space”, *UMKC L. Rev.* 1996-1997, (589) 596; D. LINDEN, “The Impact of National Space Legislation on Private Space Undertakings: Regulatory Competition vs. Harmonization”, *JSPG* 2016, (1) 3-4; IISL DIRECTORATE OF STUDIES, *Does International Space Law Either Permit or Prohibit the Taking of Resources in Outer Space and on Celestial Bodies, and how is this Relevant for National Actors? What is the Context, and What are the Contours and Limits of this Permission or Prohibition?*, unpublished background paper, 2016, 5, http://iislweb.org/docs/IISL_Space_Mining_Study.pdf, last accessed on 4 May 2018.

that State Party, which shall, upon request, furnish identifying data prior to their return.”

50. Purpose.⁸⁵ The Registration Convention provides a general registration framework for all types of space activities and dictates each state party to uphold a registry concerning all objects they launch into space. On top of this, the state must inform the U.N. Secretary General about the object. The exit from space must also be reported.

“Article II

When a space object is launched into earth orbit or beyond, the launching State shall register the space object by means of an entry in an appropriate registry which it shall maintain. Each launching State shall inform the Secretary-General of the United Nations of the establishment of such a registry.

Where there are two or more launching States in respect of any such space object, they shall jointly determine which one of them shall register the object in accordance with paragraph 1 of this article, bearing in mind the provisions of Article VIII of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, and without prejudice to appropriate agreements concluded or to be concluded among the launching States on jurisdiction and control over the space object and over any personnel thereof.

The contents of each registry and the conditions under which it is maintained shall be determined by the State of registry concerned.”

Registration is a key factor in state jurisdiction and control of a space object and its personnel. Only the launching state can gain state jurisdiction and control over a space object through registration. It is debatable whether registration has a constitutive characteristic or merely a declarative characteristic in the determination of state jurisdiction and control.

51. The focus of the Registration Convention of 1975 lies with the national registration. The registering state is responsible for the practical execution concerning concrete form, content and maintenance of the

⁸⁵ R. OOSTERLINCK, *Exploration and Exploitation of Outer Space: Seen from a Legal Perspective, Chapter 9 – Sources of Space Law*, unpublished, 2015, 50-51.

national registration. There should however be registration in two or more registers: one in a national register and one in a register of the United Nations Office for Outer Space Affairs (UNOOSA).⁸⁶

52. Private enterprises.⁸⁷ Can private enterprises be involved in this registration process? The use of the term ‘launching state’ would suggest the contrary. In the United States, it is common practice to register private commercial flights.

53. Launching and procuring state.⁸⁸ Furthermore, there is some uncertainty regarding the distinction between ‘launching’ and ‘procuring’. What are the criteria to be a ‘procuring state’? This is especially problematic when private enterprises are involved, as only one state should complete the registration for the private space activity. This could lead to national regulatory competition.

E. The Moon Treaty of 1979

54. Context.⁸⁹ The Agreement Governing the Activities of States on the Moon and Other Celestial Bodies of 1984 came into being thirteen years after the Outer Space Treaty. It fits in with the idea of elaborating further on the concepts set out in the Outer Space Treaty. It aims to clear out the ambiguities present in the Outer Space Treaty. The role of states in the exploration and use of Outer Space and its resources would be specified.

⁸⁶ D. LINDEN, “The Impact of National Space Legislation on Private Space Undertakings: Regulatory Competition vs. Harmonization”, *JSPG* 2016, (1) 3.

⁸⁷ F. G. VON DER DUNK, “Beyond What? Beyond Earth Orbit? . . . ! The Applicability of the Registration Convention to Private Commercial Manned Sub-Orbital Spaceflight”, *Cal.W.Int'l L.J.* 2013, (269) 338.

⁸⁸ D. LINDEN, “The Impact of National Space Legislation on Private Space Undertakings: Regulatory Competition vs. Harmonization”, *JSPG* 2016, (1) 3.

⁸⁹ T.S. TWIBELL, “Space Law: Legal Restraints on Commercialization and Development of Outer Space”, *UMKC L. Rev.* 1996-1997, (589) 597-600; J. THOMAS, “Privatization of Space Ventures: Proposing a Proven Regulatory Theory for Future Extraterrestrial Appropriation”, *Int'l L. & Mgmt. Rev.* 2005, (191) 200-201; F. TRONCHETTI, “The Moon Agreement in the 21st Century: Addressing Its Potential Role in the Era of Commercial Exploitation of the Natural Resources of the Moon and Other Celestial Bodies”, *J. Space L.* 2010, (489) 495-496; IISL DIRECTORATE OF STUDIES, *Does International Space Law Either Permit or Prohibit the Taking of Resources in Outer Space and on Celestial Bodies, and how is this Relevant for National Actors? What is the Context, and What are the Contours and Limits of this Permission or Prohibition?*, unpublished background paper, 2016, 5, http://iislweb.org/docs/IISL_Space_Mining_Study.pdf, last accessed on 4 May 2018.

Unlike the Outer Space Treaty, the Moon Treaty was not a success. At its inception, merely ten nations ratified it. Today there are 18 parties, but the world's most powerful spacefaring nations – Russia and the United States – are not part of the treaty.⁹⁰

The treaty is in fact quite contested. Many believe it has an inhibiting effect on space exploration.

However, this treaty ushered in a new era in space legislation. It represents the discrepancies between regular spacefaring states and the more earth-bound states on the one hand and between the ideologies of the Soviet Union and the United States on the other hand. Its goal is the equitable distribution of space resources to all countries by being protective of developing countries⁹¹ and minor space powers.

It is composed bearing in mind the potential exploitation of outer space. And as evidenced by the NewSpace Industry, this is becoming an increasingly realistic practice. It even provided in Article 11 for the establishment of an international management organization whenever exploitation of outer space becomes a reality:

“5. States Parties to this Agreement hereby undertake to establish an international regime, including appropriate procedures, to govern the exploitation of the natural resources of the Moon as such exploitation is about to become feasible.”

55. Common heritage of mankind.⁹² There is a heavy focus on the concept of the ‘common heritage of mankind’. The Moon as well as its resources should belong to all humans, it is ‘res communis’. A fitting regulatory regime should be drawn up.

“Article 4

The exploration and use of the Moon shall be the province of all mankind and shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development. Due regard shall be paid to the interests of present and future generations as well as to the need to promote higher standards of

⁹⁰ Status of the Agreement governing the Activities of States on the Moon and Other Celestial Bodies, https://treaties.un.org/Pages/ViewDetails.aspx?src=IND&mtdsg_no=XXIV-2&chapter=24&lang=en, last accessed on 3 May 2018; The state parties are: Australia, Austria, Belgium, Chile, Kazakhstan, Kuwait, Lebanon, Mexico, Morocco, Netherlands, Pakistan, Peru, Philippines, Saudi Arabia, Turkey, Uruguay, Venezuela.

⁹¹ The terminology ‘developed country’ and ‘developing country’ will be maintained in this dissertation. It is used to differentiate countries with an advanced space industry from the ones with an emerging one, and will only be used in this sense, not pertaining to any socio-economic advancements.

⁹² R. OOSTERLINCK, *Exploration and Exploitation of Outer Space: Seen from a Legal Perspective, Chapter 9 – Sources of Space Law*, unpublished, 2015, 59.

living and conditions of economic and social progress and development in accordance with the Charter of the United Nations.

States Parties shall be guided by the principle of cooperation and mutual assistance in all their activities concerning the exploration and use of the Moon. International cooperation in pursuance of this Agreement should be as wide as possible and may take place on a multilateral basis, on a bilateral basis or through international intergovernmental organizations.”

The implementation of this principle without offering a clear definition was met with heavy critique in the wake of problems with the principle in the Law of the Sea Convention.⁹³ At the time, the United States expressed that the treaty would however be “unobjectionable” if a good definition of the common heritage of mankind is negotiated.⁹⁴

It is rather interesting that the same principle in the Outer Space Treaty was widely accepted years earlier.⁹⁵ However, at the time of the proposal of the Moon Treaty, states were confronted with the practical application of the principle because space exploration was actually happening. This was hardly the case at the time of accepting the Outer Space Treaty.⁹⁶

56. Property regime.⁹⁷ Dealing with property, Article 11 specifies:

“2. The moon is not subject to national appropriation by any claim of sovereignty, by means of use or occupation, or by any other means.

3. Neither the surface nor the subsurface of the Moon, nor any part thereof or natural resources in place, shall become property of any State, international intergovernmental or non-governmental organization, national organization or non-governmental entity or of any natural person. The placement of personnel, space vehicles, equipment, facilities, stations and installations on or below the surface of the Moon, including

⁹³ *Infra* No. 170.

⁹⁴ V. BELDAVS, “Simply Fix the Moon Treaty”, *The Space Review* 2018, <http://www.thespacereview.com/article/3408/1>, last accessed on 3 May 2018.

⁹⁵ *Supra* No. 25 *et seq.*

⁹⁶ J. FRAKES, “The Common Heritage of Mankind Principle and the Deep Seabed, Outer Space, and Antarctica: Will Developed and Developing Nations Reach a Compromise?”, *Wis. Int'l L.J.* 2003, (409) 423.

⁹⁷ R. OOSTERLINCK, *Exploration and Exploitation of Outer Space: Seen from a Legal Perspective, Chapter 9 – Sources of Space Law*, unpublished, 2015, 56.

structures connected with its surface or subsurface, shall not create a right of ownership over the surface or the subsurface of the Moon or any areas thereof. The foregoing provisions are without prejudice to the international regime referred to in paragraph 5 of this article.”

In theory the Moon Treaty places a moratorium on the exploitation of outer space until an international regime governing these activities is agreed upon.

Furthermore, the property regime of the Moon Treaty builds on the non-appropriation principle of the Outer Space Treaty. The prohibition of sovereignty included in the Outer Space Treaty however was not enough to keep the lust for commercialization in check. On top of that, there are only a few parties to the stricter Moon Treaty. In a way, there is a disregard for the existing international space property regime. At the very least, the international provisions will be interpreted in that way. This in turn may lead to the NewSpace Industry having more breathing room. As it turns out, national space law will try to meet the wishes and requirements of the private enterprises. This topic will be further expanded upon later in this dissertation.⁹⁸

The Moon Treaty in a way purposely inhibits commercial investments in space related activities. There would be no form of property rights whatsoever in outer space. Being stripped of any exclusive rights in space, there would be no incentive for private enterprises to start investing. Only by disregarding the Moon Treaty is it possible for private enterprises to take ownership of space property. This critical reception of the property regime in the Moon Treaty will also be explored even more later in this dissertation.⁹⁹

57. Contrarian opinion.¹⁰⁰ A contrarian point of view suggests that the Moon Treaty would in practice work against its own goals. This would be the case because less encouragement for the significantly more developed space faring states – the major space powers such as the United States and the Soviet Union – would result in these states being less invested in the exploitation of space. So, there will be a significantly smaller amount of exploited space resources for everybody. As a consequence, the less developed countries would also have almost no reward. The developing countries will feel the negative effects of the implementation of the Moon Treaty, limiting investment opportunities. If developing countries are willing to take the risk, investing in commercial space ventures could turn out to be more beneficial.

⁹⁸ *Infra* No. 82.

⁹⁹ *Infra* No. *et seq.*

¹⁰⁰ J. THOMAS, “Privatization of Space Ventures: Proposing a Proven Regulatory Theory for Future Extraterrestrial Appropriation”, *Int'l L. & Mgmt. Rev.* 2005, (191) 204.

F. Further Elaboration on the Common Heritage of Mankind Principle

58. As the common heritage of mankind principle will be featured frequently in this writing, this part of the dissertation is devoted entirely to a more extensive elaboration of its workings.

a. The Principle in General

59. Origin.¹⁰¹ The common heritage principle harkens back to the ancient ‘res communis’ ideas. The res communis thinking proposes that all property belonged to humankind from the beginning. A parallel can be drawn with the Bible. In Genesis, mankind received the earth to rule from God on the sixth day. If we persist on this thinking, this leads us to believe that the entire universe and all the property it holds, belongs to mankind.

60. The common heritage principle is surrounded by a lot of controversy and international academic debate. Its implementation is not satisfactory to everyone, and the halting factors to its development are twofold.¹⁰²

-International law basis.¹⁰³ Firstly, because the principle is based in Treaties, it can technically only be binding for the signing countries. This practicality clashes with the inherent goal of the principle, as it should apply to all mankind. This is a theoretical inconsistency which stems from international law.

Many believe that the legal origin of the principle lies in the Law of the Sea Convention.

“Article 136

Common heritage of mankind. The Area and its resources are the common heritage of mankind”

Only states parties are bound by an interpretation instituted by a treaty. This modus operandi applies to all treaties. More so, treaties have varying interpretations of the common heritage principle. Because of the varying interpretations of the principle, it is not unanimously considered clear international customary law.

¹⁰¹ *Ibid.* 211-212; F. TRONCHETTI, “The Moon Agreement in the 21st Century: Addressing Its Potential Role in the Era of Commercial Exploitation of the Natural Resources of the Moon and Other Celestial Bodies, *J. Space L.* 2010, (489) 504.

¹⁰² J. FRAKES, “The Common Heritage of Mankind Principle and the Deep Seabed, Outer Space, and Antarctica: Will Developed and Developing Nations Reach a Compromise?”, *Wis. Int'l L.J.* 2003, (409) 410.

¹⁰³ *Ibid.* 410-411.

The common heritage principle should be a norm to govern every single nation. In practice however, this will not be the case, since non-signatory countries are legally not bound by it. In this way, the principle counteracts itself.

-Vague working definition.¹⁰⁴ Secondly, the definition of the common heritage principle is extremely vague. This leads to disagreeing interpretations from developing and developed nations.

There is not one universally accepted definition or interpretation of the common heritage principle. But J. FRAKES and C. PASTORIUS outline the five recurring fundamental characteristics of this principle as follows:

a) Non-appropriation of the common heritage areas.¹⁰⁵ Firstly, there is the non-appropriation of the territory. The territory is ‘res communis’, it belongs to everybody. As there can be no legal owner of a common heritage space, there can be no public nor private appropriation. This makes controlling and possessing property irrelevant.

Countries would not be able to make territorial claims over the common grounds, which would lead to open access and free use for all mankind.

b) International management organization.¹⁰⁶ Secondly, there is the common management of the resources by representatives of mankind from all nations. There is no place for sovereignty, only participation. The underlying rationale is that a common area belongs to the entire international community, meaning every single person of this community. Consequently, the area should also be managed by everyone for their common interests. This is where a practical difficulty surfaces as it is impossible to collectively manage this operation. As a solution, a specialized management and coordination organization could be put in place. This organization could work on shared management policies.

The free use of common areas has negative consequences for developing nations. Developed nations have more options in accessing these regions compared to developing nations. This could lead to an even bigger

¹⁰⁴ C. PASTORIUS, “Law and Land Policy in the Global Space Industry’s Lift-off”, *Barry L. Rev.* 2013, (201) 227; J. FRAKES, “The Common Heritage of Mankind Principle and the Deep Seabed, Outer Space, and Antarctica: Will Developed and Developing Nations Reach a Compromise?”, *Wis. Int’l L.J.* 2003, (409) 411-413.

¹⁰⁵ J. FRAKES, “The Common Heritage of Mankind Principle and the Deep Seabed, Outer Space, and Antarctica: Will Developed and Developing Nations Reach a Compromise?”, *Wis. Int’l L.J.* 2003, (409) 411.

¹⁰⁶ *Ibid.* 412.

gap between the two. The management policies of this agency should definitely try to counteract these negative consequences.

In practice countries rarely agree, so there is often a lack of unity in these international management cases.

c) Sharing of exploited benefits.¹⁰⁷ Thirdly, there is the element of the active sharing of the acquired exploitation benefits when it comes to common heritage areas. This establishes an obligation for private enterprises to benefit all of mankind in case they want to exploit space resources for profit.

The gained wealth should be shared equitably, but the practical implications of this statement are still unclear. A specialized management organization would have to assume responsibility in this context.

It is important to bear in mind that a singular focus on the sharing of economic benefits could compromise the attention paid to the environmental preservation of the area. This leads us to the next topic, namely the protection and preservation of given resources for the benefit and interest of mankind.

d) Preservation for future generations.¹⁰⁸ Furthermore, the preservation and protection of space for the benefit of future generations should be a major consideration. Resources should be conserved and environments properly protected. The importance of robust preservation policies cannot be overstated, as the depletion of our go-to resources continues at an alarming rate. The improvements in technology should boost cost-effectiveness which should in turn bring about a surge in the use of these scarce resources.

e) Peaceful use of areas and resources.¹⁰⁹ Lastly, there can be no use that clashes with peaceful purposes. As such, the specialized management organization will have to define the boundaries.

These boundaries should cover military applications of space, implying that there can be no stationing of military personnel in these common areas. Weapons should be excluded, as should any military conflict.

Every single nation would benefit from adhering to this principle as each individual nation has a stake in these common areas.

¹⁰⁷ *Ibid.* 412-413.

¹⁰⁸ *Ibid.* 413.

¹⁰⁹ *Ibid.*

61. Interpretations.¹¹⁰ The reading of the common heritage principle and its elements varies between countries. These different interpretations are a consequence of the ambiguity of the principle itself.

Depending on their worldview, countries will have varying interpretations. Multiple elements define these interpretations, such as the needs, wants, interests and values.

Globally, there are two movements: one of the developed nations and one of the developing nations.

The developed nations will allow the common use of these areas, but they also uphold traditions such as the freedom of exploration. These traditions lead to resource exploitation by countries that are in a position to do so. This should ideally lead to the distribution of the exploited resources on a basis of equality. The developed nations would guide this process, and the interests of the developing nations would have to be considered. Since the developed nations would extract the resources, they would lead the charge.¹¹¹

The developing nations' interpretation contrarily uses the principle to realize three major goals. To begin with, they want to stop the monopolization through technology and financing of the common area by developed nations. In addition, they want to play a part in the international management of the common resources. Last but not least, they want to be economically favored by the distribution of benefits because they are less developed. For them, an international committee independent from the exploiting nations would provide the best managing organization.¹¹²

It should be possible to meet both movements' wishes. For each common area, the particular issues should be discussed. Just like developed countries, developing countries do not necessarily want to conserve the areas. They just want a share that they find equitable. In reaching this compromise, an incentive for investment can be established.

62. Critique, tragedy of the commons.¹¹³ It is possible that the common use of an area could maximize the social and economic benefits, but that is not what usually happens. Commonly when a property is open for everybody, the 'tragedy of the commons' will ensue and over-exploitation will hinder the optimization of the property. This is a tried and tested consequence.

¹¹⁰ F. TRONCHETTI, "The Moon Agreement in the 21st Century: Addressing Its Potential Role in the Era of Commercial Exploitation of the Natural Resources of the Moon and Other Celestial Bodies," *J. Space L.* 2010, (489) 505.

¹¹¹ J. FRAKES, "The Common Heritage of Mankind Principle and the Deep Seabed, Outer Space, and Antarctica: Will Developed and Developing Nations Reach a Compromise?," *Wis. Int'l L.J.* 2003, (409) 414.

¹¹² *Ibid.* 415.

¹¹³ C. PASTORIUS, "Law and Land Policy in the Global Space Industry's Lift-off," *Barry L. Rev.* 2013, (201) 226.

This tragedy of the commons is for example becoming fully realized in the form of the space debris problem in Earth's orbit. The use of Earth's orbit should have been more moderate to prevent pollution. Now pollution is becoming an ever-bigger problem.¹¹⁴ This is a very interesting topic for another dissertation.

But realistically, an inequitable or unfair access to the resources will limit this over-use of the space resources. The origin of this inequitable access is twofold. Firstly, there is a scarcity of the relatively reachable resources in outer space. Secondly, there can be a lack of adequate technology to obtain and use the resources. This lack of technology characterizes developing countries. Especially in the space industry there is a big gap between the developed and developing countries.

63. Tragedy of the anti-commons.¹¹⁵ On the other hand, a tragedy of 'anti-commons' could hit the concerned parties. Selective and unequal distribution of the property can lead to under-utilization of all the resources. International space law is in a sense boosting this tragedy, as these international laws can inhibit the growth of the industry.

But the development of the legal frame recently started picking up pace. This evolution that can put the 'anti-commons' concern in perspective. The commercial incentives are becoming far greater, outweighing the factors that led to the stagnation of the space industry, like the uncertainty regarding property rights in Outer Space. But this process is still ongoing.

64. Divisive reception.¹¹⁶ Historically, the common heritage principle had varying degrees of success. This divisive reception can be seen on a plethora of areas, ranging from Antarctica to the deep-seabed and in outer space (also the moon).

Initial rejection came from the clash with the United States' capitalist and the Soviet Union's socialist ideas.

¹¹⁷ The non-appropriation did not fit in with the capitalist mind-set as there would be no incentive without

¹¹⁴ The amplifying effects on pollution are twofold. There is the effect that space junk has on the composition of the radiation belts (Van Allen) and the 'Kessler effect'. The 'Kessler effect' details the self-sustaining process of debris creating more debris supported by the ever-increasing amount collisions that occur between the gradually increasing number of smaller and smaller debris parts; There are multiple initiatives but the costs of 'clean up'-missions are huge; This theory is explained in C. PASTORIUS, "Law and Land Policy in the Global Space Industry's Lift-off", *Barry L. Rev.* 2013, (201) 226; ESA, [The Kessler Effect and How to Stop it](https://m.esa.int/Our_Activities/Space_Engineering_Technology/The_Kessler_Effect_and_how_to_stop_it), [https://m.esa.int/Our Activities/Space Engineering Technology/The Kessler Effect and how to stop it](https://m.esa.int/Our_Activities/Space_Engineering_Technology/The_Kessler_Effect_and_how_to_stop_it), last accessed on 6 May 2018.

¹¹⁵ C. PASTORIUS, "Law and Land Policy in the Global Space Industry's Lift-off", *Barry L. Rev.* 2013, (201) 226.

¹¹⁶ *Ibid.* 227-228.

¹¹⁷ It was first proposed by Maltese representative Arvid Pardo, the father of the Law of the Sea conference in his 1967 speech before the General Assembly calling for international regulations to ensure peace at sea, to prevent further pollution and to protect ocean resources, https://www.un.org/depts/los/convention_agreements/texts/pardo_ga1967.pdf, last accessed

fair economic compensation. And the concept of profiting without working ran counter to the socialist mindset. Only developed countries could work for the profit because they have the technology to do so.

The rejection is also apparent for Treaties that contain the common heritage principle. The United Nations Convention on the Law of the Sea¹¹⁸ was signed but not ratified by the United States and the Moon Treaty of 1982 was only ratified by a small group of countries. The treaties were too limiting for their rights.

Nevertheless, the common heritage of mankind principle has become part of international law. This has happened in mostly environmental settings and for efforts concerning resource management.

And eventually, the biggest space-faring states, including the United States have become more accepting of the principle.

In finding a solution for the space property right problem, the principle could be implemented. The concluding chapter of this dissertation will shed a light on this.¹¹⁹

65. Terra Nullius.¹²⁰ To offer a closing remark, the principle should be distinguished from the Lockean ‘terra nullius’ philosophy. These ideas could also help avoid title-conflicts as land would belong to no-one. This directly contrasts the res communis ideas and the common heritage of mankind principle. Locke theorized that mixing labor with the ‘terra nullius’ land would give a title. This would lead to the acquisition of titles for extraterrestrial territory by mixing labor with the land, irrespective of state or origin.

b. Application of the Principle: The Public Trust Doctrine

66. Public trust.¹²¹ The common heritage of mankind principle has been applied throughout history in the form of the ‘public trust’ doctrine.¹²² However, this application is problematic in outer space.

on 3 May 2018; C. PASTORIUS, “Law and Land Policy in the Global Space Industry's Lift-off”, *Barry L. Rev.* 2013, (201) 226-227.

¹¹⁸ Convention on the Law of the Sea of 10 Dec. 1982 (**LOS Convention**), *UNTS* Vol. 1835, 3.

¹¹⁹ *Infra* No. 164 *et seq.*

¹²⁰ C. PASTORIUS, “Law and Land Policy in the Global Space Industry's Lift-off”, *Barry L. Rev.* 2013, (201) 223-224; J. LOCKE, *Two Treatises of Government*, Awnsham Churchill, 1689, 220-221, §32.

¹²¹ C. PASTORIUS, “Law and Land Policy in the Global Space Industry's Lift-off”, *Barry L. Rev.* 2013, (201) 224-226, 229; F. VON DER DUNK, H.R. HERTZFELD, “Bringing Space Law into the Commercial World: Property Rights without Sovereignty”, *Chi. J. Int'l L.* 2005-2006, (81) 84-85.

¹²² E.g. in Roman law and now Common law; C. PASTORIUS, “Law and Land Policy in the Global Space Industry's Lift-off”, *Barry L. Rev.* 2013, (201) 229.

The doctrine proposes that states possess all the property rights of the common areas. While these states remain the owners, they can subsequently convey usage rights of the property to its residents – possibly private enterprises. This results in a division between the rights of the state and the rights conveyed to its residents. Both parties have their own interests in owning the area and using its resources, but the state’s interest is the primary concern.

Article I of the Outer Space Treaty seemingly creates such a public trust situation. However, states do not have the purposed sovereignty over outer space that is necessary in the public trust doctrine. Sovereign control over real property by a state is needed before any rights can be conferred to private actors. States do not have this control in outer space and as a result, states would not be able to recognize private ownership there.

§2. National Space Law

67. Even though space activities have an intrinsic international character, there is a growing amount of national space legislation. The original international framework remains intact, but several national space laws are beginning to take center stage. This evolution is caused in part by the growing number of private enterprises in the space industry. States want to offer these private enterprises a solid legal ground to start their businesses on.¹²³

68. Consequence of privatization.¹²⁴ Private enterprises and governments of a lot of countries are interested in the NewSpace Industry developments because in the foreseeable future it can provide them with a lot of exciting applications and substantial economic advantages.¹²⁵ The existing international framework however is not very supportive of these new uses of outer space. As a result, the qualified government bodies will have to devise new national rules. The needs of the private enterprises are taken care of on a national level.

¹²³ S. HOBE, “The Impact of New Developments on International Space Law (New Actors, Commercialisation, Privatisation, Increase in the Number of “Space-faring Nations”), *Rev. dr. unif.* 2010, (869) 879-880; P. DE MAN, “State Practice, Domestic Legislation and the Interpretation of Fundamental Principles of International Space Law”, *Space Policy* 2017, 92-93.

¹²⁴ D. LINDEN, “The Impact of National Space Legislation on Private Space Undertakings: Regulatory Competition vs. Harmonization”, *JSPG* 2016, (1) 2.

¹²⁵ A. MORRIS, “Intergalactic Property Law: a New Regime for a New Age”, *Vand. J. Ent. & Tech. L.* 2017, (1085) 1090.

For now, this national legislation can meet the absence of a new international umbrella-treaty. This and other ways to cater to the privatization of outer space will be studied later in this dissertation.¹²⁶

69. National differences leading to regulatory competition.¹²⁷ For the most part, there is a large discrepancy between the legal frames in different countries. The needs and activities of different countries result in varying rules.

Bearing in mind the enormous gains this new industry can bring, governments will maneuver in a pole position. A lot of times, the governments want to attract certain investors and enterprises and will start regulating with that in mind. For instance, as part of the exploitation of celestial bodies, the governments will create a legal frame for entrepreneurs, with regards for liability, registration and property rights for the acquired extraterrestrial products.

This variety in national space law results in a choice-based modus operandi for the private enterprises. This makes it possible for an enterprise's goals to align with the legal framework of a country. As such, regulatory competition is born.

For example, the Grand Duchy of Luxembourg wants to present itself as the European authority on space mining.¹²⁸ In doing so, they have passed a very supportive national law. This topic will also be discussed later in this dissertation.¹²⁹

Space legislators were used to avoiding additional regulatory competition in their field, but these recent evolutions are threateningly close to completely abolishing this state of mind.

70. Relationship to international law.¹³⁰ Following a monistic approach, the national legislation has to color between the lines drawn by the international framework space law. The states will make sure the internationally agreed upon rules will still be followed.

¹²⁶ *Infra* No. 123 *et seq.*

¹²⁷ D. LINDEN, "The Impact of National Space Legislation on Private Space Undertakings: Regulatory Competition vs. Harmonization", *JSPG* 2016, (1) 1.

¹²⁸ H. SIDDIQUE, "Luxembourg aims to be big player in possible asteroid mining", *The Guardian* 2016, <https://www.theguardian.com/science/2016/feb/03/luxembourg-aims-to-be-big-player-in-possible-asteroid-mining>.

¹²⁹ *Infra* No. 96 *et seq.*

¹³⁰ IISL DIRECTORATE OF STUDIES, *Does International Space Law Either Permit or Prohibit the Taking of Resources in Outer Space and on Celestial Bodies, and how is this Relevant for National Actors? What is the Context, and What are the Contours and Limits of this Permission or Prohibition?*, unpublished background paper, 2016, 8, http://iislweb.org/docs/IISL_Space_Mining_Study.pdf, last accessed on 4 May 2018.

National legal frameworks are shaped and limited by general international law and international space law.¹³¹ The national interpretation of international space law defines the frame in which national space law can be created. If not its nationals, at least the state will have to adhere to international space law and cannot contradict it.

Even though the United States act as though believing the opposite, professor S. HOBE, a space law expert exclaims that “*outer space and all non-man-made objects it entails are subject to international regulation, I repeat international regulation, not national regulation.*”¹³²

A dualistic approach on the other hand prioritizes national constitutional law and ranks an international legal framework on the same place as statutory law.

However, some principles enshrined in the international legal framework have reached the status of international customary law and should thus be adhered to at all times.¹³³

71. Different national interpretation of international law. Each state party has their own understanding of the treaties. Different national interpretations of the international legal framework will lead to the creation of dissimilar national laws.¹³⁴ With this in mind it is interesting to have a closer look at the different approaches.

Generally speaking, the different national law systems can be categorized into three distinctly different approaches.

On the one hand, there are the countries – with the United States taking the lead – that interpret the international space law as being only applicable to states parties and not to its nationals.¹³⁵

¹³¹ D. LINDEN, “The Impact of National Space Legislation on Private Space Undertakings: Regulatory Competition vs. Harmonization”, *JSPG* 2016, (1) 4.

¹³² D. WERNER, “Space Law Workshop exposes rift in legal community over national authority to sanction space mining”, *SpaceNews* 2018, <http://spacenews.com/space-law-workshop-exposes-rift-in-legal-community-over-national-authority-to-sanction-space-mining/>, last accessed on 3 May 2018.

¹³³ *Supra* No. 24.

¹³⁴ IISL DIRECTORATE OF STUDIES, *Does International Space Law Either Permit or Prohibit the Taking of Resources in Outer Space and on Celestial Bodies, and how is this Relevant for National Actors? What is the Context, and What are the Contours and Limits of this Permission or Prohibition?*, unpublished background paper, 2016, 34, http://iislweb.org/docs/IISL_Space_Mining_Study.pdf, last accessed on 4 May 2018.

¹³⁵ *Infra* No. 87 *et seq.*

On the other hand, there are the countries that will extend the application of international space law to their nationals.¹³⁶

In academic writing, there is also a drastic movement that wants to completely abandon the existing international framework of space law.¹³⁷

This discrepancy will become more evident by looking at concrete applications in the space industry, like space-mining. In the next chapter, among other things, the space property rights problem will be discussed. Here the different national interpretations will be examined in-depth.

¹³⁶ *Infra* No. 99 *et seq.*

¹³⁷ *Infra* No. 79 *et seq.*

Chapter III. Can the Existing Legal Framework Support the Evolutions in the Space Industry?

72. As previous chapters served the purpose of familiarizing the reader with the NewSpace Industry and its legal context, this chapter will deal with the crux of the matter. Some of the discussed elements already alluded to the legal question at hand: Can the existing legal framework support the current evolutions in the space industry?¹³⁸

Is it possible for private enterprises to thrive in a predominantly antiquated legal context? The international legal framework was drawn up in a time when the legislators did not think of private enterprises in outer space. This was demonstrated in the chapter above, as private enterprises were never fully addressed in the international legal texts, nor did lawmakers think of this scenario.¹³⁹

73. As a result, privatization of outer space will clash with the existing legal framework and private enterprises will encounter several legal problems. The more superficial and clear legal problems were already unearthed when detailing the existing legal framework in the previous chapter. In examining the treaties' provisions, it became clear that these were not fully prepared for the rise of private enterprises. The liability regime for example, is not adjusted to private enterprises, nor is the registration regime.¹⁴⁰

In order to understand whether the use of the existing legal framework is still workable for private enterprises in outer space, this chapter will examine some specific NewSpace industries and the legal problems they face. National law, state practices and doctrine will offer insight in how the private enterprises can overcome these hurdles.

The space exploitation and space tourism and transportation industries will be featured extensively in this chapter as they face the most widely contested and intricate legal problems.¹⁴¹

A thorough research regarding commercial remote sensing lies outside the scope of this dissertation.

¹³⁸ P.J. BLOUT, "Renovating Space: The Future of International Space Law", *Denv. J. Int'l L. & Pol'y* 2011, (515) 523.

¹³⁹ *Supra* No. 18.

¹⁴⁰ *Supra* respectively No. 33 and No. 52.

¹⁴¹ *Infra* respectively No. 74 *et seq.* and No. 104 *et seq.*

§1. The Legal Problems in Specific Industries

A. The Exploitation Industry (Space Mining)

74. The exploitation industry is becoming increasingly relevant as private enterprises are specializing in space mining. For example, Planetary Resources is already testing the key technologies needed for future asteroid prospecting.¹⁴² Enterprises are hoping to eventually exploit raw materials from asteroids and possibly other minor planets. Near-Earth objects will be the primary focus when mining for these space resources.

But firstly, these private enterprises will have several legal hurdles to overcome. As former president of the International Institute of Space Law (IISL) and Deputy Director of the International Institute of Air and Space Law at Leiden University, Professor TANJA MASSON-ZWAAN expressed in a recent tweet:¹⁴³

“biggest killer of #spacemining business will be legal uncertainty. We do need rules, but good ones, [...]#spacelaw #spaceresources”

a. The Property Problem

75. The property rights discussion takes centerstage in the exploitation industry. In short, private enterprises will want legal certainty regarding the ownership of space resources they unearth. Ideally these private enterprises will have property rights in outer space.

The common heritage of mankind principle as outlined above,¹⁴⁴ will be featured frequently in this part of the dissertation.

76. The main stumbling block is the non-appropriation principle of the Outer Space Treaty¹⁴⁵ and the Moon Treaty.¹⁴⁶ This international principle establishes that there will be no ownership over outer space or parts of it. There is thus no legal ground for property rights in outer space, on the contrary, their very existence seems to be excluded. By design, the principle clashes with the wants of private space mining enterprises and is unsupportive of an exploitation-based industry in outer space.

¹⁴² <https://www.planetaryresources.com/missions/arkyd-6/>, last accessed on 3 May 2018.

¹⁴³ <https://twitter.com/tanjamasson>, last accessed on 3 May 2018.

¹⁴⁴ *Supra* No. 59 *et seq.*

¹⁴⁵ Article II Outer Space Treaty.

¹⁴⁶ Article 11 Moon Treaty.

States will approach this problem in various ways.

77. Three varying approaches.¹⁴⁷ As discussed earlier in this dissertation,¹⁴⁸ states differ in their application of international space law. Theoretically there are currently three different approaches to the property rights problem. A loyal, a middle ground and a radical approach can be distinguished. Depending on their internal goals, states will choose to support one of them.

These varying approaches are a consequence of the possibility to interpret the non-appropriation provision of Article II of the Outer Space Treaty in different ways. This perceived ambiguity is in turn the cause for disagreement in the legal doctrine.

78. Interpretation and context.¹⁴⁹ Commonly, if there are different takes on a treaty, the issue would be resolved by researching the preparatory works for the text and analyzing the intentions of the parties. Another interpretational technique would be analyzing the plain meaning of the text. However, doing so with Article II of the Outer Space Treaty only leads to the conclusion that it is a very conflicted and zeitgeist-influenced provision.

The wording of the provision is intentionally ambiguous. The text was conceived this way because the parties – the United States and the Soviet Union - were in conflict and tried to reach a compromise.¹⁵⁰ In the context of the Cold War, the socialist and capitalist ideas clashed and various economic models were being preached. These glaring political and socio-economic contrasts affected the implementation of the property rights idea in the Outer Space Treaty. The context thus explains the non-singular legal meaning of the wording, purposely kept vague. As a result, there is no international consensus on the interpretation of the provision.

There is also no prospect of an international consensus arriving soon, so it is important to monitor the different national approaches. As each approach spawns from states' internal economic and political needs and objectives, they are very different from each other. The radical, middle ground and loyal approach respectively will now be discussed in more detail.

¹⁴⁷ C. PASTORIUS, "Law and Land Policy in the Global Space Industry's Lift-off", *Barry L. Rev.* 2013, (201) 220.

¹⁴⁸ *Infra* No. 71.

¹⁴⁹ C. PASTORIUS, "Law and Land Policy in the Global Space Industry's Lift-off", *Barry L. Rev.* 2013, (201) 221-222.

¹⁵⁰ C. D. JOHNSON, "The Outer Space Treaty at 50", *The Space Review* 2017, <http://www.thespacereview.com/article/3155/1>, last accessed on 3 May 2018.

i. The Radical Approach

79. The radical approach is not very vocal but it highlights some of negative sides of the non-appropriation principle and the more moderate approaches that back this principle. For its critical quality alone, it will be dealt with first as it offers perspective on what comes next. It should be noted however that the radical approach is mainly an theoretical movement without footing in state practice.

In essence.¹⁵¹ The approach rejects the non-appropriation principle embedded in the international framework of space law entirely, as this approach interprets the non-appropriation principle as a full prohibition of appropriation by states as well as private enterprises. This interpretation will be different for the middle ground regime, where the non-appropriation principle only applies to states.

The radical theoreticians start from the idea that the government on its own will not be able to meet the commercial spacefaring demands, and the private enterprises will be key to the development of commercial space activities. This is a realistic prediction and a sound theoretical starting point. As a result, they see the current international legal framework as a big obstacle towards reaching the privatization goals. In brief, the legal framework hinders growth of the space industry by making space resources non-appropriable. The existing international rules have an inhibiting nature and lack attention to private enterprises. This follows from the changed geopolitical context in which they were drafted.¹⁵²

Furthermore, the radical approach leans heavily on the belief that the current legal framework – especially the Outer Space and Moon Treaties – are inadequate because they are based on the common heritage of mankind principle, of which the supporters of the approach are very critical. As the principle is interwoven with the current legal framework, they do not believe in the success of the existing system.¹⁵³

80. Common heritage of mankind principle.¹⁵⁴ The radical approach is indeed very critical of the common heritage of mankind principle. The radical approach believes this principle will prohibit commercial undertakings, as it undermines any incentive for production by equally distributing all gains. A principle of community ownership gives non-laboring and non-investing parties a reward, which makes

¹⁵¹ J. THOMAS, “Privatization of Space Ventures: Proposing a Proven Regulatory Theory for Future Extraterrestrial Appropriation”, *Int'l L. & Mgmt. Rev.* 2005, 193 and (191) 202-203.

¹⁵² P.J. BLOUT, “Renovating Space: The Future of International Space Law”, *Denv. J. Int'l L. & Pol'y* 2011, (515) 523.

¹⁵³ J. THOMAS, “Privatization of Space Ventures: Proposing a Proven Regulatory Theory for Future Extraterrestrial Appropriation”, *Int'l L. & Mgmt. Rev.* 2005, (191) 196.

¹⁵⁴ *Ibid.* 204.

it acceptable for them to continue in the same vein. This is in contrast to the heavy-investor and heavy-producer, who will get demotivated by not being able to reap the full benefits of their labor.

A strict application is problematic.¹⁵⁵ The contemporary legal frame is rooted in the common heritage of mankind principle which makes outer space ‘res communis’. In practice, this would result in some hiccups. The following problems can be distilled mostly from J. THOMAS’ writing:

-Dangerous.¹⁵⁶ The radical approach believes it to be an inherently dangerous principle that can be easily abused. They cite the assumptions made by the historic colonists as an example. The belief that the newly discovered land was theirs for the taking, lead to a lot of unfairness and tragedy.

-Unrealistic because too idealistic.¹⁵⁷ The radical approach intends to point out a faulty premise: humankind will be able to share the common space resources. This is basically teamwork on a global level, but rarely has this been achieved. Certainly at present, this will be too difficult as most states interested in outer space are ruled by politics, economy and competition, which clashes with the principles of teamwork. The mindset of the Outer Space Treaty and the Moon Treaty seems a bit too uncompromising in perspective.

Especially in the Western world, an applied res communis theory has not had a lot of success. In some particular societies, it was more successful, e.g. in the Aboriginal communal society in the Australian Outback and multiple communal societies in Africa. But it can be laconically pointed out that these societies as of now have virtually zero input in the development of the space industry.

But if it is possible to cooperate on this level, is the res communis ideal achievable? It could be argued that our modern society clings too hard to capitalism to implement these ideas. These communal societies have radically different values and worldviews. The communal society is considered the way of the past. Communal experiments in a capitalistic society for example oftentimes fail. In the end they revert to an individual ownership system.¹⁵⁸

¹⁵⁵ J. THOMAS, “Privatization of Space Ventures: Proposing a Proven Regulatory Theory for Future Extraterrestrial Appropriation”, *Int’l L. & Mgmt. Rev.* 2005, (191) 208-212; M. J. LISTNER, “It’s time to rethink international space law”, *The Space Review* 2005, <http://www.thespacereview.com/article/381/1>, last accessed on 3 May 2018.

¹⁵⁶ J. THOMAS, “Privatization of Space Ventures: Proposing a Proven Regulatory Theory for Future Extraterrestrial Appropriation”, *Int’l L. & Mgmt. Rev.* 2005, (191) 211-212.

¹⁵⁷ *Ibid.* 203, 206-209.

¹⁵⁸ E.g. The Church of Jesus Christ of Latter-day Saints in 19th century America wanted to form the perfect Christian utopia through a self-sufficient community. A United Order was brought upon its servants, in the hopes of abolishing persecution, poverty and disparate wealth. The Church would gain all property which it would in turn let its servants steward. The distribution would happen fairly and by laboring, surpluses could be gained. But in the end, the entire system failed because of perceived inequality and greed in the distribution process; this is an example from J. THOMAS, “Privatization of Space

The radical approach focusses on a vision of today's society where practical matters and corporate contemplations rule the day. Here, the government would seemingly only operate in the background, while society life takes place in a business environment. Here, all businesses aspire to be lucrative. In turn, space business should also be lucrative.

Furthermore, the existing international legal framework would not belong in this dog-eat-dog competitive reality fueled by global capitalism. It openly clashes with our existing property jurisprudence as the rules of this framework are formulated with a utopian society in mind.

A total non-ownership of property in space would clash with the logical evolutions in the industry. In this worldview, the *res communis* idea has no basis in reality and should be confined to philosophical discussions.

As the common heritage of mankind principle is idealistic and does not fit with the radical approach's view of human nature, there is the belief that the industry would thrive under a more realistic mindset.

However, it could be argued that this perspective is very one-sided, focusing only on capitalistic values. A broader vision would be appreciated. Space, being the final frontier, could mean a new beginning for mankind. With lessons learned from the past and the common goal to durably exploit outer space for all mankind, perhaps a smart and fitting regime could be instated.

-Slowing down development of outer space exploration.¹⁵⁹ Another consequence of the fact that neither private nor public enterprises could appropriate outer space or parts of it, is the slowing down of the development of outer space exploration because any possible incentive to go to space is taken away. If governments invest their residents' tax money, there would be no directly correlating gain for them, which would make it immensely hard to justify decisions involving space exploration. This will be further explored when examining the struggle between developing and developed countries.¹⁶⁰

Ventures: Proposing a Proven Regulatory Theory for Future Extraterrestrial Appropriation", *Int'l L. & Mgmt. Rev.* 2005, (191) 203.

¹⁵⁹ J. THOMAS, "Privatization of Space Ventures: Proposing a Proven Regulatory Theory for Future Extraterrestrial Appropriation", *Int'l L. & Mgmt. Rev.* 2005, (191) 206-207.

¹⁶⁰ *Infra* No. 83.

-In case of scarcity: black market and armed conflict.¹⁶¹ If in some way scarcity develops in a res communis society, this could lead to disastrous results.

There is a parallel with the Lockean situation. When the community can fall back on Locke's principles of property endowment, the community is the owner of all property. Individuals are permitted to make use of some of the property, excluding other individuals of the community. This happens when individuals mix their labor with property. This is a healthy system if there is enough left for the other individuals. But the situation will go awry in case of scarcity. The community will be placed against the individual and conflict may arise. The Lockean principles will not be fitting when faced with the reality of scarcity.

Whenever there is a regime of common ownership in place in the case of a potential shortage, there is the risk that a black market may arise as a result. Taking it even further, actual armed conflicts may develop.

Even if the universe is immeasurable, with an infinite number of planets and space resources, in the first stages of space exploitation, the technological and financial restraints will result in an inevitable scarcity. Time management is also a consideration, as traveling to another planet or an asteroid takes a considerable amount of time and preparation. This makes the practical application of the res communis idea in space problematic.

-Hindrance to the colonization of outer space.¹⁶² Even more so, non-appropriation could hinder the potential colonization of outer space. A prohibition of private and national appropriation would lead to distinctive legal problems as settlers would have no legal control over their grounds and the available resources. At any moment, the occupied 'property' could be repurposed for the benefit of all mankind. Logically this will lead to a lack of motivation and be detrimental to the colonization movement.

81. Outer Space Treaty.¹⁶³ Although not featuring the common heritage of mankind principle directly, this treaty was clearly drafted with the principle's application in mind. There is the express non-appropriation principle in Article II and on top of that, the treaty designates the celestial bodies for peaceful purposes and scientific research.¹⁶⁴ The Outer Space Treaty clearly does not establish a legal order for the

¹⁶¹ J. THOMAS, "Privatization of Space Ventures: Proposing a Proven Regulatory Theory for Future Extraterrestrial Appropriation", *Int'l L. & Mgmt. Rev.* 2005, (191) 209-210.

¹⁶² *Ibid.* 206.

¹⁶³ *Ibid.* 198-200; M. J. LISTNER, "It's time to rethink international space law", *The Space Review* 2005, <http://www.thespacereview.com/article/381/1>, last accessed on 3 May 2018; Z. ABBANY, "Interview with Christopher J. Newman: Outer Space Treaty, another one for Trump to dump", *Deutsche Welle News* 2017, <http://www.dw.com/en/outer-space-treaty-another-one-for-trump-to-dump/a-39077097>, last accessed on 3 May 2018.

¹⁶⁴ Article I Outer Space Treaty.

commercial use of outer space as it consist of mostly basic provisions and it even purposely restricts freedom in outer space.¹⁶⁵

Adhering to the treaty, even the developed countries – that finance the biggest part of space related undertakings – are forbidden from appropriating outer space. Thus, no single country can have more of outer space. Consequently, both developed and developing countries should gain equally from outer space. This means that making an investment will not matter at all or only on a reputational level.

As a reaction, some developed nations have maintained a rather loose interpretation of the relevant Outer Space Treaty provisions, and in this process negated the purpose of the text. This will be highlighted when discussing the United States’ middle ground approach.¹⁶⁶ If the purpose of this text is defeated, should it still exist? This is a question the radical approach justifiably asks.

82. Moon Treaty.¹⁶⁷ Contrary to the Outer Space Treaty, the Moon Treaty expressly uses the label ‘common heritage of all mankind’ in Article 4. It delves deeper into the practicalities connected to the ideals expressed in the Outer Space Treaty, implementing an idealistic regime. The moon and its resources are the common heritage of mankind. A regulatory regime should also be put in place. This treaty for one thing ensures a *de facto* moratorium on space exploration until a workable regime is instated. Just like the Outer Space Treaty, this treaty does not establish a legal order for the commercial use of outer space, it only hints at it. In a way it even actively works against it and in the process, it raises more questions than answers.¹⁶⁸

Once more, the developed countries will have no incentive to invest if the case remains that non-funding developing countries will receive the same gains.

¹⁶⁵ S. HOBE, “The Impact of New Developments on International Space Law (New Actors, Commercialisation, Privatisation, Increase in the Number of “Space-faring Nations””, *Rev. dr. unif.* 2010, (869) 878-879.

¹⁶⁶ *Infra* No. 87 *et seq.*

¹⁶⁷ J. THOMAS, “Privatization of Space Ventures: Proposing a Proven Regulatory Theory for Future Extraterrestrial Appropriation”, *Int’l L. & Mgmt. Rev.* 2005, (191) 200-202; M. J. LISTNER, “It’s time to rethink international space law”, *The Space Review* 2005, <http://www.thespacereview.com/article/381/1>, last accessed on 3 May 2018.

¹⁶⁸ S. HOBE, “The Impact of New Developments on International Space Law (New Actors, Commercialisation, Privatisation, Increase in the Number of “Space-faring Nations””, *Rev. dr. unif.* 2010, (869) 879; F. TRONCHETTI, “The Moon Agreement in the 21st Century: Addressing Its Potential Role in the Era of Commercial Exploitation of the Natural Resources of the Moon and Other Celestial Bodies”, *J. Space L.* 2010, (489) 518-519.

The reasoning behind this provision's workings however is very understandable, as the provision stresses the interests of present and future generations and the promotion of durable economic and social development.¹⁶⁹

Even though most countries are party to the Outer Space Treaty, most countries refuse to ratify or sign the Moon Treaty. Even though it bolsters ideas similar to the ones in the Outer Space Treaty, this newer treaty seems impractical and contrasts most countries' philosophical ideas.

83. The radical approach views both treaties as being very unfair, stating that the investing developed countries are at a big disadvantage, which could justify their refusal of these space exploration related treaties.¹⁷⁰

But this unfair treatment should be put in perspective as the developing countries will also be able to have input. Developing countries could to their fullest capacity contribute to the decrease of manufacturing and labor costs. This can have a big influence on the industry and the developing countries should be compensated appropriately. However, the radical approach would suggest foregoing the attribution of appropriated space resources or a monetary equivalent as the payment for their services alone would have to suffice. Granting an additional reward in the form of appropriated property would clash with the capitalistic principles in place.

Supporters of the radical approach favor the capitalistic principles as they think these will incite all parties to develop and produce by paying them proportional rewards. This might however lead to an unequal distribution of wealth. A fairer system could be instated. In this system, developing countries contributing to their fullest extent would be rewarded equally as the developed countries that contribute to their fullest extent. The radical approach puts developing countries at a disadvantage by only rewarding them for what they are able to contribute. In this way, their potential reward is restricted by their economic situation rather than by the extent of their contribution.¹⁷¹

¹⁶⁹ Article 4.1 Moon Treaty.

¹⁷⁰ J. THOMAS, "Privatization of Space Ventures: Proposing a Proven Regulatory Theory for Future Extraterrestrial Appropriation", *Int'l L. & Mgmt. Rev.* 2005, (191) 205.

¹⁷¹ *Contra Ibid.*

84. On a side note, a similar struggle between developing and developed nations characterized the legal debate concerning Antarctica.¹⁷² While developing nations want to fall back on a direct implementation of the common heritage of mankind principle, developed nations want to opt for a more open and free regime.

85. Abandonment of the Outer Space Treaty.¹⁷³ Ultimately, the radical approach would propose to abandon the existing legal framework altogether. It pushes to purposely ignore the Outer Space Treaty – the Moon Treaty is already very widely ignored –, in order to eventually replace it with laws based in established principles such as capitalism, property rights and fairness.

This will however clash with the approach of most of the other states parties, who will claim that the provisions of the Outer Space Treaty have reached the status of customary international law.¹⁷⁴ Consequently, it is believed that there are two ways around this issue.

A) Fundamental change of circumstances.¹⁷⁵ Firstly, the context in which the Outer Space Treaty was drafted and signed was vastly different from the contemporary one. This huge shift implies a fundamental change of circumstances, which in itself can suffice to justify shifting aside the treaty.

This legal doctrine is called ‘*clausula rebus sic stantibus*’¹⁷⁶ and provides an escape of sorts from the ‘*pacta sunt servanda* rule’, which states that agreements should be kept. But as the integrity of treaties is at stake, this should be handled with great care.

This principle is expressed in the Vienna Convention on the Law of Treaties.¹⁷⁷ In section 3, termination and suspension of the operation of treaties is handled. Article 62 specifies the fundamental change of circumstances:

¹⁷² J. FRAKES, “The Common Heritage of Mankind Principle and the Deep Seabed, Outer Space, and Antarctica: Will Developed and Developing Nations Reach a Compromise?”, *Wis. Int’l L.J.* 2003, (409) 429.

¹⁷³ J. THOMAS, “Privatization of Space Ventures: Proposing a Proven Regulatory Theory for Future Extraterrestrial Appropriation”, *Int’l L. & Mgmt. Rev.* 2005, (191) 212; T.S. TWIBELL, “Space Law: Legal Restraints on Commercialization and Development of Outer Space”, *UMKC L. Rev.* 1996-1997, (589) 640-641; M. J. LISTNER, “It’s time to rethink international space law”, *The Space Review* 2005, <http://www.thespacereview.com/article/381/1>, last accessed on 3 May 2018.

¹⁷⁴ K. A. BACA, “Property Rights in Outer Space”, *J. Air L. & Com.* 1992-1993, (1041) 1068.

¹⁷⁵ J. THOMAS, “Privatization of Space Ventures: Proposing a Proven Regulatory Theory for Future Extraterrestrial Appropriation”, *Int’l L. & Mgmt. Rev.* 2005, (191) 213-217.

¹⁷⁶ A. HECHE, “Les Conditions d’Application de la *Clausula Rebus Sic Stantibus*”, *Rev. BDI* 2014, (322) 322-323.

¹⁷⁷ Vienna Convention on the Law of Treaties of 23 May 1969, *UNTS* Vol. 1155, 331.

“1. A fundamental change of circumstances which has occurred with regard to those existing at the time of the conclusion of a treaty, and which was not foreseen by the parties, may not be invoked as a ground for terminating or withdrawing from the treaty unless:

(a) the existence of those circumstances constituted an essential basis of the consent of the parties to be bound by the treaty; and

(b) the effect of the change is radically to transform the extent of obligations still to be performed under the treaty.

2. A fundamental change of circumstances may not be invoked as a ground for terminating or withdrawing from a treaty:

(a) if the treaty establishes a boundary; or

(b) if the fundamental change is the result of a breach by the party invoking it either of an obligation under the treaty or of any other international obligation owed to any other party to the treaty.”

3. If, under the foregoing paragraphs, a party may invoke a fundamental change of circumstances as a ground for terminating or withdrawing from a treaty it may also invoke the change as a ground for suspending the operation of the treaty.” (underlining by author of this dissertation)

This principle is widely regarded as customary international law and a classic concept in legal doctrine. Case law concerning this doctrine has a rich history¹⁷⁸ even before being encapsulated in the Vienna Convention. However, it has never before been applied to international space law.

The element of not being able to foresee the fundamental change is essential and it can be argued that the rise of the private enterprises in outer space could not have been foreseen by the parties to the Outer Space Treaty. Private enterprises’ obligations reach much further and are more pressing now than ever before. At the time of the signing of the treaty, governments were the primary actors and the privatization of outer space was not considered at all.

¹⁷⁸ There is even a ‘rebus sic stantibus’ case dating back to 211 BC as recorded by Polybius. Lyciscus of Acarnania noted that there were fundamentally changed circumstances between the Lacedaemonians and the Aetolian League. This argument would be used to abandon the Treaty between the parties; https://en.wikipedia.org/wiki/Clausula_rebus_sic_stantibus.

No government with a space program would have predicted the decrease of their importance in space. The zeitgeist was completely different when the Outer Space Treaty was formally presented in 1967. This is evident when outlining the three major changes that have happened since.

-Political change.¹⁷⁹ At the time, in the midst of the Cold War, the ruling space powers – the United States and the Soviet Union – had only one objective: winning the space race. A big power struggle ensued which led to them rapidly joining the Outer Space Treaty in fear of missing out.

The current political climate is another beast entirely. Nobody is concerned with winning the space race anymore. State's space agendas and private enterprises with economic concerns¹⁸⁰ rule the day.

-Technological change.¹⁸¹ Furthermore, the advancement of space-related technology could not have been predicted by the signing states. At the time, many would not have believed it possible to mine in space or to have a tourist trip to the moon. Now this reality dawns rapidly upon us. Two years after the formal presentation of the Outer Space Treaty, the United States astounded the world with the Apollo moon landing. Space vehicles are becoming much cheaper and more advanced, and concrete plans to build a moon village¹⁸² are in the works.

-Privatization.¹⁸³ The last fundamental change is the privatization of outer space itself. Private enterprises are becoming more active – and quite possibly more important – in space than government agencies. These enterprises are built on strong beliefs but also on financial incentives.

Eventually, these three changes could be considered fundamental enough to justify the use of Article 62 of the Vienna Convention.

¹⁷⁹ J. THOMAS, "Privatization of Space Ventures: Proposing a Proven Regulatory Theory for Future Extraterrestrial Appropriation", *Int'l L. & Mgmt. Rev.* 2005, (191) 215-216.

¹⁸⁰ Wining the Ansari X Prize, gathering intellectual property and contracting with global companies and governments; J. THOMAS, "Privatization of Space Ventures: Proposing a Proven Regulatory Theory for Future Extraterrestrial Appropriation", *Int'l L. & Mgmt. Rev.* 2005, (191) 216.

¹⁸¹ J. THOMAS, "Privatization of Space Ventures: Proposing a Proven Regulatory Theory for Future Extraterrestrial Appropriation", *Int'l L. & Mgmt. Rev.* 2005, (191) 216-217.

¹⁸² ESA, Moon Village, a Vision for Global Cooperation and Space 4.0, https://m.esa.int/About_Us/Ministerial_Council_2016/Moon_Village, last accessed on 3 May 2018.

¹⁸³ J. THOMAS, "Privatization of Space Ventures: Proposing a Proven Regulatory Theory for Future Extraterrestrial Appropriation", *Int'l L. & Mgmt. Rev.* 2005, (191) 216.

With these changes in mind, it seems logical that twelve years after the Outer Space Treaty, the Moon Treaty would not be accepted as widely. The effects of these changes were becoming more visible and countries could not rally behind a more realized version of the Outer Space Treaty.

B) Inspiring a widespread abandonment.¹⁸⁴ Another way around the issue could consist of a state individually abandoning the Outer Space Treaty and not adhering to the non-appropriation principle. The radical scholars believe the state can thus inspire a widespread abandonment of the Treaty. Although unlawful, their belief is that if enough states will join this course of action, rule of law will have to comply.

The appropriation could be guided by simply persevering in their reservations and interpretations of the Outer Space Treaty.

This however seems to be a very dangerous and opportunistic tactic, making room for grossly exaggerated actions by the highly developed countries and property owners. If it is possible for the developing and developed states to mutually abandon the treaty, this is the preferred way to go.

86. Conclusion. These radical academics definitely expose the weaknesses of the existing legal framework concerning property rights in outer space. However, they possibly take their beliefs a bridge too far, as a more balanced version of the common heritage of mankind principle can possibly contribute to reaching a workable solution.¹⁸⁵

ii. The Middle Ground Approach

87. A clear example of a slightly less radical outlook on the property rights discussion can be found in the recent practices of the United States.¹⁸⁶ They take a middle ground approach, as they balance between the radical and loyal approach. Before elaborating on these national practices¹⁸⁷ however, the theory of the middle ground approach will firstly be explained in its global context.

¹⁸⁴ *Ibid.* 217-218; T.S. TWIBELL, “Space Law: Legal Restraints on Commercialization and Development of Outer Space”, *UMKC L. Rev.* 1996-1997, (589) 640-641; A. MORRIS, “Intergalactic Property Law: a New Regime for a New Age”, *Vand. J. Ent. & Tech. L.* 2017, (1085) 1103-1105.

¹⁸⁵ *Infra* No. 164 *et seq.*

¹⁸⁶ V. BLANCHETTE-SÉGUIN, “Reaching for the Moon: Mining in Outer Space”, *N.Y.U. J. Int’l L. & Pol.* 2017, (959) 964-966.

¹⁸⁷ *Infra* No. 91 *et seq.*

88. In essence.¹⁸⁸ This approach makes use of the ambiguity in the international legal texts regarding property rights. ‘National appropriation’ is interpreted very plainly, arguing that appropriation by sovereign states is barred, but accepting that appropriation by private (non-sovereign) actors is permitted. It boils down to the fact that states will have to follow the international legal framework, but private enterprises can have property rights in outer space, which are conferred to them by solely by national space law.

89. Main substantiation.¹⁸⁹ A total non-appropriation of property is seen as practically unworkable as the supporters of this approach believe that the process of unlocking the full potential of outer space would be hindered by it. With the ‘full potential of outer space’, they hint at the commercial exploitation by competitive private enterprises. If these private enterprises cannot appropriate resources in outer space there will be no commercial incentive. So, without a kind of compromise, non-appropriation would be unworkable. This compromise in practice comes down to the following: there will be no appropriation of anything in outer space, with the exception of appropriation by private actors. This approach is based on a singular liberal interpretation of the international principle.¹⁹⁰ This contrasts the ‘total non-appropriation’ interpretation by supporters of the loyal approach, explained further in this dissertation.¹⁹¹

So, following this approach, even though they cannot appropriate in outer space, each state shall however be given the right to pass through and operate in outer space without interference. States shall not interfere with space systems of other states, because that would clash with the other state’s rights.¹⁹²

Furthermore, the Lockean terra nullius principles can be applied to private actors, where in an unappropriated state, property is considered *res nullius*. The territory is under nobody’s control, but appropriation is possible by mixing the property with labor.¹⁹³ This method can exist parallel with the Outer Space Treaty which expressly prohibits appropriation, if the interpretation of the provision is done accordingly. For this middle ground approach, the Outer Space Treaty is interpreted as prohibiting appropriation by states, but not by private enterprises and individuals under the state’s jurisdiction. With

¹⁸⁸ D. SARNACKI, “Property Rights in Space: Asteroid Mining”, *Tex. A&M J. Prop. L.* 2014, (123) 137-138; K. A. BACA, “Property Rights in Outer Space”, *J. Air L. & Com.* 1992-1993, (1041) 1065.

¹⁸⁹ *Ibid.*; C. PASTORIUS, “Law and Land Policy in the Global Space Industry's Lift-off”, *Barry L. Rev.* 2013, (201) 224; V. BLANCHETTE-SÉGUIN, “Reaching for the Moon: Mining in Outer Space”, *N.Y.U. J. Int’l L. & Pol.* 2017, (959) 964-966; K. A. BACA, “Property Rights in Outer Space”, *J. Air L. & Com.* 1992-1993, (1041) 1065.

¹⁹⁰ J. KRAUSE, “The Outer Space Treaty turns 50. Can it survive a new space race?”, *ABA Journal* 2017, http://www.abajournal.com/magazine/article/outer_space_treaty, last accessed on 3 May 2018.

¹⁹¹ *Infra* No. 99 *et seq.*

¹⁹² C. PASTORIUS, “Law and Land Policy in the Global Space Industry's Lift-off”, *Barry L. Rev.* 2013, (201) 222.

¹⁹³ *Supra* No. 65.

this in mind, private enterprises could appropriate by occupation or use being supported by national space laws. If a state subsequently recognizes a private enterprise's property right it arguably would not violate the Outer Space Treaty. This is, not surprisingly, a highly debated topic.

The reality is that private enterprises are already moving in a direction that will need a similar regime. So, the big legal uncertainties concerning space property should be dealt with sooner rather than later.¹⁹⁴ Legal certainty on an international level would greatly benefit the space industry. The existing risks of space ventures would be minimized as private companies would know what they are up against. This could give a boost to private enterprises to be more technologically innovative and entrepreneurial when it comes to outer space exploration. The prospect of gaining property rights might push them to undergo more fully realized expeditions for larger and fixed rewards. The legal regime should however ensure fairness and order between the competing space entrepreneurs.¹⁹⁵

90. Critique. Firstly, detractors of this regime point to the fact that the act of recognizing private ownership in outer space – which comes with appropriation – is not permissible. This is based on the fact that recognition can only be given by a state that has the right to confer these kinds of titles, and there are no such rights. Consequently, sovereign control over real property by a state is needed before any property rights can be conferred to private actors.¹⁹⁶

On top of that, some space experts claim that not only states but also private enterprises should fully adhere to the international legal framework. If a state's national space law grants private enterprises property rights, this is illegal as the international legal framework does not allow it.¹⁹⁷

Besides, commercial exploitation might not be as achievable in practice as some private enterprises make it out to be. After all, the resources in outer space that are realistically reachable are limited. Harkening back to the Lockean principles concerning *res nullius*, free appropriation through improvement and use of a property would also be limited.¹⁹⁸

¹⁹⁴ *Ibid.* 223.

¹⁹⁵ *Ibid.* 225.

¹⁹⁶ C. PASTORIUS, "Law and Land Policy in the Global Space Industry's Lift-off", *Barry L. Rev.* 2013, (201) 229; F. VON DER DUNK, H.R. HERTZFELD, "Bringing Space Law into the Commercial World: Property Rights without Sovereignty", *Chi. J. Int'l L.* 2005-2006, (81) 84-85.

¹⁹⁷ D. WERNER, "Space Law Workshop exposes rift in legal community over national authority to sanction space mining", *SpaceNews* 2018, <http://spacenews.com/space-law-workshop-exposes-rift-in-legal-community-over-national-authority-to-sanction-space-mining/>, last accessed on 3 May 2018.

¹⁹⁸ C. PASTORIUS, "Law and Land Policy in the Global Space Industry's Lift-off", *Barry L. Rev.* 2013, (201) 225-226.

Furthermore, an application of the ‘first in time’-principle, where private enterprises would race for a piece of space and proactively claim it, would not be optimal. This will lead to antiquated colonial practices. There should first be international agreement on this front to avoid inequitable acts where states unilaterally confirm the existence of property rights in outer space.¹⁹⁹

Lastly, a larger concern could be a repetition of the tragic mistakes made by humankind on earth regarding the environment. Overuse and pollution should be avoided at all cost. In outer space a ‘tragedy of the commons’²⁰⁰ could ensue if there is no set limit on the space resources that private enterprises can use.²⁰¹ However, a sound legal framework should be able to remedy this.

The Position of the United States

91. The practices in the United States throughout (recent) history will here be expanded upon in a chronological manner as they evolved into an example of the middle ground approach. It should be noted that the United States is a party to the Outer Space Treaty but not to the Moon Treaty.²⁰²

92. Nemitz Case.²⁰³ In 2001, a peculiar case presented itself which clarified the outlook of the United States Government on space property rights at the time. The case concerned an American citizen, George Nemitz, and this man strongly believed he was the owner of a specified asteroid. He had registered his claim over the so-called ‘Eros’ asteroid through an online application and to make his claim even stronger, he used the asteroid as collateral for a security interest. A little while later NASA landed a spacecraft on this particular asteroid and Nemitz turned to them to collect ‘parking fees’. The response of NASA to this request went as follows:

¹⁹⁹ *Ibid.* 224.

²⁰⁰ *Supra* No. 62.

²⁰¹ C. PASTORIUS, “Law and Land Policy in the Global Space Industry's Lift-off”, *Barry L. Rev.* 2013, (201) 226-227.

²⁰² IISL DIRECTORATE OF STUDIES, *Does International Space Law Either Permit or Prohibit the Taking of Resources in Outer Space and on Celestial Bodies, and how is this Relevant for National Actors? What is the Context, and What are the Contours and Limits of this Permission or Prohibition?*, unpublished background paper, 2016, 13, http://iislweb.org/docs/IISL_Space_Mining_Study.pdf, last accessed on 4 May 2018.

²⁰³ *Nemitz v United States and ors*, Decision on Motion to Dismiss, 2004 WL 3167042 (D Nev 2004), ILDC 1986 (US 2004), 26 Apr 2004, United States; S. COFFEY, “Establishing a Legal Framework for Property Rights to Natural Resources in Outer Space”, *Case W. Res. J. Int'l L.* 2009, 139-140; D. SARNACKI, “Property Rights in Space: Asteroid Mining”, *Tex. A&M J. Prop. L.* 2014, (123) 131-132.

“Your individual claim of appropriation of a celestial body (the asteroid 433 Eros) appears to have no foundation in law. Unlike an individual's claim for seabed minerals, which was considered and debated by the U.S. Congress that subsequently enacted a statute, The Deep Seabed Hard Mineral Resource Act, P.L. 96-283, 94 Stat. 533 (1980), expressly authorizing such claims. There is no similar statute related in outer space.”

The property issue eventually reached federal court. The court agreed with the NASA and as it turns out, Nemitz had no ground to stand on to defend his property claim at the time. The approach to private space appropriation is however completely different now.

93. President Obama’s National Space Policy.²⁰⁴ In 2010, it became clear that the United States would take try to walk a middle ground. They distanced themselves from their initial view and steered clear of the more radical approach of some commercially minded academics.

The President of the United States at the time, Barack Obama, came forth with the official National Space Policy²⁰⁵, bearing the message that the United States would keep adhering to the principles of the Outer Space Treaty, even though they also plan to further their ventures in commercializing outer space. The introduction concluded with the following words:

“The United States, therefore, calls on all nations to work together to adopt approaches for responsible activity in space to preserve this right for the benefit of future generations.

From the outset of humanity's ascent into space, this Nation declared its commitment to enhance the welfare of humankind by cooperating with others to maintain the freedom of space.

The United States hereby renews its pledge of cooperation in the belief that with strengthened international collaboration and, reinvigorated U.S. leadership, all nations and peoples-spacefaring and space-benefiting-will find their horizons broadened, their knowledge enhanced, and their lives greatly improved.”

²⁰⁴ C. PASTORIUS, “Law and Land Policy in the Global Space Industry's Lift-off”, *Barry L. Rev.* 2013, (201) 228.

²⁰⁵ PRESIDENT BARACK OBAMA, OFFICE OF THE PRESIDENT OF THE UNITED STATES, National Space Policy of the United States of America, 28 Jun. 2010, https://obamawhitehouse.archives.gov/sites/default/files/national_space_policy_6-28-10.pdf, last accessed on 4 May 2018.

The United States explicitly recognized the ‘freedom of space’ and their focus on cooperation, letting all nations know that they should work together to responsibly organize space exploration in a durable way. The aim is to conserve space for the benefit of future generations.

-Non-appropriation.²⁰⁶ The National Space Policy continued under the heading “Principles” as follows:

“As established in international law, there shall be no national claims of sovereignty over outer space or any celestial bodies. The United States considers the space systems of all nations to have the rights of passage through, and conduct of operations in, space without interference. Purposeful interference with space systems, including supporting infrastructure, will be considered an infringement of a nation's rights.

The United States will employ a variety of measures to help assure the use of space for all responsible parties, and, consistent with the inherent right of self-defense, deter others from interference and attack, defend our space systems and contribute to the defense of allied space systems, and, if deterrence fails, defeat efforts to attack them.”

So, in accordance with international law, the United States will not support national appropriation in outer space.²⁰⁷ This leads to all nations having the right to freely and without interference conduct missions and pass through these extraterrestrial areas. Any purposeful interference might be considered an infringement of a nation’s rights.

Furthermore, the United States will help facilitate the use of space *for all responsible parties*. In doing so, they will defend the space systems and counteract interference and attacks, falling back on the inherent right of self-defense.

Thus, the United States confirms their allegiance to the national non-appropriation principle.

-Private enterprises.²⁰⁸ Concerning private actors, the phrasing “for all responsible parties” could relate to them. This is strengthened by the fact that the document purposely deviates from using the previously used word “nation”. This indicates the United States’ support to the middle ground approach with a prohibition of national appropriation but an acceptance of private appropriation.

²⁰⁶ C. PASTORIUS, “Law and Land Policy in the Global Space Industry's Lift-off”, *Barry L. Rev.* 2013, (201) 228-229.

²⁰⁷ *Ibid.* 222.

²⁰⁸ *Ibid.* 223-224.

However, the specific wording might as well be a reaction to the threat of space warfare. The use of “for all responsible parties” would urge other states to act very self-conscious when it comes to anti-satellite tests and suchlike. The United States is mainly concerned with China’s preparation for space warfare.²⁰⁹ A comparison can be drawn between this situation and the one during the cold war, as the United States and the Soviet Union had similar concerns when the international legal framework was drawn up.

94. United States Commercial Space Launch Competitiveness Act.²¹⁰ In 2015, President Obama signed the United States Commercial Space Launch Competitiveness Act²¹¹, which aims to benefit the private enterprises in outer space.

“An Act to facilitate a pro-growth environment for the developing commercial space industry by encouraging private sector investment and creating more stable and predictable regulatory conditions, and for other purposes”

At the time, the act garnered a considerable amount of international attention as it granted several remarkable rights to the American citizens.

In short, the United States saw the non-appropriation principle as a deficiency in international law that could be met by national law. With the United States Commercial Space Launch Competitiveness Act of 2015 the government wanted to hand American entrepreneurs the right to the resources they have mined. This undoubtedly clashes with a strict application of the non-appropriation-principle from the Outer Space Treaty of 1967, but these national rules are trying to keep pace with the privatization. It remains however unclear whether these rules will prove acceptable in the long run.

-Promoting private space exploitation enterprises.²¹² One of the 2015 Act’s four Titles addresses ‘Space Resource Exploration and Utilization’. Part of Section 402, which contains amendments, reads as follows:

²⁰⁹ “China confirms anti-satellite missile test”, *The Guardian* 2007, <https://www.theguardian.com/science/2007/jan/23/spaceexploration.china>, last accessed on 7 May 2018.

²¹⁰ IISL BOARD OF DIRECTORS, *Position Paper on Space Resource Mining*, 2015, 3, <http://www.iislweb.org/docs/SpaceResourceMining.pdf>, last accessed on 4 May 2018; IISL DIRECTORATE OF STUDIES, *Does International Space Law Either Permit or Prohibit the Taking of Resources in Outer Space and on Celestial Bodies, and how is this Relevant for National Actors? What is the Context, and What are the Contours and Limits of this Permission or Prohibition?*, unpublished background paper, 2016, 12, http://iislweb.org/docs/IISL_Space_Mining_Study.pdf, last accessed on 4 May 2018; E. REAVEN, “The United States Commercial Space Launch Competitiveness Act: The Creation of Private Space Property Rights and the Omission of the Right to Freedom from Harmful Interference”, *Wash. U. L. Rev.* 2016, (233) 235.

²¹¹ U.S. Commercial Space Launch Competitiveness Act, *Publ. L.* 114-90, 25 Nov. 2015, <https://www.congress.gov>.

²¹² IISL DIRECTORATE OF STUDIES, *Does International Space Law Either Permit or Prohibit the Taking of Resources in Outer Space and on Celestial Bodies, and how is this Relevant for National Actors? What is the Context, and What are*

“§ 51302. *Commercial exploration and commercial recovery*

“(a) *IN GENERAL.—The President, acting through appropriate Federal agencies, shall—*

“(1) *facilitate commercial exploration for and commercial recovery of space resources by United States citizens;*

“(2) *discourage government barriers to the development in the United States of economically viable, safe, and stable industries for commercial exploration for and commercial recovery of space resources in manners consistent with the international obligations of the United States; and*

“(3) *promote the right of United States citizens to engage in commercial exploration for and commercial recovery of space resources free from harmful interference, in accordance with the international obligations of the United States and subject to authorization and continuing supervision by the Federal Government.*”

The United States wanted to encourage private exploitation enterprises in outer space by offering them a legal document that supports their activities, because the existing international legal framework is unclear on the subject.

-Explicit titles for space resources.²¹³ Another part of the same sections elaborates on the following:

“§ 51303. *Asteroid resource and space resource rights*

“*A United States citizen engaged in commercial recovery of an asteroid resource or a space resource under this chapter shall be entitled to any asteroid resource or space resource obtained, including to possess, own, transport, use, and sell the asteroid resource or space resource obtained in accordance with applicable law, including the international obligations of the United States.” (underlining by author of this dissertation)*

the Contours and Limits of this Permission or Prohibition?, unpublished background paper, 2016, 13, http://iislweb.org/docs/IISL_Space_Mining_Study.pdf, last accessed on 4 May 2018.

²¹³ *Ibid.*

Here, an explicit title for space resources is given. This initially seems to contradict the non-appropriation principle from Article II of the Outer Space Treaty of 1967,²¹⁴ which clarifies that “*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*”.

However, the appropriation of “resources” may be possible under the treaty, since it is not explicitly prohibited.²¹⁵ More so, in Article I of the Outer Space Treaty, the second paragraph puts emphasis on the right of free exploration and use. This should be done without any kind of discrimination, but on the basis of equality and in accordance with international law. This ‘right of free use’ is not explained further. Possibly, it could entail the right to take or exploit minerals and water or other non-renewable natural resources in outer space.

As was outlined before, The Moon Treaty²¹⁶ has a more exclusive view on the subject of property²¹⁷. However, its provisions are not viewed as customary international law. As previously mentioned, the Treaty is only binding to the countries that have signed it – the United States not being one of these countries.

The Space Competitiveness Act can in this light be viewed as an interpretation of the Outer Space Treaty.

-Disclaimer.²¹⁸ Furthermore, the Act states that resources should be “*obtained in accordance with applicable law, including the international obligations of the United States*”. In doing so, the legislators cleverly avoided directly addressing the problem of appropriating in a world that hails the non-appropriation principle. They do not touch on the existing legal frame concerning property in outer space.

It should be noted that there is also a clear disclaimer in the Act:

“*SEC. 403. DISCLAIMER OF EXTRATERRITORIAL SOVEREIGNTY.*”

²¹⁴ Treaty on principles governing the activities of States in the exploration and use of outer space, including the moon and other celestial bodies of 10 Okt. 1967 (**The Outer Space Treaty**), *UNTS* Vol. 610, 205.

²¹⁵ IISL BOARD OF DIRECTORS, *Position Paper on Space Resource Mining*, 2015, 3, <http://www.iislweb.org/docs/SpaceResourceMining.pdf>, last accessed on 4 May 2018.

²¹⁶ Agreement governing the Activities of States on the Moon and Other Celestial Bodies of 11 Jul. 1984 (**The Moon Treaty**), *UNTS* Vol. 1363, 3.

²¹⁷ Article 11, 3 Moon Treaty.

²¹⁸ IISL BOARD OF DIRECTORS, *Position Paper on Space Resource Mining*, 2015, 3, <http://www.iislweb.org/docs/SpaceResourceMining.pdf>, last accessed on 4 May 2018.

It is the sense of Congress that by the enactment of this Act, the United States does not thereby assert sovereignty or sovereign or exclusive rights or jurisdiction over, or the ownership of, any celestial body.”

The United States explicitly does not make any claim over a celestial body.²¹⁹ As United States’ citizens are granted these rights over space resources, this does not follow from any claim over a celestial body made by the United States. The United States’ government intends to adhere to the national non-appropriation principle of the Outer Space Treaty.

This disclaimer is very similar to the one embedded in the Deep Seabed Hard Mineral Resources Act²²⁰, as this act set an interesting precedent for the United States to recognize property rights in an international common area.²²¹

-Conclusion.²²² It remains to be seen if this legal behavior can hold its own in the space industry once actual implementation commences. It is possible that other states will follow suit in dealing with the appropriation of outer space. Hopefully, it might initiate a peaceful dialogue between governments on how to deal with this problem in the future. It could also be a starting point for the future of space appropriation.²²³

However, not only international legal doctrine is critical of the Act, even United States legal doctrine has some remarks, albeit on another topic. The Act is mostly seen as a step in the right direction for United States’ space policy, but a critical right seems missing: the right to freedom from harmful interference for space-faring private enterprises, which in itself should be properly defined before being implemented.²²⁴

²¹⁹ P. DE MAN, “State Practice, Domestic Legislation and the Interpretation of Fundamental Principles of International Space Law”, *Space Policy* 2017, (92) 97.

²²⁰ United States’ Deep Seabed Hard Mineral Resources Act of 28 Jun. 1980, *Publ. L.* 69-283.

²²¹ T.S. TWIBELL, “Space Law: Legal Restraints on Commercialization and Development of Outer Space”, *UMKC L. Rev.* 1996-1997, (589) 641.

²²² IISL DIRECTORATE OF STUDIES, *Does International Space Law Either Permit or Prohibit the Taking of Resources in Outer Space and on Celestial Bodies, and how is this Relevant for National Actors? What is the Context, and What are the Contours and Limits of this Permission or Prohibition?*, unpublished background paper, 2016, 14, http://iislweb.org/docs/IISL_Space_Mining_Study.pdf, last accessed on 4 May 2018.

²²³ *Infra* No. 147.

²²⁴ E. REAVEN, “The United States Commercial Space Launch Competitiveness Act: The Creation of Private Space Property Rights and the Omission of the Right to Freedom from Harmful Interference”, *Wash. U. L. Rev.* 2016, (233) 252-253.

95. President Trump’s plans. Current President of the United States, Donald Trump, has a lot of major plans for the space industry, promising to ‘unlock the mysteries of space’.²²⁵ The first step towards this goal came in March 2017 with his National Aeronautics and Space Administration Transition Authorization Act of 2017.²²⁶ This bill will see to it that NASA prioritizes public-private partnerships, setting aside additional funds for space related activities from private enterprises.

Contrasting with the former President Obama’s stance however, there is currently a stronger desire to denounce the Outer Space Treaty entirely – or at the very least try to change it. This can go either way as a formal act is still in the works. As of this writing, debates on the usefulness of the Outer Space Treaty in its current state are ongoing.²²⁷

Up until recently, the focus on private enterprises remains, as President Trump signed the Space Policy Directive 1 in December 2017. This new Space Policy focuses on the human return to the moon by working closely with private enterprises.²²⁸ This also fits in with ESA’s ambitions to establish a Moon Village.²²⁹

The Position of the Grand Duchy of Luxembourg

96. Europe’s most proactive supporter of the middle ground approach to property rights in outer space is the Grand Duchy of Luxembourg. They are also party to the Outer Space Treaty but not to the Moon Treaty.²³⁰

²²⁵ A. GRIFFIN, “Donald Trump promises that he will ‘unlock the mysteries of space’ as president”, *The Independent* 2017, <https://www.independent.co.uk/life-style/gadgets-and-tech/news/donald-trump-president-space-policy-inauguration-speech-nasa-climate-change-a7538551.html>, last accessed on 4 May 2018.

²²⁶ United States’ National Aeronautics and Space Administration Transition Authorization Act of 21 Mar. 2017, *Publ. L.* 115-10, <https://www.congress.gov>.

²²⁷ C. FINNIGAN, “Why the Outer Space Treaty Remains Valid and Relevant in the Modern World”, *The Space Review* 2018, <http://www.thespacereview.com/article/3448/1>, last accessed on 4 May 2018; J. FOUST, “Companies, lawyers argue against changing Outer Space Treaty”, *SpaceNews* 2017, <http://spacenews.com/companies-lawyers-argue-against-changing-outer-space-treaty/>, last accessed on 4 May 2018; Z. ABBANY, “Interview with Christopher J. Newman: Outer Space Treaty, another one for Trump to dump”, *Deutsche Welle News* 2017, <http://www.dw.com/en/outer-space-treaty-another-one-for-trump-to-dump/a-39077097>, last accessed on 4 May 2018.

²²⁸ United States’ Space Policy Directive-1 of December 11, 2017, *Fed. Reg.* Vol. 82, No. 239, 59501-59502 <https://www.gpo.gov/fdsys/pkg/FR-2017-12-14/pdf/2017-27160.pdf>, last accessed on 4 May 2018.

²²⁹ *Infra* No. 179 and No. 180.

²³⁰ IISL DIRECTORATE OF STUDIES, *Does International Space Law Either Permit or Prohibit the Taking of Resources in Outer Space and on Celestial Bodies, and how is this Relevant for National Actors? What is the Context, and What are the Contours and Limits of this Permission or Prohibition?*, unpublished background paper, 2016, 23, http://iislweb.org/docs/IISL_Space_Mining_Study.pdf, last accessed on 4 May 2018.

97. Law on outer space resources.²³¹ In the summer of 2017 their Chamber of Deputies passed the Law on the Exploration and Use of Outer Space Resources²³² and Article 1 very boldly states:

“Space resources are capable of being appropriated”

The law recognizes the legal ownership of resources mined in outer space by private enterprises, which makes the Grand Duchy of Luxembourg an attractive operating base.

The Grand Duchy of Luxembourg defended this bold declaration of the appropriability of space resources in an accessory Explanatory Statement, where they mostly harkened back to 19th Century schools of thought regarding mining and the sea.²³³

98. Relation to international law.²³⁴ There is however a big difference with the approach of the United States. While the US seems to accept nationally regulating space law, and more specifically space mining, at face value, the Grand Duchy of Luxembourg has a more nuanced and uncertain outlook.

On April 7th of 2017, the Grand Duchy of Luxembourg’s Conseil d’État (Council of State) issued a negative advice²³⁵ regarding the Draft Law on the Exploration and Use of Outer Space Resources. The Conseil d’État of the Grand Duchy of Luxembourg is an advisory institution to the state’s national legislature. They are for example tasked with reporting any inconsistencies between these draft laws and the international legal framework of which the Grand Duchy of Luxembourg is part.

In this negative advice, the Conseil d’État exposed several legal and practical issues. For the Conseil d’État, a major obstacle for passing the Draft Law was the context of legal uncertainty in which it is situated. As there is no international legal framework for the regulation of the commercial space mining industry, there are questions regarding the validity of a national regulation. This creates a context of legal uncertainty for private enterprises in the space mining business. They mainly stated that without a connection to

²³¹ *Ibid.*

²³² Loi du 20 juillet 2017 sur l’exploration et l’utilisation des ressources de l’espace du Grand-Duché de Luxembourg, *Journal Officiel du Grand-Duché de Luxembourg*, N°674 du 28 juillet 2017, <http://data.legilux.public.lu/eli/etat/leg/loi/2017/07/20/a674/jo>, last accessed on 4 May 2018.

²³³ P. DE MAN, “Luxembourg’s law on space resources rests on a contentious relationship with international framework”, *The Space Review* 2017, <http://www.thespacereview.com/article/3355/1>, last accessed on 4 May 2018.

²³⁴ *Ibid.*

²³⁵ CONSEIL D’ÉTAT, Avis sur projet de loi sur l’exploration et l’utilisation des ressources de l’espace, N° CE 51.987, N° dossier parl. 7093, 7 April 2017, http://conseil-etat.public.lu/content/dam/conseil_etat/fr/avis/2017/07042017/51987.pdf, last accessed on 4 May 2018; P. DE MAN, “Luxembourg’s law on space resources rests on a contentious relationship with international framework”, *The Space Review* 2017, <http://www.thespacereview.com/article/3355/1>, last accessed on 4 May 2018.

international legislation in the field of commercial space mining, national legislation such as the Grand Duchy of Luxembourg's Draft Law is ineffective.

The Grand Duchy of Luxembourg amended the Draft Law in such a way that they formally adhered to the existing legal frame. The legal uncertainty regarding the relationship between the international and national legal framework however remains. The same holds true for the enforceability of the enacted law.

iii. The Loyal Approach

99. To conclude the approaches to the property rights discussion, the least dissident one will be explained. This approach is very widespread.

100. In essence.²³⁶ This approach chooses to stay loyal to a strict non-appropriation principle, all the while looking back at the common heritage of mankind doctrine. They consider other Outer Space Treaty clauses and the Liability Convention, so the words "appropriation by any other means" are seen in a way that would indicate that private enterprises under national jurisdiction are included.²³⁷ Consequently, there would be absolutely no sovereignty – private or governmental – in outer space.

101. Main substantiation.²³⁸ This approach hails complete non-appropriation as a structural rule of international law and a basic principle of space law. There is no exception for private enterprises as there is with the middle ground approach.²³⁹ The non-appropriation principle is considered vital for keeping peace and order while managing and developing outer space activities. Supporters of the loyal approach believe that the abandonment of the non-appropriation principle would lead to chaos and thus to obstruction of commercialization.

The principle has the status of a structural rule of international law as it has a long history alongside the Outer Space Treaty.

²³⁶ F. TRONCHETTI, "The Non-Appropriation Principle under Attack: Using Article II of the Outer Space Treaty in its Defense", unpublished, (1) 10, <https://iislweb.org/docs/Diederiks2007.pdf>, last accessed on 4 May 2018.

²³⁷ Articles IV, VI, VIII, XI, VII Outer Space Treaty.

²³⁸ F. TRONCHETTI, "The Non-Appropriation Principle under Attack: Using Article II of the Outer Space Treaty in its Defense", unpublished, (1) 10, <https://iislweb.org/docs/Diederiks2007.pdf>, last accessed on 4 May 2018.

²³⁹ *Supra* No. 88.

Therefore, every change to the principle should be made collectively by all states: unilateral action should not be allowed in space.

The common heritage of mankind principle is heavily featured in this approach.²⁴⁰

102. Critique. If we consider the many arguments put forth by the detractors however,²⁴¹ it seems as if a loyalist approach would not hold up in the long term. Supporters of the contrasting radical approach take most offence at the common heritage of mankind element in the loyalist approach.²⁴²

The loyal followers of the non-appropriation principle however, see no problem for the foreseeable future. They believe that the supposed problems are instigated by entrepreneurs who fear for future investments and private enterprises who would not adhere to the existing rules. These organizations should be properly held in check by their respective governments.²⁴³

We do not know for certain what the future holds, which will eventually lead us to the solutions provided by some creative thinkers (of the legal doctrine) further in this dissertation.²⁴⁴

b. Practical Conclusion: The Case of Planetary Resources, Space Mining

103. To make matters more concrete, it would be interesting to analyze how a real-life private enterprise can maneuver the legal asteroid-mining context.

Planetary Resources is a private enterprise²⁴⁵ that will focus on the exploitation of near-earth asteroids because they claim these are more easily accessible than the moon. These asteroids could offer humanity an extensive amount of space resources and much needed water supplies.²⁴⁶

²⁴⁰ *Supra* No. 59 *et seq.*

²⁴¹ *Supra* No. 79 *et seq.*

²⁴² *Supra* No. 100.

²⁴³ F. VON DER DUNK, H.R. HERTZFELD., “Bringing Space Law into the Commercial World: Property Rights without Sovereignty”, *Chi. J. Int’l L.* 2005-2006, (81) 99.

²⁴⁴ *Infra* No. 123 *et seq.*

²⁴⁵ Planetary Resources aims to operate entirely independent from the NASA; C. PASTORIUS, “Law and Land Policy in the Global Space Industry’s Lift-off”, *Barry L. Rev.* 2013, (201) 216.

²⁴⁶ <https://www.planetaryresources.com/why-asteroids/>.

-Overview.²⁴⁷ The enterprise was founded in the United States in 2009 by Eric Anderson and Dr. Peter H. Diamandis. Along the way, the private enterprise gained backing, from among others, Google’s Larry Page and Eric Schmidt. On top of that, they have also had success with crowdfunding through Kickstarter, even attracting Virgin Galactics’ Richard Branson.²⁴⁸

In 2016, Planetary Resources started working closely together with the Grand Duchy of Luxembourg,²⁴⁹ as part of the country’s SpaceResources.lu project. The Grand Duchy already has a proven record in the area of space with its satellite industry. Eventually, the Grand Duchy and the Société Nationale de Crédit et d’Investissement invested 25 million euro in Planetary Resources.

In 2017, the Grand Duchy passed the Law on the Exploration and Use of Outer Space Resources (as detailed above)²⁵⁰ and appointed a Special Envoy for Space Resources, Mr. Georges Schmit to create a positive policy climate for the space mining industry.

Planetary Resources now has a base of operations in the Grand Duchy of Luxembourg to take advantage of its national space law.

However, this new law does not offer as much certainty as one would hope as it only seemingly allows appropriation of space resources by private enterprises. There is no international legal framework that explicitly allows the appropriation of space resources, so the national space law is ineffective.²⁵¹

Planetary Resources is also based in the United States where there is a similar national space law that allows private enterprises to appropriate space resources.²⁵² Likewise, there is no certainty if this national space law can offer enough support for the planned space mining industry. As there is no international consensus on the interpretation of the non-appropriation principle in Article II of the Outer Space Treaty, this national

²⁴⁷ The company’s website offers an extensive chronological overview of their activities: <https://www.planetaryresources.com/company/timeline/>, last accessed on 7 May 2018.

²⁴⁸ C. PASTORIUS, “Law and Land Policy in the Global Space Industry’s Lift-off”, *Barry L. Rev.* 2013, (201) 215-216.

²⁴⁹ A. A., ABRAHAMIAN, “How a tax haven is leading the race to privatise space”, *The Guardian* 2017, <https://www.theguardian.com/news/2017/sep/15/luxembourg-tax-haven-privatise-space>, last accessed on 4 May 2018.

²⁵⁰ *Supra* No. 97.

²⁵¹ *Supra* No. 98.

²⁵² *Supra* No. 94.

space law cannot offer enough certainty. Planetary Resources is also involved in the ongoing discussions regarding the future of the United States national space law.²⁵³

In order to have a successful space mining industry, many believe appropriation of space resources should be possible, as otherwise private enterprises would have no property rights over the space resources they invested in and thus have no incentive to undertake risky space mining expeditions.

However, once the international legal framework is decided upon, Planetary Resources is positioned to be one of the most successful players in the space mining industry as the enterprise is currently undertaking a widespread observational research operation in order to eventually find the most suitable asteroids for exploitation.

B. The Tourism and Transportation Industry

104. After an extensive elaboration on the legal problems of private enterprises in the space exploitation industry, we will now focus on the space tourism industry. This industry encompasses a multitude of elements, including accommodation and food, but the focus will be human transportation. Ideally, part of the legal framework regarding human transportation will be used whenever permanent extraterrestrial settlement is made possible.

105. Private enterprises. Besides the well-known industry giant Virgin Galactic, there are also smaller private enterprises making waves in the industry. For example, at the end of 2017, Manchester's Starchaser worked together with the University of Chester to launch a company-made reusable rocket, which they achieved quite successfully. This launch was part of the companies' plan of testing and developing rockets destined for space tourism. Within a year they will try to launch rockets that can hold a human being.²⁵⁴ Ambitious moves from small companies like these hint at the exciting opportunities ahead for both major and minor enterprises.

Private enterprises already offer 'space holidays' at astronomical prizes to a very small group of hyper-rich and daring tourists.²⁵⁵ Hopefully, it will soon be realistically achievable to offer this kind of getaway for a

²⁵³ J., FOUST, "Companies, lawyers argue against changing Outer Space Treaty", SpaceNews 2017, <http://spacenews.com/companies-lawyers-argue-against-changing-outer-space-treaty/>, last accessed on 4 May 2018.

²⁵⁴ H. ADAM, "Space tourism firm launches largest rocket to blast off from UK mainland", *the Guardian* 2017, <https://www.theguardian.com/science/2017/sep/11/largest-rocket-to-blast-off-from-uk-mainland-paves-way-for-space-tourism>, last accessed on 4 May 2018.

²⁵⁵ D. GRIFFITH, "Rocketing Private Citizens into Space - A Consideration of Liability", *Brief* 2009, (30) 30.

more economic price to a larger crowd.²⁵⁶ In the foreseeable future, a clear legal framework should be conceived with regard to space tourism. For now however, a less well-defined framework has to suffice.

For example, it is unclear whether suborbital flights are space activities.²⁵⁷ Furthermore, the development of an outer space insurance industry will require both strong safety standards and a working liability regime. As the current affairs indicate, both are lacking.²⁵⁸

What follows is an elaboration on the legal problems private enterprises will face in the flourishing space tourism industry.

a. The Classification of Suborbital Flights

106. First off, there is uncertainty regarding the scope of space tourism and whether suborbital flights can be classified as a space activity.

107. Orbital and suborbital.²⁵⁹ There is a difference between orbital and suborbital flights, but there is no fixed altitude that functions as a clear separation point between both. Simply put, suborbital flights are flights that go up to a very high altitude – some say the edge of space – but that do not bring the vehicle into orbit as orbital flights do.²⁶⁰

108. Space law or air law.²⁶¹ The legal problem that presents itself here is the uncertainty whether suborbital flights should be guided by the framework of space law or the legal frame of air law. Neither areas of law fit entirely as they do not have clear and fitting definitions for ‘space object’, ‘aircraft’ or a clear separation point where air space stops and outer space begins.

²⁵⁶ Companies are already working on this, with Virgin Galactic and XCOR willing to ask a ticket price of respectively \$ 200.000 and \$ 95.000; C. PASTORIUS, “Law and Land Policy in the Global Space Industry's Lift-off”, *Barry L. Rev.* 2013, (201) 214.

²⁵⁷ *Infra* No. 106 *et seq.*

²⁵⁸ *Infra* respectively No. 110 *et seq.* No. 115 *et seq.*

²⁵⁹ R. MORO-AGUILAR, “National Regulation of Private Suborbital Flights: A Fresh View”, *FIU L. Rev.* 2014-2015, (679) 682.

²⁶⁰ Orbit is reached by gaining ‘orbital velocity’, which sends a vehicle flying along the curvature of a planet; <http://www.orbpace.com/background-information/suborbital-vs-orbital.html>, last accessed on 7 May 2018.

²⁶¹ T. CHENEY, L. NAPIER, “Policy Analysis: Air versus Space, Where do Suborbital Flights Fit Into International Regulation?”, *JSPG* 2015, (1) 11 <http://www.sciencepolicyjournal.org/uploads/5/4/3/4/5434385/pm3finalformatted.pdf>, last accessed on 4 May 2018.

Air law on one side is highly developed as it has a rich history filled with practical experience and a guiding international institution in the form of the International Civil Aviation Organization (ICAO). Space law on the other hand is less developed and frankly quite antiquated on an international level. Thus, in the area of space law, the suborbital industry could be given leeway in contributing to the creation of a new and adjusted legal framework inspired but not hampered by aviation law.

109. As long as there is no clear international legal framework, national space laws will regulate suborbital flights.²⁶² The United States pioneered by inserting stipulations about suborbital flights in its existing Commercial Space Launch Act.²⁶³

b. Liability & Insurance

110. For transportation of space tourists by private enterprises to become commonplace, a clear liability regime should be instated. Companies and its investors will be very concerned with the question of liability in case of an accident. In the existing traditional transport industry, this is a key issue.²⁶⁴

Cases of spaceflight accidents will involve states, private enterprises and space tourists from different countries. To avoid legal entanglement of different actors and interests, the industry could benefit from legal clarity.

111. Liability regime. An explicit international space transportation liability regime for private enterprises is non-existent as the international legal framework – being the Liability Treaty and the Outer Space Treaty – mainly pertains to international actors, for example ‘launching states’. A legal framework concerning the liability of private enterprises in the case of a catastrophic space accident is nowhere to be found; neither is there a liability regime in place to benefit space tourists.^{265; 266}

National law will most likely fill this void, as this is already happening in the exploitation industry today.

²⁶² R. MORO-AGUILAR, “National Regulation of Private Suborbital Flights: A Fresh View”, *FIU L. Rev.* 2014-2015, (679) 684.

²⁶³ *Ibid.* 686.

²⁶⁴ D. GRIFFITH, “Rocketing Private Citizens into Space - A Consideration of Liability”, *Brief* 2009, (30) 30.

²⁶⁵ *Ibid.*

²⁶⁶ *Supra* No. 31 *et seq.* and 40 *et seq.*

However, even in the United States there is no conclusive liability framework laid out. The US regulations²⁶⁷ are mostly concerned with related elements such as sufficiently warning space tourists of the dangers of space travel. They also focus on compensating the injured people on the ground and excluding the federal government from liability. But the private enterprises themselves have less legal certainty regarding liability.²⁶⁸

112. Contents of liability regime.²⁶⁹ In space, there is very little jurisprudence to fall back on – contrary to the aviation business. Consequently, the liability regime will most likely closely resemble the one known in the aviation sector: the regime could adopt notions similar to those in an airplane crash, such as negligence, strict product liability, assumption of the risk and enforceability of releases.

An important aspect will be the ‘release of liability’-forms that are signed by the potential space tourists. To escape liability, the private spaceflight companies and their insurance firms will require these forms. There is however a discussion to be had on their merits. Falling back on a ‘release’-form will be sufficient for the first wave of space tourists, because this wave will consist of only a handful wealthy adventurers. In reaching a bigger audience with more economic spaceflight options however, the signing of a release could scare off potential customers. Thus, it can be assumed that the practice of signing releases could gradually disappear as the scope of space tourism shifts from the wealthy to the middle-class.

The industry could benefit from a ‘Montreal Convention’-like regime.

113. National space law.²⁷⁰ However, some states are already starting to cater towards the needs of private enterprises. They will for example grant limited immunity to commercial launch service providers and manufacturers from liability to passengers hurt or killed while engaged in spaceflight.²⁷¹ This practice can be quite the deal breaker for enterprises looking for a state to house their business.

²⁶⁷ United States’ Commercial Space Launch Amendments Act of 8 Mar. 2004, H.R.3752 - 108th Congress, <https://www.congress.gov>; United States’ Federal Aviation Administration’s Human Space Flight Requirements for Crew and Space Flight Participants of 15 Dec. 2006, *Fed. Reg.* Vol. 71; D. GRIFFITH, “Rocketing Private Citizens into Space - A Consideration of Liability”, *Brief* 2009, (30) 30; P.J. BLOUT, “Renovating Space: The Future of International Space Law”, *Denv. J. Int’l L. & Pol’y* 2011, (515) 531.

²⁶⁸ D. GRIFFITH, “Rocketing Private Citizens into Space - A Consideration of Liability”, *Brief* 2009, (30) 30

²⁶⁹ *Ibid* 32-33.

²⁷⁰ *Ibid.* 32.

²⁷¹ Article 24 (Spaceflight Liability and Immunity Act) Code of Virginia of 1 Feb. 1950, <https://law.lis.virginia.gov/vacode>, last accessed on 4 May 2018; D. GRIFFITH, “Rocketing Private Citizens into Space - A Consideration of Liability”, *Brief* 2009, (30) 32.

114. Aerospace insurance.²⁷² Whenever states are liable for damages caused by private enterprises, they ask for repayment from these enterprises. To cover this repayment, private enterprises apply for an aerospace insurance. There is no international obligation, but states will oftentimes require private enterprises to obtain such an insurance. This is the case for the United Kingdom, France, Australia and the United States. The latter however offers a more flexible regime that leans towards the Netherlands' 'case by case' formulation of insurance requirements.

c. Safety

115. Just like every traditional form of human transportation, space transportation will have to be safe before it can become mainstream. A strong legal frame for private enterprises will be essential in establishing enduring safety, as low-threshold space travel entails considerable security risks.²⁷³

116. Dangers.²⁷⁴ The safety risks are very real, as virtually any state can be used as a launching state for private enterprises. As such, each state will exercise jurisdiction over private enterprises in their own way and according to their own ideals, goals, resources and governmental policy plan. Without a clear international legal framework, safety could be compromised if launching states do not exert sufficient oversight or have lacking accountability policies. In particular, inexperienced states with 'immature' space programs could be prone to safety risks, especially if they lack the expertise, technological savviness, resources and regulation that are required to guarantee safety and security.

Common safety standards for the private space industry are also lacking. The evaluation of safety requirements will be done by each company according to their own standards. This does however not include the process the companies undergo to obtain a launch permit. In this process, some standards must be met,²⁷⁵ but there is no possibility to fall back on an international technical guideline.²⁷⁶

²⁷² D. LINDEN, *The Impact of National Space Legislation on Private Space Undertakings: Regulatory Competition between States?*, unpublished working paper for Leuven Centre for Global Governance Studies, 2017, (1) 12-13,19, https://ghum.kuleuven.be/ggs/publications/working_papers/2017/190linden, last accessed on 5 May 2018; S. HOBE, "The Impact of New Developments on International Space Law (New Actors, Commercialisation, Privatisation, Increase in the Number of "Space-faring Nations")", *Rev. dr. unif.* 2010, (869) 880.

²⁷³ C. PASTORIUS, "Law and Land Policy in the Global Space Industry's Lift-off", *Barry L. Rev.* 2013, (201) 232-233.

²⁷⁴ *Ibid.*

²⁷⁵ Being e.g. crew qualifications, training protocol, aeromedical certifications, manufacturing and material processes and environmental control system performance criteria; D. GRIFFITH, "Rocketing Private Citizens into Space - A Consideration of Liability", *Brief* 2009, (30) 32.

²⁷⁶ D. GRIFFITH, "Rocketing Private Citizens into Space - A Consideration of Liability", *Brief* 2009, (30) 32.

117. Need for international legal framework.²⁷⁷ Space travel holds risks for all of humanity and not only for those who are under the jurisdiction of the launching state. This contrasts markedly with international flights, where the risks are mainly limited to the state of departure and arrival. It can be argued that the global nature of these risk demands international regulatory standards.

If the industry wants to attract a bigger audience, passenger safety will be key in ensuring profitability and success for the years to come. To do so, private enterprises and states should work together, combining their motivational efforts, experience and resources to adapt the governmental requirements and standards for the private commercial sector. This way the stability and safety of private enterprises in outer space can be properly guaranteed. Consequently, insurance companies will gain confidence in the sector and its rules which will lead to them being more supportive and aiding the industries growth.²⁷⁸

118. United States' regime.²⁷⁹ In the United States, the issue of security in space technology and development is a focal point in space law discussions. Furthermore, in 2004 the Commercial Space Launch Amendments Act²⁸⁰ addressed the issue:

"The regulatory standards governing human space flight must evolve as the industry matures so that regulations neither stifle technology development nor expose crew or space flight participants to avoidable risks as the public comes to expect greater safety for crew and space flight participants from the industry."

In 2010 President Obama, stressed the nation's willingness to strengthen collaboration on an international level with the United States' Space Policy principles and directives. This would include a focus on safety.

But in 2012, the Office of Commercial Space Transportation (FAA-AST) slightly backpedaled by stating that the United States has no intention to support the creation of an international organization for safety in space. They will however support the inclusion of the principles the United States vouches for and individually adheres to already. They are also pushing the idea of waiting for 'best practices' to emerge globally. This trial-and-error approach could however prove to be a slippery slope. The current United States policy already differs from other countries when it comes to the space flight vehicle certification,

²⁷⁷ C. PASTORIUS, "Law and Land Policy in the Global Space Industry's Lift-off", *Barry L. Rev.* 2013, (201) 236.

²⁷⁸ *Ibid.* 235.

²⁷⁹ *Ibid.* 234.

²⁸⁰ United States' Commercial Space Launch Amendments Act of 8 Mar. 2004, H.R.3752 - 108th Congress, <https://www.congress.gov>; C. PASTORIUS, "Law and Land Policy in the Global Space Industry's Lift-off", *Barry L. Rev.* 2013, (201) 234.

being a 'light version' of the European Aviation Safety Agency's one, forgoing the safety certifications of vehicles for financial reasons. This trend only speaks against space travelers' safety. A precautionary principle would be more fitting.

d. Practical Conclusion: The Case of Virgin Galactic, SpaceX & MarsOne

119. To make matters more concrete once more, a brief overview will be given of a few private enterprises focusing on transport in their legal context.

120. Virgin Galactic was founded in 2004 by Richard Branson. It is a private enterprise that is active in commercial spaceflight, currently focusing on suborbital flights.²⁸¹

There is still no clear place for suborbital flights in international law, which leads to national law governing the activity. As Virgin Galactic is based in the United States they fall under the Commercial Space Launch Act. This act gave rise to the creation of federal rules and guidelines for the suborbital flight industry to which Virgin Galactic must adhere.²⁸²

121. SpaceX was founded in 2002 by Elon Musk with the goal to revolutionize space technology. In this process they have reached a few milestones, such as accomplishing the return to Earth of a reusable spacecraft and delivering cargo to the International Space Station as a private enterprise.²⁸³

As there is no international legal framework in place regarding the liability of private enterprises for space activities, states will be liable in the case that a private enterprise causes damages. The liable state(s) will require repayment from the private enterprise. Consequently, SpaceX will have an aerospace insurance to cover repayment to the state.²⁸⁴ As they are based in the United States, they deal with an obligatory but flexible insurance regime. They can choose between an insurance for the Maximum Probable Loss²⁸⁵, the

²⁸¹ <https://www.virgingalactic.com/>, last accessed on 4 May 2018.

²⁸² *Supra* No. 108.

²⁸³ <http://www.spacex.com/about>, last accessed on 4 May 2018.

²⁸⁴ *Supra* No. 114.

²⁸⁵ M. SCHAEFER, "The Need for Federal Preemption and International Negotiations regarding Liability Caps and Waivers of Liability in the U.S. Commercial Space Industry", *Berkeley J. Int'l L.* 2015, (223) 230-231.

insurance with the optimal cost and maximum liability ratio on the world market or 500 million US Dollars.²⁸⁶

122. MarsOne is a private enterprise established in 2012 in the Netherlands that hopes to land the first humans on Mars in order to establish a permanent colony for humankind. Their business plan is very much focused on media, planning to televise the entire operation.²⁸⁷

As there is no clear international legal framework regarding sufficient oversight and accountability by states, danger becomes more realistic as each private enterprise can implement national safety guidelines (or the lack thereof) themselves.²⁸⁸

While Mars One's project is very bold and creative, it has also been criticized by academics, the space industry and international publications for its seeming lack of interest in safety. Some even suggest it is a suicide mission.²⁸⁹

²⁸⁶ D. LINDEN, *The Impact of National Space Legislation on Private Space Undertakings: Regulatory Competition between States?*, unpublished working paper for Leuven Centre for Global Governance Studies, 2017, (1) 12-13, https://ghum.kuleuven.be/ggs/publications/working_papers/2017/190linden, last accessed on 5 May 2018.

²⁸⁷ <https://www.mars-one.com/about-mars-one>, last accessed on 4 May 2018.

²⁸⁸ *Supra* No. 116.

²⁸⁹ MIT scientists, Sydney Do and Andrew Owens, have produced a study claiming that Mars One's proposal would see its astronauts die in 68 days; D. DWAYNE, "Red Planet Rumble", *The Space Review* 2015, <http://www.thespacereview.com/article/2809/1>, last accessed on 4 May 2018.

Chapter IV. What Does the Future Hold: Proposed Legal Solutions

123. Legal doctrine proposes several ways of dealing with the legal problems caused by the NewSpace evolutions.

These proposals should strive to steer the evolution in the right direction by offering a legal framework that minimizes risks and stays clear from stiffening the lust for innovation of this booming industry. It will be key in reaching a durable solution to balance favorable and realistic sets of rules.²⁹⁰ A lesson could be learned from the success of the International Telecommunication Union's (ITU) efforts to give every state an equitable access to the Geostationary Satellite Orbit (GSO): a flexible approach that values compromise is key.²⁹¹

124. In any case, C. PASTORIUS is very clear when she addresses the situation in the space mining industry: "States should endeavor to proactively address the issues regarding property rights in outer space rather than attempt to establish rules once controversies arise."²⁹² This statement rings true for the industry as a whole and it is certainly time for states to start the preparatory works.

125. The United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS) is especially fit as a discussion platform because the committee rethinks the merits of international cooperation in space exploration on a yearly basis. It is used to deal with the legal problems that arise in the exploration of outer space.²⁹³ However, progress can be blocked by the consensus rule. Doctrine raises that this rule should be softened and like-minded states should come together to reach reasonable solutions instead.²⁹⁴

Another organization that can serve the same purpose is the International Institute of Space Law (IISL), as it can cooperate with state actors to foster developments in space law. On a yearly basis they organize space law studies and meetings.²⁹⁵

²⁹⁰ A. MORRIS, "Intergalactic Property Law: a New Regime for a New Age", *Vand. J. Ent. & Tech. L.* 2017, (1085) 1114.

²⁹¹ J.R. BONIN, F. TRONCHETTI, "Constructing a Regulatory Regime for the Exploitation of Resources on the Moon and Other Celestial Bodies: A Balancing Act", *Indian J. Int'l Econ. L.* 2010, (1) 25.

²⁹² C. PASTORIUS, "Law and Land Policy in the Global Space Industry's Lift-off", *Barry L. Rev.* 2013, (201) 223.

²⁹³ *Supra* No. 17.

²⁹⁴ R. JAKHU, "Legal Issues Relating to the Global Public Interest in Outer Space", *J. Space L.* 2006, (31) 108.

²⁹⁵ <https://iislweb.org/about-the-iisl/>, last accessed on 4 May 2018.

126. For now, this dissertation aims to give an overview of the most interesting proposals which could be implemented by states. The proposed solutions are divisive and three main movements can be distinguished. The first movements beliefs it is possible to keep falling back on the existing international framework of space law.²⁹⁶ To a second movement the creation of new space treaties seems necessary.²⁹⁷ The last movement would suggest to simply amend the existing treaties.²⁹⁸

Incidentally, there is also no consensus on what to do with the plethora of already existing national space laws. Is regulatory competition optimal or should we strive for harmonization (with an international umbrella-treaty)?²⁹⁹

§1. Keep the Existing International Framework for Space Law

127. States for the most part seem to have an aversion of new space related treaties. The reasoning behind this is twofold. Firstly, states do not want to limit their national security by signing another treaty that in a way would minimize their strategic advantages. Secondly, states would want to verify the compliance of others to the treaty, however, this is very hard in outer space.³⁰⁰

Consequently, there is a strong movement that wishes to keep the existing international framework of space law, mainly because it offers stability. It also offers the freedom for states to develop and push their own interpretation of the existing provisions.^{301; 302}

With a fixed international legal framework in place, the focus can be shifted towards the national space laws that interpret and build upon this international foundation.³⁰³

²⁹⁶ *Infra* No. 127 *et seq.*

²⁹⁷ *Infra* No. 137 *et seq.*

²⁹⁸ *Infra* No. 144 *et seq.*

²⁹⁹ *Infra* respectively No. 130 *et seq.* and No. 149 *et seq.*

³⁰⁰ P.J. BLOUT, “Renovating Space: The Future of International Space Law”, *Denv. J. Int’l L. & Pol’y* 2011, (515) 528.

³⁰¹ *Infra* No. 128 *et seq.*

³⁰² J. FOUST, “Companies, lawyers argue against changing Outer Space Treaty”, *SpaceNews* 2017, <http://spacenews.com/companies-lawyers-argue-against-changing-outer-space-treaty/>, last accessed on 4 May 2018.

³⁰³ *Infra* No. 130 *et seq.*

A. National Interpretations of the Existing International Provisions

128. Soft law that allows interpretations.³⁰⁴ A big part of the existing international framework of space law seems like it is inspired on ‘soft law’ ideas. ‘Soft law’ is an umbrella term for quasi-legal instruments that do not have the binding power of traditional ‘hard law’.³⁰⁵ Examples are guidelines, declarations and other non-binding texts.

The reason why it is believed that the existing international framework of space law is based on ‘soft law’ is because the vague wording of provisions in the Outer Space Treaty gives states leeway to develop their own interpretations.³⁰⁶ The framework thus offers a rather flexible regime that can indirectly adapt to the recent evolutions, so there is no need to abandon the existing international legal framework.

Moreover, there is no Court in the area of international space law to give a set interpretation of the treaties’ provisions, so interpretations should be done according to the Vienna Convention on the Law of Treaties.³⁰⁷ Article 31 reads as follows:

“General rule of interpretation

1. A treaty shall be interpreted 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.

[...]

3. There shall be taken into account, together with the context:

[...]

(b) any subsequent practice in the application of the treaty which establishes the agreement of the parties regarding its interpretation;

[...]”

³⁰⁴ P.J. BLOUT, “Renovating Space: The Future of International Space Law”, *Denv. J. Int’l L. & Pol’y* 2011, (515) 529.

³⁰⁵ B. DRUZIN, “Why does Soft Law have any Power anyway?”, *Asian Journal of International Law* 2017, (361) 361.

³⁰⁶ *Supra* No. 23.

³⁰⁷ Vienna Convention on the Law of Treaties of 23 May 1969, *UNTS* Vol. 1155, 331; IISL DIRECTORATE OF STUDIES, *Does International Space Law Either Permit or Prohibit the Taking of Resources in Outer Space and on Celestial Bodies, and how is this Relevant for National Actors? What is the Context, and What are the Contours and Limits of this Permission or Prohibition?*, unpublished background paper, 2016, 26-27, http://iislweb.org/docs/IISL_Space_Mining_Study.pdf, last accessed on 4 May 2018.

The first interpretation method featured in this provision is using the plain meaning of the text in light of its goals. Another interpretation method would be looking for a widespread state practice in the application of the treaty. If enough states apply a treaty in the same practical way, it can become treaty practice.

On a side note, doctrine proposes an ‘International Commission of Space Jurists’ which could act as an international court in space law matters.³⁰⁸ It could also offer fixed interpretations.

129. Soft law agreements.³⁰⁹ It is also possible that states, with no interest in a new treaty, turn towards other ways to assure their interests in space. They can for example really use soft law, instead of just the soft law inspired provisions. Soft law agreements can be made as they encourage cooperation in a less binding way with guidelines, declarations, etcetera. For example, the European Union's Draft Code of Conduct for Space Activities is one such international initiative.³¹⁰ It aims to boost technical safety, security and sustainability of activities in outer space. However, the draft code was poorly received because states disagreed about its provisions.³¹¹ If nothing else, these agreements open up the conversation again and this will be essential in establishing the most optimal practices.

B. The Regulatory Competition of National Space Laws

a. In General

130. If there is a fixed international legal framework in place, the focus can be shifted towards national space law. National space laws can then be employed to solve the existing legal problems.

The existing international legal framework increasingly forces the hand of states to produce national space law in order for them to operate in the contemporary privatized space context.³¹² Private enterprises will

³⁰⁸ R. JAKHU, “Legal Issues Relating to the Global Public Interest in Outer Space”, *J. Space L.* 2006, (31) 109.

³⁰⁹ IISL DIRECTORATE OF STUDIES, *Does International Space Law Either Permit or Prohibit the Taking of Resources in Outer Space and on Celestial Bodies, and how is this Relevant for National Actors? What is the Context, and What are the Contours and Limits of this Permission or Prohibition?*, unpublished background paper, 2016, 6, http://iislweb.org/docs/IISL_Space_Mining_Study.pdf, last accessed on 4 May 2018.

³¹⁰ European Union's Draft Code of Conduct for Space Activities, https://eeas.europa.eu/topics/disarmament-non-proliferation-and-arms-export-control/14715_en, last accessed on 4 May 2018.

³¹¹ See: J. SU, “The European Union Draft Code of Conduct for Outer Space Activities: An Appraisal”, *Space Policy* 2014, 34-39, <https://ssrn.com/abstract=2635038>, last accessed on 4 May 2018; R.P. RAJAGOPALAN AND D. A. PORAS, Commentary | EU Courts Support for Space Code of Conduct”, *SpaceNews* 2014, <http://spacenews.com/41254eu-courts-support-for-space-code-of-conduct/>, last accessed on 4 May 2018.

³¹² *Supra* No. 67 *et seq.*

want this national legal support if they believe that the current international regime is not supportive enough.³¹³

As there will be no new international framework of space law that can harmonize the national space laws, these national laws will keep on evolving individually. And if every state will separately provide a tailor-made national space law framework for the private enterprises it wants to attract, states will start competing. They will go out of their way to make their space law as attractive as possible in order to boost their economy.³¹⁴

This begs the question whether this is the preferred way to keep going in?

131. Mutually beneficial regime. This modus operandi can create a mutually beneficial regime for states and enterprises. A starting point in this joint venture should be fora where private enterprises can have their say and positively influence the national decision-making process. This is happening in the United States as the opinions of some of the most prominent enterprises were explicitly asked in a hearing of the Senate Commerce Committee's space subcommittee.³¹⁵ Furthermore, a similar case can be found in Europe as Prince Guillaume of the Grand Duchy of Luxembourg had a meeting with the executives of Planetary Resources.^{316; 317} Dialogue should be able to elevate the national space laws to the next level.

132. Lack of regulation.³¹⁸ Contrarily, the existing lack of regulation in some states can also seem alluring for private enterprises: not having to worry about the administrative aspect, technical guidelines, certain financial aspects and obligatory insurance costs. But this would effectively turn against them as there would be no certainty nor transparency whatsoever regarding the costs. Liability costs for example

³¹³ D. LINDEN, "The Impact of National Space Legislation on Private Space Undertakings: Regulatory Competition vs. Harmonization", *JSPG* 2016, (1) 11; S. HOBE, "The Impact of New Developments on International Space Law (New Actors, Commercialisation, Privatisation, Increase in the Number of "Space-faring Nations")", *Rev. dr. unif.* 2010, (869) 879-880.

³¹⁴ D. LINDEN, "The Impact of National Space Legislation on Private Space Undertakings: Regulatory Competition vs. Harmonization", *JSPG* 2016, (1) 6.

³¹⁵ J. FOUST, "Companies, lawyers argue against changing Outer Space Treaty", *SpaceNews* 2017, <http://spacenews.com/companies-lawyers-argue-against-changing-outer-space-treaty/>, last accessed on 4 May 2018.

³¹⁶ *Supra* No. 103.

³¹⁷ A. A., ABRAHAMIAN, "How a tax haven is leading the race to privatise space", *The Guardian* 2017, <https://www.theguardian.com/news/2017/sep/15/luxembourg-tax-haven-privatise-space>, last accessed on 4 May 2018.

³¹⁸ D. LINDEN, *The Impact of National Space Legislation on Private Space Undertakings: Regulatory Competition between States?*, unpublished working paper for Leuven Centre for Global Governance Studies, 2017, (1) 14-15, https://ghum.kuleuven.be/ggs/publications/working_papers/2017/190linden, last accessed on 5 May 2018.

could be drastically higher than in states with a fixed cost limit, because the states would turn to any measure possible to get a full compensation. A system that offers legal certainty seems healthier.

133. Competition.³¹⁹ Subsequently, it is unavoidable in this scenario that the aspect of competition gets thrown in the mix. States will want to attract the booming private space industry, offering enterprises certain ‘advantages’. As will other states and the space law of these foreign states will indirectly influence national space policies.

In theory, for competition to be able to manifest itself, several elements are required.

For the private enterprises, these requirements are threefold.

-Firstly, private enterprises will have to be able to access the market of the regulator. Private enterprises should have a choice as to which states’ principles they want to adhere to. Mobility is key in this area and globalization is an ever-increasing trend that greatly benefits mobility.

-Secondly, access to information on the substance of foreign rules will be needed for private enterprises. With strong legal advisors and a connection to the internet, private enterprises will most likely get the required information.

-And lastly, private enterprises will need the possibility to influence decision-making. As detailed above, the United States as well as the Grand Duchy of Luxembourg have recently shown that they are very open to cooperation and appreciate the input of private enterprises.

The regulating state on the other hand will need to see the benefits of entering the legal competition. For one thing, private enterprises will boost economic activity in the state. But the space related activity of private enterprises can also influence state politics and have a social impact.

134. Advantages.³²⁰ Regulatory competition has the potential to be very beneficial for both states and private enterprises.

The dynamics of competition will be at play. There will be a lot of back and forth between states and private enterprises, a lot of diversity and experimentation. All these factors can benefit the making of a national set of rules as they provide a comparative and alternative lawmaking experience. This way, innovation and

³¹⁹ D. LINDEN, “The Impact of National Space Legislation on Private Space Undertakings: Regulatory Competition vs. Harmonization”, *JSPG* 2016, (1) 6.

³²⁰ *Ibid.*

differentiation will be stimulated. The national space law could be more competitive and qualitative as a result.

Furthermore, the national space laws can be catered to the specific needs of states and private enterprises. If a certain provision of a national space law does not fit, there will be a plethora of more suitable space laws from other states to choose from. If more states join the competition, more specific legal requirements should be met. But there is a caveat which concerns this theory. The assumption is made that private enterprises will have very distinct requirements. It may very well be that private enterprises will mostly need and/or want the same national space law. A preferred national space law will be detailed below.³²¹

135. Concerns, a Race to the bottom.³²² A recurrent concern with regulatory competition is the so-called ‘race to the bottom’. This theory warns states for a downward spiral of lowering standards in order to be competitive.³²³ A state will lower its regulatory standards to attract investments from private enterprises. States favor private enterprises at the cost of inefficient rules. But when states are economically interdependent, this lowering of regulatory standards in one state will cause an economic decline in another state. As a reaction to this economic decline, this state will also lower their regulatory standards. Eventually the downward spiral will lead to a situation in which states and consumers are in a far worse place than before.

It should be possible to halt a ‘race to the bottom’. A centralized policy could instate harmonizing actions to systematically higher the regulatory standards.

Contrarily, a ‘race to the top’ ensues when a state strives for optimal rules and other states follow suit. This has happened in practice in a few relevant areas of law, namely the ones concerning environmental and health regulations.

³²¹ *Infra* No. 136.

³²² D. LINDEN, “The Impact of National Space Legislation on Private Space Undertakings: Regulatory Competition vs. Harmonization”, *JSPG* 2016, (1) 6-7.

³²³ J. M. QUINTANA, “Going Private Transactions: Delaware’s Race to the Bottom?”, *Colum. Bus. L. Rev.* 2004, (547) 549.

b. The Preferred National Space Law

136. When states and private enterprises work together to draw up a national space law, the result should be beneficial for both parties. The International Law Association (ILA) proposes a ‘Model Law on National Space Legislation’.³²⁴ Likewise, D. LINDEN argues³²⁵ that there is a preferred national space law.

This is very interesting for states in need of direction for their future space law. A summarized version follows.

In short, the national space law should focus on authorization, supervision, registration and a liability regime interlinked with insurance.³²⁶ Even though national interest will be key, states should strive for international cooperation and collaboration and private enterprises should be encouraged. Private enterprises should be conversation partners in the preparation of the national space law, as they are becoming more prominent in outer space.³²⁷

A government controlled management organization should be instated with the specific purpose to handle authorization and supervision. It will be important to have an overview of all space activities and their different phases that require authorization. Comprehensible definitions should offer clarity. In the authorization process, technical safety and environmental protection should be guaranteed. Furthermore, private enterprises should be urged to act within the boundaries set out by the international legal framework that the state is bound by. The length and cost of the authorization process should be limited in order to accommodate to the needs of private enterprises.³²⁸

³²⁴ S. HOBE, “The ILA Model Law for National Space Legislation, ZLW 2013, 87; P. DE MAN, “State Practice, Domestic Legislation and the Interpretation of Fundamental Principles of International Space Law”, *Space Policy* 2017, (81) 93.

³²⁵ Also see D. LINDEN, *The Impact of National Space Legislation on Private Space Undertakings: Regulatory Competition between States?*, unpublished working paper for Leuven Centre for Global Governance Studies, 2017, (1) 15-20, https://ghum.kuleuven.be/ggs/publications/working_papers/2017/190linden, last accessed on 5 May 2018.

³²⁶ DE MAN, “State Practice, Domestic Legislation and the Interpretation of Fundamental Principles of International Space Law”, *Space Policy* 2017, (81) 93.

³²⁷ D. LINDEN, *The Impact of National Space Legislation on Private Space Undertakings: Regulatory Competition between States?*, unpublished working paper for Leuven Centre for Global Governance Studies, 2017, (1) 15-16, https://ghum.kuleuven.be/ggs/publications/working_papers/2017/190linden, last accessed on 5 May 2018; S. HOBE, “The ILA Model Law for National Space Legislation, ZLW 2013, 87; P. DE MAN, “State Practice, Domestic Legislation and the Interpretation of Fundamental Principles of International Space Law”, *Space Policy* 2017, (81) 89-90.

³²⁸ D. LINDEN, *The Impact of National Space Legislation on Private Space Undertakings: Regulatory Competition between States?*, unpublished working paper for Leuven Centre for Global Governance Studies, 2017, (1) 16, https://ghum.kuleuven.be/ggs/publications/working_papers/2017/190linden, last accessed on 5 May 2018; S. HOBE, “The ILA Model Law for National Space Legislation, ZLW 2013, 87; P. DE MAN, “State Practice, Domestic Legislation and the Interpretation of Fundamental Principles of International Space Law”, *Space Policy* 2017, (81) 90.

There should be non-stop state supervision of space activities. To achieve this, the states should be given access to all necessary information. States should also have a way to counteract intrusions by undoing the authorization and imposing fines.³²⁹

On the topic of responsibility, both geographical and personal jurisdiction should be factors in pointing out the responsible states for actions of private enterprises.³³⁰

Furthermore, the liability regime should be victim-oriented. Nationals of the launching state should also be protected. For private enterprises that cause damages there should be a clear compensation regime with a maximum amount set by law.³³¹

Consequently, insurance should be mandatory for private enterprises for the complete space activity and the insured amount should be the same as the maximum amount private enterprises could be held to reimburse. As per usual, in certain cases the insurance will not intervene: e.g. in the case of gross negligence. This regime would benefit launching states greatly as otherwise they could pay for all damages.³³²

For registration, there should be a national regime that fits well with the international regime and uses the same definitions.³³³

³²⁹ D. LINDEN, *The Impact of National Space Legislation on Private Space Undertakings: Regulatory Competition between States?*, unpublished working paper for Leuven Centre for Global Governance Studies, 2017, (1) 17, https://ghum.kuleuven.be/ggs/publications/working_papers/2017/190linden, last accessed on 5 May 2018; S. HOBE, “The ILA Model Law for National Space Legislation, *ZLW* 2013, 87; P. DE MAN, “State Practice, Domestic Legislation and the Interpretation of Fundamental Principles of International Space Law”, *Space Policy* 2017, (81) 90.

³³⁰ D. LINDEN, *The Impact of National Space Legislation on Private Space Undertakings: Regulatory Competition between States?*, unpublished working paper for Leuven Centre for Global Governance Studies, 2017, (1) 17-18, https://ghum.kuleuven.be/ggs/publications/working_papers/2017/190linden, last accessed on 5 May 2018.

³³¹ D. LINDEN, *The Impact of National Space Legislation on Private Space Undertakings: Regulatory Competition between States?*, unpublished working paper for Leuven Centre for Global Governance Studies, 2017, (1) 18, https://ghum.kuleuven.be/ggs/publications/working_papers/2017/190linden, last accessed on 5 May 2018; S. HOBE, “The ILA Model Law for National Space Legislation, *ZLW* 2013, 87; P. DE MAN, “State Practice, Domestic Legislation and the Interpretation of Fundamental Principles of International Space Law”, *Space Policy* 2017, (81) 92-93.

³³² D. LINDEN, *The Impact of National Space Legislation on Private Space Undertakings: Regulatory Competition between States?*, unpublished working paper for Leuven Centre for Global Governance Studies, 2017, (1) 15-20, https://ghum.kuleuven.be/ggs/publications/working_papers/2017/190linden, last accessed on 5 May 2018; S. HOBE, “The Impact of New Developments on International Space Law (New Actors, Commercialisation, Privatisation, Increase in the Number of “Space-faring Nations””, *Rev. dr. unif.* 2010, (869) 880; S. HOBE, “The ILA Model Law for National Space Legislation, *ZLW* 2013, 87; P. DE MAN, “State Practice, Domestic Legislation and the Interpretation of Fundamental Principles of International Space Law”, *Space Policy* 2017, (81) 94.

³³³ D. LINDEN, *The Impact of National Space Legislation on Private Space Undertakings: Regulatory Competition between States?*, unpublished working paper for Leuven Centre for Global Governance Studies, 2017, (1) 19-20, https://ghum.kuleuven.be/ggs/publications/working_papers/2017/190linden, last accessed on 5 May 2018; S. HOBE, “The

To conclude it is recommended to extent the freedom principle of the Outer Space Treaty³³⁴ to private enterprises as this would encourage states to make access to space for private enterprises achievable if these private enterprises comply with, among other restrictions, the technical safety standards and the international legal framework for space law.³³⁵

§2. Amending the Existing International Framework of Space Law

137. Another movement likewise does not want to completely abandon the existing international legal framework; however, it does not find its solution in national space laws. Instead there are proposals to amend the existing international legal framework. The thinking goes as follows.

A. In General

138. Even though the existing international framework of space law has its origin in a context entirely unlike the current one,³³⁶ it should not be thrown overboard entirely. It still offers a useful set of texts as some core concepts of the Outer Space Treaty still ring true to this day.³³⁷

Furthermore, states seem to have an aversion of new space related treaties. The reasoning behind this is twofold. Firstly, states do not want to limit their national security by signing another treaty that in a way would minimize their strategic advantages. Secondly, states would want to verify the compliance of others to the treaty, and this is very hard in outer space.³³⁸

Nevertheless, the texts should be updated for this new age, taking into account the evolutions in the industry.³³⁹

ILA Model Law for National Space Legislation, *ZLW* 2013, 87; P. DE MAN, “State Practice, Domestic Legislation and the Interpretation of Fundamental Principles of International Space Law”, *Space Policy* 2017, (81) 92.

³³⁴ Article I Outer Space Treaty.

³³⁵ D. LINDEN, *The Impact of National Space Legislation on Private Space Undertakings: Regulatory Competition between States?*, unpublished working paper for Leuven Centre for Global Governance Studies, 2017, (1) 20, https://ghum.kuleuven.be/ggs/publications/working_papers/2017/190linden, last accessed on 5 May 2018.

³³⁶ *Supra* No.1 *et seq.*

³³⁷ P.J. BLOUT, “Renovating Space: The Future of International Space Law”, *Denv. J. Int'l L. & Pol'y* 2011, (515) 524.

³³⁸ *Ibid.*

³³⁹ *Ibid.*

The most obvious candidates for an update are the Outer Space Treaty and the Moon Treaty.

B. Amending the Outer Space Treaty.

139. If the soft law methods will not stick,³⁴⁰ a more far-reaching solution would be amending the Outer Space Treaty.³⁴¹

Amending the Outer Space Treaty is made possible by Article XV:

“Any State Party to the Treaty may propose amendments to this Treaty. Amendments shall enter into force for each State Party to the Treaty accepting the amendments upon their acceptance by a majority of the States Parties to the Treaty and thereafter for each remaining State Party to the Treaty on the date of acceptance by it.”

140. Ideally, all concerns could be addressed. The private enterprises will want a beneficial and fixed property regime and states will want to keep free access to outer space.³⁴²

A major discussion point has always been Article II with its non-appropriation principle. This should thus be the first article to be amended. A new appropriation regime could be instated here and all other articles should be amended in a way that they would not contradict this.³⁴³

This appropriation regime may however not hinder the free access to outer space by all states. To prevent this hinderance, excessive claims should be counteracted by a well thought out legal and administrative frame that would guarantee a fair distribution of outer space property. This can come in the form of an international management organization with oversight competence. Its objective would be to prevent harmful interference and to promote productive use of the outer space property.³⁴⁴

³⁴⁰ *Supra* No. 128 *et seq.*

³⁴¹ T.S. TWIBELL, “Space Law: Legal Restraints on Commercialization and Development of Outer Space”, *UMKCL Rev.* 1996-1997, (589) 638-639.

³⁴² *Ibid.*

³⁴³ *Ibid.*

³⁴⁴ *Ibid.*

This inclusion of a property regime in the Outer Space Treaty would be in line with the recent national space laws of the United States and Luxembourg.³⁴⁵

C. Amending the Moon Treaty.

141. Turning to the Moon Treaty however, a similar approach could be taken. As elaborated earlier in this dissertation,³⁴⁶ the Moon Treaty was not a success as it has only 18 parties – the United States is not even a member. This failure was mostly due to the inclusion of the common heritage of mankind principle.

Instead of abandoning this treaty, it could be fixed with amendments in order to offer a more attractive regime that could eventually be internationally used in outer space. Article 17 of the Moon Treaty allows this by stipulating that amendments could be decided upon by a majority of the states parties, not unlike Article XV of the Outer Space Treaty.³⁴⁷

142. Suggestions are offered for amendments that could make for a more attractive Moon Treaty. Most importantly, they suggest that the common heritage of mankind principle should be clarified adequately.³⁴⁸

The focus should be shifted towards the exploration and use of the moon and its resources as common heritage of mankind. How this will work in practice is still up in the air. Again, for example, an international organization with oversight competence could be instituted to equitably manage the property.³⁴⁹

Furthermore, private enterprises in the space industry should be supported by an international regime for exploitation. Implementing this obligation would meet the want for more certainty from the private enterprises.³⁵⁰

The best place to insert these amendments would be Article 11 as this deals with the common heritage of mankind and the establishment of an international regime.³⁵¹

³⁴⁵ *Supra* No. 91 *et seq.*

³⁴⁶ *Supra* No. 54.

³⁴⁷ V. BELDAVS, “Simply Fix the Moon Treaty”, *The Space Review* 2018, <http://www.thespacereview.com/article/3408/1>, last accessed on 4 May 2018.

³⁴⁸ *Ibid.*

³⁴⁹ *Ibid.*

³⁵⁰ *Ibid.*

³⁵¹ *Ibid.*

143. On top of that, initiatives to give developing countries access to outer space should be encouraged.³⁵² The Organization for Economic Cooperation and Development (OECD) instated a Space Forum that can be used as a platform to discuss the place of the space industry in the global economy.³⁵³ As developing countries do not have the same industrial and technical power as some prominent spacefaring states, they should be supported in their efforts to exploit space resources. Once this is achieved, an equitable sharing regime will be better received.

This equitable sharing regime should also be clarified accordingly. Earlier in this writing, this idea was already touched upon. There could be a system, where developing countries and developed countries that contribute to their fullest extent would be rewarded equally.³⁵⁴

§3. A New International Framework for Space Law

144. A final movement is more radical and pushes the creation of entirely new space law treaties.

To achieve this, the existing international legal framework could be abandoned first.³⁵⁵

Consequently, a new framework could be drawn up to work away all uncertainties regarding legal space activities. In the process of achieving this, the stance on the common heritage of mankind principle should be clarified and the harmonization of national space laws could be strived for.³⁵⁶ Furthermore, some academics juggle very creative ideas regarding this new international framework for space law.³⁵⁷

A. Radically Abandoning the Existing International Legal Framework

145. One way to deal with the issue at hand harkens back to the radical regime. They wanted to inspire a widespread abandonment by proposing to individually abandon the Outer Space Treaty and not adhere to

³⁵² *Ibid.*

³⁵³ <https://www.innovationpolicyplatform.org/oecd-space-forum>, last accessed on 4 May 2018.

³⁵⁴ *Supra* No. 83.

³⁵⁵ *Infra* No. 145.

³⁵⁶ *Infra* respectively No. 164 *et seq.* and No. 153 *et seq.*

³⁵⁷ *Infra* No. 177.

the non-appropriation principle.³⁵⁸ This unilateral action should be taken in the hopes of inspiring enough states to join this course of action so that rule of law will have to comply.³⁵⁹

Unilateral action has some advantages. It has none of the slowness of national legislation process and none of the rigidity of international decision-making.³⁶⁰ Contrasting the slow-moving field of international space law with the rapid evolutions in the space industry, unilateral action seems an attractive solution.³⁶¹

146. However, it also has great disadvantages. Simply abandoning the Outer Space Treaty or its non-appropriation principle would put a state in a very negative position in international society.³⁶² Other states will likely not want to further cooperate with a state that simply abandons a mutual treaty.

147. The recent practices from the United States and the Grand Duchy of Luxembourg may look like unilateral action,³⁶³ but they are in fact a smarter type of solution.³⁶⁴ By simply recognizing claims of their citizens, they are not entirely radical, but they walk a middle ground, seemingly falling within the interpretation limits of the Outer Space Treaty.

148. To fill the subsequent legal void, J. THOMAS for example proposes a new legal framework based entirely on the existing capitalistic property regimes. The main elements would be discovery, claim and possession.³⁶⁵

The fact that this regime is tried and tested for a very long time would guarantee that it is a workable one. However, the existing unequal distribution of wealth as on earth would probably further manifest itself. To counteract this, developing countries should receive some sort of support to be able to contribute.³⁶⁶

³⁵⁸ *Supra* No. 85.

³⁵⁹ T.S. TWIBELL, "Space Law: Legal Restraints on Commercialization and Development of Outer Space", *UMKC L. Rev.* 1996-1997, (589) 640; J. THOMAS, "Privatization of Space Ventures: Proposing a Proven Regulatory Theory for Future Extraterrestrial Appropriation", *Int'l L. & Mgmt. Rev.* 2005, (191) 217-218.

³⁶⁰ *Supra* No. 19.

³⁶¹ J. THOMAS, "Privatization of Space Ventures: Proposing a Proven Regulatory Theory for Future Extraterrestrial Appropriation", *Int'l L. & Mgmt. Rev.* 2005, (191) 217-218.

³⁶² T.S. TWIBELL, "Space Law: Legal Restraints on Commercialization and Development of Outer Space", *UMKC L. Rev.* 1996-1997, (589) 640.

³⁶³ *Supra* No. 91 *et seq.*

³⁶⁴ T.S. TWIBELL, "Space Law: Legal Restraints on Commercialization and Development of Outer Space", *UMKC L. Rev.* 1996-1997, (589) 640-641.

³⁶⁵ Also see J. THOMAS, "Privatization of Space Ventures: Proposing a Proven Regulatory Theory for Future Extraterrestrial Appropriation", *Int'l L. & Mgmt. Rev.* 2005, (191) 218 *et seq.*

³⁶⁶ *Ibid.*

B. The Harmonization of National Space Laws

a. Harmonization in General

149. National space laws should be dealt with accordingly if a new international framework of space law will be instated. As regulatory competition can result in widely differing national space laws, these will cause unbalanced conditions of competition and low-quality standards will have a negative effect on citizens. If it is possible to instate a new international treaty, this treaty could strive for the opposite of regulatory competition: regulatory harmonization of all national space laws.³⁶⁷

In essence, regulatory harmonization is the implementation of a uniform space law for every state. An international management organization could oversee the process.³⁶⁸

150. Positive aspects of regulatory harmonization.³⁶⁹ Regulatory harmonization counteracts most negative aspects of regulatory competition such as the race to the bottom, which is especially dangerous in the context of taxation.

Furthermore, detrimental side effects across borders of industry activity can now more easily be taken into account. For example, when environmental standards are lowered in a state's effort to attract private enterprises, this lowering of standards can harm the environment across borders and the other state would pay for it. When there is international cooperation, this will not happen.

Additionally, transaction costs can be lowered drastically. And by cooperating across borders, the industry's scale increases and scale economies are achieved, bringing forth substantial industry improvements.

However, it should be noted that these positive aspects are relative as they have different impact on various fields of law.

151. Negative aspects.³⁷⁰ Harmonization does however cause political distortion; a politicians' interests can clash with what the citizens want.

³⁶⁷ D. LINDEN, "The Impact of National Space Legislation on Private Space Undertakings: Regulatory Competition vs. Harmonization", *JSPG* 2016, (1) 7.

³⁶⁸ *Ibid.*

³⁶⁹ *Ibid.*

³⁷⁰ *Ibid.*

152. Searching a perfect compromise.³⁷¹ Theoretically, there is a regime that can accommodate to the shortcomings of both regulatory harmonization as well as regulatory competition: vertical competition. Here, private enterprises have a choice between local or centralized rules. This way they can take advantage of the positive aspects of both regulatory regimes, as there will be incentives for innovation with market pressure and political responsibility on one hand, and a clear streamlined legal framework with global applicability on the other hand.

b. The Regulatory Harmonization of Space Law

153. As elaborated earlier in this dissertation, there is an emergence of national space law to accommodate the shortcomings of the international legal framework and states differ in their application of international law as they can have their own interpretations of provisions and their wording.³⁷² This results in very diverging national space laws because all states have their own economy, legal history, goals, resources etcetera. However, in this inherently international industry, widely differing space laws will result in uncertainty, unequal treatment and unworkable legal situations. As globalization increases, uniformization of space law, which is a cross-border sector, would be in place.³⁷³

In the space industry, regulatory harmonization can accommodate to this.³⁷⁴

154. Positive aspects of regulatory harmonization for space law.³⁷⁵ Harmonization of space law encourages international cooperation and it simplifies business for private enterprises by giving them uniform legal and administrative requirements across borders.

Ideally, it would create an environment of competition and fairness for private enterprises.

On top of that, harmonization of space laws counteracts negative effects of regulatory competition, such as ‘flags of convenience’ and forum shopping.

³⁷¹ *Ibid.*

³⁷² *Supra* No. 67 *et seq.*

³⁷³ *Ibid.*; V.S. VERESHCHETIN, The Law of Outer Space in the General Legal Field (Commonality and Particularities), *Revista Brasileira de Direito Aeronáutico e Espacial* 2010, (42) 44.

³⁷⁴ D. LINDEN, “The Impact of National Space Legislation on Private Space Undertakings: Regulatory Competition vs. Harmonization”, *JSPG* 2016, (1) 7.

³⁷⁵ *Ibid.* 9.

In a system guided by regulatory competition, private enterprises could take advantage of the situation by creating companies in order to adhere to other states' space laws. Some national space laws are less strict and can attract private enterprises because of this. If this is the case and another state's lower standards would be used, the outcome could be dangerous as space activities are highly risky. Harmonization would solve this problem.

155. Using the ideal national space law.³⁷⁶ The most attractive elements of national space laws can be used to base the harmonized set of rules upon. The aforementioned preferred national space law can offer inspiration in this respect.³⁷⁷

Specifically, in the context of safety, insurance and registration, harmonization will prove to be superior to regulatory competition.

-Regarding technical **safety**, the states' need for procedures to prevent damage and international liability contrasts the private enterprises' want for less regulation to avoid being less competitive than foreign states with less strict regulation.

It is in any case of great importance to assure the safety of the passengers and the people on earth, so a thorough safety assessment should be in place. This safety assessment could be placed in the authorization process.

Coherent safety standards could be ensured by establishing uniform quality goals that can be safeguarded by standardization organizations, for example European Cooperation for Space Standardization (ECSS).³⁷⁸ Furthermore, these standards should be used when drafting national space laws or when harmonizing.

Regulatory competition could result in a race to the bottom.³⁷⁹ In the space industry this could be very detrimental for both safety and environment.

-The **insurance** business will have a key role in the new space industry. Differences in insurance requirements between states will lead to forum shopping. This will happen because insurances can bring a

³⁷⁶ *Ibid.* 9-10.

³⁷⁷ *Supra* No. 136.

³⁷⁸ "The European Cooperation for Space Standardization is an initiative established to develop a coherent, single set of user-friendly standards for use in all European space activities", <http://ecss.nl/>, last accessed on 4 May 2018; D. LINDEN, "The Impact of National Space Legislation on Private Space Undertakings: Regulatory Competition vs. Harmonization", *JSPG* 2016, (1) 9.

³⁷⁹ *Supra* No. 135.

large cost and private enterprises will definitely look at the financial picture when choosing a place to settle their business. Obligatory insurance in every state and ideally harmonization could work against this.

-Lastly, **registration** of space objects would fare best with regulatory harmonization. It is in the benefit of everybody that registration of space activities can be done easily in both national and international registers. Frequent updates that keep up with evolutions in the industry are advised.

Harmonization would help in keeping the information and parameters in national registers uniform.

156. Soft harmonization.³⁸⁰ Perhaps, soft harmonization is a more compromising solution. As the non-uniform interpretations of the international legal framework result in confusion and miscommunication, the provisions of the international legal framework could be referenced in all national space laws in a consistent way. Interpretation issues can thus be avoided with a system of uniform references to international law.

c. A Practical Example: Harmonization in Europe

157. Practically, in Europe, harmonization would mean adhering to European Union rules. The opposite being the following of member state rules. Harmonization in the European Union has been successfully achieved before in other areas than space law. They have the tools to legislate and regulate. If these tools are used accordingly, harmonization of the national legal frameworks of space law can be achieved for its member states.³⁸¹

158. Europe has the ambition to have an innovative economy, so building a competitive and competent European space sector with independent access to space will certainly add to that. In these plans, the European Union should be the institution charged with control over the procedures and specifically

³⁸⁰ “The European Cooperation for Space Standardization is an initiative established to develop a coherent, single set of user-friendly standards for use in all European space activities”, <http://ecss.nl/>, last accessed on 4 May 2018; D. LINDEN, “The Impact of National Space Legislation on Private Space Undertakings: Regulatory Competition vs. Harmonization”, *JSPG* 2016, (1) 9.

³⁸¹ *Ibid.* 7.

authorization.³⁸² Harmonized space law would give the European Union a strong position relative to other space faring entities.³⁸³

However, it should be noted that states in Europe can also cooperate outside the European Union's context.³⁸⁴

159. Legislation.³⁸⁵ Article 4 (3) of the Consolidated version of the Treaty on the Functioning of the European Union reads as follows:

“In the areas of research, technological development and space, the Union shall have competence to carry out activities, in particular to define and implement programmes; however, the exercise of that competence shall not result in Member States being prevented from exercising theirs.” (underlining by author of the dissertation)

So, there is a shared space competence between the European Union and its member states. Article 189 of the Consolidated version of the Treaty on the Functioning of the European Union is a sort of extension of this principle:

“1. To promote scientific and technical progress, industrial competitiveness and the implementation of its policies, the Union shall draw up a European space policy. To this end, it may promote joint initiatives, support research and technological development and coordinate the efforts needed for the exploration and exploitation of space.

2. To contribute to attaining the objectives referred to in paragraph 1, the European Parliament and the Council, acting in accordance with the ordinary legislative procedure, shall establish the necessary measures, which may take the form of a

³⁸² EUROPEAN COMMISSION, *Communication from the Commission to the European Parliament, The Council, The European Economic and Social Committee and the Committee of the Regions: the Space Strategy for Europe*, COM(2016) 705 final, https://www.consilium.europa.eu/media/32870/com_2016_705_f1_communication_from_commission_to_inst_en_v12_p1_864471.pdf, last accessed on 4 May 2018; D. LINDEN, “The Impact of National Space Legislation on Private Space Undertakings: Regulatory Competition vs. Harmonization”, *JSPG* 2016, (1) 10.

³⁸³ *Ibid.*

³⁸⁴ *Ibid.* 9

³⁸⁵ *Ibid.* 8.

European space programme, excluding any harmonisation of the laws and regulations of the Member States.

3. The Union shall establish any appropriate relations with the European Space Agency.

*4. This Article shall be without prejudice to the other provisions of this Title.”
(underlining by author of the dissertation)*

The competence is practically an overseeing one, as the European Union can offer support or coordinate. They can carry out space activities but it this may not prevent its member states from doing the same. The activities must be able to run parallel.

The European Union should also consider the subsidiarity principle when carrying out space activities. This means that when member states are decentralized actors can fully exercise their competence, there is no need for the centralized European Union to intervene. However, when a member state can only partly exercise their competence, the European Union has a margin to act.³⁸⁶

Also, the proportionality principle should be kept in mind. The European Union should consider what actions are necessary to achieve their goals and not go any further.³⁸⁷

Interestingly, any harmonization of the laws and regulations of the Member States is clearly excluded in Article 189 of the Consolidated version of the Treaty on the Functioning of the European Union.³⁸⁸ Member states have shown that they will not give up their space competence as there was no exclusion in the first draft, but member states would not allow this.³⁸⁹

Member states thus have an explicit provision to lean on when drawing up national space law with their own unique approach.³⁹⁰

However, the wording of Article 189, leaves some breathing room for the European Union. They can meet their harmonization goals in different ways as their rules should avoid ‘hard harmonization’.

³⁸⁶ *Ibid.*

³⁸⁷ *Ibid.*

³⁸⁸ *Ibid.*

³⁸⁹ *Ibid.*

³⁹⁰ *Ibid.*

160. Negative aspects of hard harmonization in the European Union.³⁹¹ ‘Hard harmonization’ would practically not be ideal. Member states of the European Union are not a homogeneous group, as their economies and level of involvement in the space industries differ widely.

The unworkability of having one authorization system for all member states illustrates this very well. With a centralized system in place, states would not be able to fully exercise the competence that they have in this area. The member states would for example have no control over export and licensing anymore.

161. Soft Harmonization.³⁹² Contrarily, ‘soft harmonization’ should be pursued. This can mean that national space law should not be uniform. The focus should however be compatibility between all national space laws.

There are nevertheless some fundamental freedoms (establishment, movement of goods and services) of the European Union that should be adhered to at all times: such as the freedom of establishment and the free movement of goods and services.

Coming back to the authorization, a system of mutual authorization by member states would be more workable. This has been achieved before in the national space laws of the United Kingdom and Australia. If there are strong authorization procedures in each member state, the licenses should be valid cross borders. Private enterprises would benefit greatly by the added flexibility.

162. There are several ways to reach this soft harmonization for space law in the context of the European Union.

-Cross-over regulations.³⁹³ For one, harmonization can be achieved when European Union regulations from other contexts can cross over with the space industry. This way, the European Union can achieve a soft harmonization of regulations that have a crossover appeal with space. Article 189 leaves enough breathing room for this.

This has happened in the past, as even before the implementation article 189, the European Union had been focusing on space law. Space activities namely cross over with areas of the European Union’s competence or interests such as telecommunication technology, the environment, research, etcetera. For example, the

³⁹¹ *Ibid.* 10.

³⁹² *Ibid.*

³⁹³ *Ibid.* 8.

European Union's project 'Galileo', which aims to bring satellite navigation with a higher accuracy independent from GPS and other systems, represents a crossover of space law and the Trans-European Networks competence.

Obviously, this modus operandi is not ideal as the European Union's influence can differ across contexts and the legal framework for space law will become very disparate and unfocused.

-System of institutions.³⁹⁴ Another way to achieve soft harmonization by the European Union, is by creating a system of institutions that have a competence in space. This way, European Union goals can be achieved with a strong integration of its policies.

This 'enhanced cooperation' has also been applied before, namely with regards to the Schengen Area and the implementation of the euro currency.

-Article 114 TFEU.³⁹⁵ Also, a possible way towards soft harmonization is Article 114 of the Consolidated version of the Treaty on the Functioning of the European Union. Article 114.1 reads as follows:

"1. Save where otherwise provided in the Treaties, the following provisions shall apply for the achievement of the objectives set out in Article 26. The European Parliament and the Council shall, acting in accordance with the ordinary legislative procedure and after consulting the Economic and Social Committee, adopt the measures for the approximation of the provisions laid down by law, regulation or administrative action in Member States which have as their object the establishment and functioning of the internal market."

Member states can have such disparate national space laws that fundamental freedoms become obstructed and consequently the internal market stops functioning properly. If that is the case, the European Union can take measures based on Article 114 to protect the internal market. This is called the 'approximation of laws'.

This has been applied in the past to harmonize the coordination of frequency allocation with the Radio Spectrum Decision.

³⁹⁴ *Ibid.*

³⁹⁵ *Ibid.* 8-9.

-Article 352 TFEU.³⁹⁶ Furthermore, there is Article 352 of the Consolidated version of the Treaty on the Functioning of the European Union:

“1. If action by the Union should prove necessary, within the framework of the policies defined in the Treaties, to attain one of the objectives set out in the Treaties, and the Treaties have not provided the necessary powers, the Council, acting unanimously on a proposal from the Commission and after obtaining the consent of the European Parliament, shall adopt the appropriate measures. Where the measures in question are adopted by the Council in accordance with a special legislative procedure, it shall also act unanimously on a proposal from the Commission and after obtaining the consent of the European Parliament.

2. [...]

3. Measures based on this Article shall not entail harmonisation of Member States' laws or regulations in cases where the Treaties exclude such harmonisation.

4. [...]”

If in some area there is no fitting competence to reach the European Union goals, they can take action. All appropriate measures can be taken. However, harmonization can be explicitly excluded.

-OMC.³⁹⁷ A last way to reach soft harmonization may be the ‘open method of coordination’ (OMC). The EUR-Lex website offers the follow definition in its glossary:³⁹⁸

“The open method of coordination (OMC) in the European Union may be described as a form of ‘soft’ law. It is a form of intergovernmental policy-making that does not result in binding EU legislative measures and it does not require EU countries to introduce or amend their laws.

The OMC has provided a new framework for cooperation between the EU countries, whose national policies can thus be directed towards certain common objectives. Under this intergovernmental method, the EU countries are evaluated by one another (peer

³⁹⁶ *Ibid.* 9.

³⁹⁷ *Ibid.* 9.

³⁹⁸ https://eur-lex.europa.eu/summary/glossary/open_method_coordination.html, last accessed on 4 May 2018.

pressure), with the Commission's role being limited to surveillance. The European Parliament and the Court of Justice play virtually no part in the OMC process.

The OMC is principally based on:

jointly identifying and defining objectives to be achieved (adopted by the Council);

jointly established measuring instruments (statistics, indicators, guidelines);

benchmarking, i.e. comparison of EU countries' performance and the exchange of best practices (monitored by the Commission).”

The OMC tries to achieve unity by focusing on cooperation but without the implementation legal provisions. The member states keep their individuality within the frame of the European Union.

This method would be particularly fitting to achieve a uniform policy for outer space safety and authorization.

163. Conclusion on harmonization of space law in Europe.³⁹⁹ Harmonization may not be the best direction to take space law in the European Union. As detailed in the international framework of space law,⁴⁰⁰ states are responsible for space activities. In addition, not all space industries have uniform market features. On top of that, states will want to exert a strict control over space because of space’s strategic qualities. Even though this strict state responsibility should not necessarily be counteracting international cooperation, harmonization will eliminate market barriers if this has not happened already. Harmonization thus clashes with these characteristics of the space industry, as states would like to keep some control.

Furthermore, harmonization has various degrees of compatibility with areas of the space industry depending on the need for common standards. If the implementation of common standards is beneficial for an area of the space industry, harmonization is in place. Harmonization is for example fitting in the area of service satellites, but not in the security heavy area of launch services.

³⁹⁹ D. LINDEN, “The Impact of National Space Legislation on Private Space Undertakings: Regulatory Competition vs. Harmonization”, *JSPG* 2016, (1) 10.

⁴⁰⁰ *Supra* No. 42.

Even characteristics of states can stand in the way of harmonization. As the space industry has specific needs, these cannot always be accommodated accordingly in each state. States have different legal systems, landscape elements, population density, etcetera.⁴⁰¹

Even vertical competition as a compromise would not be entirely satisfactory. The existing international legal frame focusses on states so it would not be appropriate to give private enterprises a choice between a centralized European Union regime or a member state's national regime, as the member states are exclusively fitted. Liability in outer space for example always reverts back to states, not the European Union. States would also be more fitted than the European Union to assess safety risks on their territory.⁴⁰²

C. The New Legal Framework & the Common Heritage of Mankind Principle

164. If a new international framework is indeed drawn up, its treatment of the common heritage of mankind principle should be fully addressed. For example, a full-fledged public trust doctrine could be beneficial.⁴⁰³ Furthermore, the use of the common heritage principle in other areas can offer inspiration on how the implementation can be most beneficial.⁴⁰⁴ Contrarily, a regime without the common heritage of mankind principle is also an option.⁴⁰⁵

Today, the common heritage of mankind principle is very much interwoven with the existing framework of space law. Space should be explored and used “for the benefit of and in the interest of all countries”.⁴⁰⁶

Unfortunately, the application of the principle does not warrant an entirely sound regime when property rights get thrown in the mix. And private enterprises will want those property rights.⁴⁰⁷

If an internationally agreed and equitable way to manage property rights in outer space could be achieved, it may be possible to reap all the intended benefits of the common heritage of mankind principle in outer

⁴⁰¹ D. LINDEN, “The Impact of National Space Legislation on Private Space Undertakings: Regulatory Competition vs. Harmonization”, *JSPG* 2016, (1) 10-11.

⁴⁰² *Ibid.* 11.

⁴⁰³ *Infra* No 165 *et seq.*

⁴⁰⁴ *Infra* No 168 *et seq.*

⁴⁰⁵ *Infra* No 174 *et seq.*

⁴⁰⁶ *Supra* No. 59 *et seq.*

⁴⁰⁷ *Supra* No. 75 *et seq.*

space. The implementation of the common heritage principle through an international management organization for example, could be very beneficial.

a. The Public Trust Doctrine

165. Theoretically, by introducing a form of the common heritage principle in article I of the Outer Space Treaty, all property rights should be trusted to the sovereign state which would in turn convey these rights to private enterprises or individuals in the form of a usage rights. However, the sovereign state does not have these rights in outer space.^{408; 409}

Nevertheless, the management of property by a state in the form of a trust can be very beneficial and therefore it can pay off on an international scale to try to achieve a similar regime for outer space that is well defined and concrete.⁴¹⁰

166. Historically.⁴¹¹ In the past such an international management system was in place when the United Nations created the Trusteeship Council in 1945. Its goal was to manage the common heritage properties via a coordinated approach. The organization became inactive in 1994. Its members are very politically diverse which led to a slow decision-making process.

The Trusteeship Council could be reinstated to deal with the conferment of usage rights in outer space, or a new organization could be created. The usage of the public trust doctrine in outer space can harbor economic advantages. It could be very helpful in space resource management.

167. Applications and benefits.⁴¹² There are different ways to deal with a public trust in outer space. This should be determined when developing the regime. For example, a concession regime could be instated or fixed term leasehold estates can be equitably allocated with the option of renewal. Prices can be

⁴⁰⁸ C. PASTORIUS, "Law and Land Policy in the Global Space Industry's Lift-off", *Barry L. Rev.* 2013, (201) 229; F. VON DER DUNK, H.R. HERTZFELD, "Bringing Space Law into the Commercial World: Property Rights without Sovereignty", *Chi. J. Int'l L.* 2005-2006, (81) 84-85.

⁴⁰⁹ *Supra* No. 66.

⁴¹⁰ C. PASTORIUS, "Law and Land Policy in the Global Space Industry's Lift-off", *Barry L. Rev.* 2013, (201) 229; F. VON DER DUNK, H.R. HERTZFELD, "Bringing Space Law into the Commercial World: Property Rights without Sovereignty", *Chi. J. Int'l L.* 2005-2006, (81) 84-85.

⁴¹¹ C. PASTORIUS, "Law and Land Policy in the Global Space Industry's Lift-off", *Barry L. Rev.* 2013, (201) 230.

⁴¹² *Ibid.* 230-232.

proportional to the land's production-potential. Furthermore, a distinction can be made between allocated property rights and extraction or usage rights. And a limit on resource extraction can be put in place.

A set of rules that offers private enterprises certainty would be much welcomed.

States on the other hand can reap the economic benefits. In line with the common heritage of mankind principle, the benefits sharing should be equitable. In order to establish a reasonable regime, the benefits can be distributed proportionally with a plethora of factors such as the invested sums, the contribution to technology, etc. And for the non-spacefaring states, the investment in the global space industry and other more specific undertakings can be taken into account. In this way, the benefits of space activities could be commonly shared in a more equitable manner while also encouraging investments in infrastructure and funding to benefit the commercial space corporations.

b. Inspiration from other Areas

168. In the search of a solution the inspiration can come from various places, as there are legal frameworks similar to space law that can assist in the creation of a legal regime for the new industries. For now, we will search the Deep Seabed and Antarctica for inspiration.

i. The Deep Seabed

169. The existing earthly mining industry has a framework that could apply to the exploitation of outer space and the most likely place to find a comparable context is the Deepsea bottom.⁴¹³

⁴¹³ T.S. TWIBELL, "Space Law: Legal Restraints on Commercialization and Development of Outer Space", *UMKC L. Rev.* 1996-1997, (589) 640; IISL DIRECTORATE OF STUDIES, *Does International Space Law Either Permit or Prohibit the Taking of Resources in Outer Space and on Celestial Bodies, and how is this Relevant for National Actors? What is the Context, and What are the Contours and Limits of this Permission or Prohibition?*, unpublished background paper, 2016, 38-39, http://iislweb.org/docs/IISL_Space_Mining_Study.pdf, last accessed on 4 May 2018.

The United Nations' Convention on the Law of the Sea

170. For instance, the United Nations' Convention on the Law of the Sea⁴¹⁴ explicitly applies the common heritage of mankind principle on its deep seabed regime.⁴¹⁵

Just like Article II of the Outer Space Treaty, the Convention on the Law of the Sea has a non-appropriation provision. However, there is the issue of non-adherence to this principle. This is problematic as exceptions undermine a non-appropriation provision completely.⁴¹⁶

And one particular element of the regime stands out as it was very negatively received by developed countries: the sharing of benefits. This was to be achieved by the sharing of research and technology by developed nations with developing nations and the instated international management organization (more on this later). This was supposed to be a transgressional arrangement as after some time the organization and developing nations would become capable enough.⁴¹⁷

Financial requirements would also differ for developing and developed countries, taking into account their characteristics.⁴¹⁸

Most developed countries would not join because they disagreed with the application of the common heritage of mankind principle on the deep seabed and the disagreement culminated in the 1994 amendments of the convention. The amended convention eventually encouraged more countries to join. The new agreement was based on the free market principles and was attractive for developed countries. Benefit sharing was abandoned entirely.⁴¹⁹

Space law is walking a similar path and can take cues from it. A very strict common heritage of mankind principle seems unworkable.

⁴¹⁴ Convention on the Law of the Sea of 10 Dec. 1982 (**LOS Convention**), *UNTS* Vol. 1835, 3.

⁴¹⁵ J. FRAKES, "The Common Heritage of Mankind Principle and the Deep Seabed, Outer Space, and Antarctica: Will Developed and Developing Nations Reach a Compromise?", *Wis. Int'l L.J.* 2003, (409) 416-417; V. BLANCHETTE-SÉGUIN, "Reaching for the Moon: Mining in Outer Space", *N.Y.U. J. Int'l L. & Pol.* 2017, (959) 967-968.

⁴¹⁶ J. FRAKES, "The Common Heritage of Mankind Principle and the Deep Seabed, Outer Space, and Antarctica: Will Developed and Developing Nations Reach a Compromise?", *Wis. Int'l L.J.* 2003, (409) 416

⁴¹⁷ *Ibid.* 417-418.

⁴¹⁸ *Ibid.* 418.

⁴¹⁹ *Ibid.* 419-420.

171. Interestingly, in its application of the common heritage principle, the regime instated an international management organization with the specific purpose to oversee the exploitation of the deep seabed. This United Nations' organization is called the International Deep Seabed Authority or the Authority in short. Every undertaking to exploit the deep seabed must be in agreement with the Authority. The Enterprise would consequently extract the resources alongside states and private enterprises.⁴²⁰

Each state has only one vote to achieve equality and for the resolution of disputes, internationally renowned tribunals offer their services including the International Tribunal for the Law of the Sea and even the International Court of Justice.⁴²¹

This modus operandi could offer inspiration when instating a similar organization for outer space exploitation.

The United States' Deep Seabed Hard Mineral Resources Act

172. Another source of inspiration could be the United States' Deep Seabed Hard Mineral Resources Act.⁴²² This act has provisions that could be used to instate a mining regime.⁴²³

Most importantly, a regime for mutual recognition by states of claims could be found here.⁴²⁴

“§1412. Licenses for exploration and permits for commercial recovery

[...]

(b) Nature of licenses and permits

[...]

(2) Any license or permit issued under this subchapter shall be exclusive with respect to the holder thereof as against any other United States citizen or any citizen, national

⁴²⁰ *Ibid.* 416-417.

⁴²¹ *Ibid.*

⁴²² United States' Deep Seabed Hard Mineral Resources Act of 28 Jun. 1980, *Publ. L.* 69-283.

⁴²³ T.S. TWIBELL, “Space Law: Legal Restraints on Commercialization and Development of Outer Space”, *UMKC L. Rev.*, 1996-1997, (589) 639-640.

⁴²⁴ *Ibid.*

or governmental agency of, or any legal entity organized or existing under the laws of, any reciprocating state.

[...]

(4) In the event of interference with the exploration or commercial recovery activities of a licensee or permittee by nationals of other states, the Secretary of State shall use all peaceful means to resolve the controversy by negotiation, conciliation, arbitration, or resort to agreed tribunals.

[...]”

Furthermore, there is a focus on the exclusion of harmful interference. On top of that, mining activities would be secured and free access to outer space should be guaranteed.⁴²⁵

As states can have jurisdiction over spacecrafts based on Article VIII of the Outer Space Treaty, a parallel could be drawn between jurisdiction over spacecrafts and jurisdiction over mining facilities. A certain zone around the facility should be under the same control for safety considerations.⁴²⁶ This is not possible in maritime law, but seems appropriate for outer space.⁴²⁷

The regime should thus be adjusted accordingly to fit the outer space context. For private enterprises the risks could be minimized by having a regime that protects their rights as they would make substantial investments.

ii. Antarctica

173. An analogy with the legal situation of Antarctica is also in place, as both outer space and the Antarctic area have valuable resources and interesting areas for scientific exploration.⁴²⁸

⁴²⁵ *Ibid.*

⁴²⁶ *Ibid.* 639.

⁴²⁷ *Supra* No. 27.

⁴²⁸ T.S. TWIBELL, “Space Law: Legal Restraints on Commercialization and Development of Outer Space”, *UMKC L. Rev.*, 1996-1997, (589) 594.

Antarctica is a very interesting case as it is a certain match for the common heritage of mankind principle, but territorial claims have also been made there. These claims are oftentimes overlapping. The Antarctic Treaty protects the existing claims and puts a hold on future claims with Article IV.⁴²⁹

However, there is a freedom of scientific investigation.⁴³⁰

The Antarctic Treaty thus only indirectly features the common heritage of mankind principle,⁴³¹ pitting developed nations against developing nations in a similar fashion as stipulated above.^{432; 433}

Space lawmaker should keep an eye open for the evolutions in this area. It has a lot of similarities with outer space and its legal regime also features a form of the non-appropriation principle.

c. Without the Common Heritage Concept

174. Another option is drawing up a new regime focused on exploitation of outer space, but without the full use of the common heritage of mankind principle. Granted, this is a regime favored by developed countries.⁴³⁴

175. Contents.⁴³⁵ There should be legal clarity in every phase of the exploitation process (research, actual mining, commercial use) and an international management organization should be instituted to oversee the process. This would not be unlike the deep seabed regime,⁴³⁶ where further inspiration could be found. However, the common heritage of mankind principle should be ignored. Only its most practical and feasible elements would be used. A “free market”-like approach could be applied to the management of outer space and its resources. Here, the states that are most active in the space industry will have a proportionally larger participation.

⁴²⁹ J. FRAKES, “The Common Heritage of Mankind Principle and the Deep Seabed, Outer Space, and Antarctica: Will Developed and Developing Nations Reach a Compromise?”, *Wis. Int'l L.J.* 2003, (409) 425-426.

⁴³⁰ Also see *ibid.* 427.

⁴³¹ *Ibid.* 428.

⁴³² Also see *ibid.* 429-433.

⁴³³ *Supra* No. 8359 *et seq.*

⁴³⁴ F. TRONCHETTI, “The Moon Agreement in the 21st Century: Addressing Its Potential Role in the Era of Commercial Exploitation of the Natural Resources of the Moon and Other Celestial Bodies”, *J. Space L.* 2010, (489) 519-520.

⁴³⁵ *Ibid.*

⁴³⁶ *Supra* No. 169 *et seq.*

Furthermore, licensing, liability, supervision and registration should also be fully addressed.

A dispute resolution system should be implemented as disputes will most definitely arise. It can be based on the one in the context of the World Trade Organization (WTO).

176. As this regime would not be supported by developing countries, it will not be entirely successful, but the theorization is welcomed as it offers another perspective on the problems.

D. The Curious Case of Asgardia

177. A left field approach to the problems comes in the form of Asgardia. This is a proposal to leave the division of earth into states behind for the creation of a new independent nation in outer space. They already have a fully-fledged Constitution and aim to own an inhabited spacecraft. The goal would be to achieve peace in outer space. The creation of a new universal legal framework in outer space would help in achieving this goal, by leaving behind the conflicting space laws of Earth.⁴³⁷

178. Even though the idea is commendable, it is mostly laughed away by academics, mainly because Asgardia will have difficulties being recognized by other states.⁴³⁸

§4. Practical Conclusion: The Case of the Moon Village

179. European Concept.⁴³⁹ Setting its sight on the future, the European Space Agency means to respond to the international want for a reasonable space development by offering a global vision for cooperation in the form of the Moon Village.

It is an extension of the international achievement of building and maintaining the International Space Station (ISS) through cooperation in outer space. Interests and skills would be shared and all and any parties are welcomed if they are willing to fully partake in the concept of this international community initiative. Projects regarding space tourism and the exploitation of space resources are also supported.

⁴³⁷ <https://asgardia.space/en/word>, last accessed on 4 May 2018.

⁴³⁸ E. MACK, “‘Asgardia’, the first nation in space, wants you!”, *CNET* 2016, <https://www.cnet.com/news/asgardia-will-be-a-new-nation-in-space-and-you-can-be-a-citizen/>, last accessed on 4 May 2018.

⁴³⁹ ESA, Moon Village, a Vision for Global Cooperation and Space 4.0, https://m.esa.int/About_Us/Ministerial_Council_2016/Moon_Village, last accessed on 4 May 2018.

The placement of a telescope in a zone not restricted by human interference and the on-site development of new and helpful technologies will be the primary focus.

If nothing else, the concept can inspire discussions on how to achieve a feasible new way to cooperate in outer space within the contemporary context as both international cooperation and commercialization are key to the moon village concept.

Ideally, this international cooperation could lead into the creation of an enhanced international space institution that could be used to manage the commercialization. This could work if states are willing to set aside their interest in immediate national benefits for the lasting international benefit of peaceful space development. International agreements could guide the process. This has already been proven to be possible by the ISS program.⁴⁴⁰

180. American Execution. This European wish is partly echoed by the United States where President Trump has signed the Space Policy Directive 1,⁴⁴¹ which aims to achieve the human return to the moon within the contemporary context by working closely together with private enterprises.⁴⁴² Instead of focusing on cooperation, the United States has the ambition to lead the project.⁴⁴³

⁴⁴⁰ A. MORRIS, “Intergalactic Property Law: a New Regime for a New Age”, *Vand. J. Ent. & Tech. L.* 2017, (1085) 1106-1107.

⁴⁴¹ United States’ Space Policy Directive-1 of December 11, 2017, *Fed. Reg.* Vol. 82, No. 239, 59501-59502 <https://www.gpo.gov/fdsys/pkg/FR-2017-12-14/pdf/2017-27160.pdf>, last accessed on 4 May 2018.

⁴⁴² *Supra* No. 95.

⁴⁴³ <https://www.nasa.gov/press-release/new-space-policy-directive-calls-for-human-expansion-across-solar-system>.

Conclusion

With the emergence of private space enterprises, the so-called NewSpace industry, a slew of legal concerns is introduced into space law as this privatization entails numerous legal consequences.

The context in which private enterprises undertake space activities is far from lawless: there is the international framework of space law and there is a plethora of national space laws. The international framework consists of a set of treaties of which the Outer Space Treaty is the cornerstone. These treaties put forth some fundamental principles to which states must abide. However, implementation does not run very smoothly, as the common heritage of mankind principle and the non-appropriation of outer space provoke a lot of discussion.

The set of treaties in force does not seem complete and sufficiently up to date to meet the demands of the NewSpace industry and consequently, national space laws attempt to fill the void. The international framework does offer national space laws sufficient leeway to allow for state interpretation. However, uncertainty and legal concerns remain. In the exploitation industry, actors and market players are faced with the property rights problem. Various national approaches attempt to deal with the problem, without arriving at a consensus that offers clarity. The tourism and transportation industry is also characterized by a multitude of legal concerns regarding liability and insurance, the classification of suborbital flights and safety.

As these concerns can halt and impede the NewSpace evolution, the international community should discuss the optimal way forward. There is a fair amount of proposed solutions, with three distinguishable trends. A first line of thought wants to keep the existing international framework of space law because it offers freedom for national space laws to develop. A second trend argues amending the existing international framework of space law in order for it to support the contemporary space business. Finally, a third group suggests drafting an entirely new international framework of space law that can possibly harmonize all national space laws. However, a clearer vision of the common heritage principle should be strived for.

As Elon Musk suggested, we really are “at the dawn of a new era for space exploration”. This privatization is both an inevitable and positive evolution in many ways, but it is characterized by a plethora of judicial pitfalls. As the international community negotiates to navigate these pitfalls, fairness, international cooperation and the peaceful development of outer space should always be held in high regards.

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